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Trauma, Attachment and Neuroaffective Developmental Psychology

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The human brain needs stimulation for growth. In 1998, Daniel Stern (1998c) pointed out that just as food is necessary for the body to grow, mental stimulation is needed to supply the brain with the raw materials needed for the perceptual, cognitive and sensorimotor processes to mature. Different brain regions need different stimulation, because the cognitive, emotional and motor structures in the brain mature in different ways. Basically, emotional development follows the same principles as cognitive and motor learning. The key difference is that the medium of emotional stimulation is interactions with other people – initially, the child's closest caregivers. Human beings are highly advanced social mammals, and the development of an emotional life is what binds us together. Therefore, human relationships form the arena where our emotional potential has the opportunity to unfold.

It is obviously important to know which neural conditions have to be present for a potential to develop, but it is equally important to know what sort of stimulation our interpersonal relationships have to provide for our emotional capacity to develop. Humanity and humanisation depends much more on emotional and personality development than it does on cognitive development. In recent years, there has been an increasing interest in attachment theory. The first step in formulating attachment theory was made by Donald Winnicott and John Bowlby (Hart/Schwartz 2008) and occurred in the aftermath of the Second World War with all its departures, separations and evacuated children. Bowlby's theories highlighted the fact that everything caregivers habitually do for their children is generally taken so much for granted that the impact goes unnoticed. He pointed out that being a caregiver for a child is not something that can be put on a formula – it is a living, unfolding human relationship that changes both the parents' and the child's personalities. Bowlby formulated that although attachment behaviour is particularly evident in early childhood, it is considered a human characteristic throughout life, from cradle to grave.

In everyday interactions, children form mental images of themselves and others based on what Bowlby called *internal working models*. Any flaws in the sending and/or receiving apparatus in one of the interacting systems or in their mutual synchronisation may interfere with development. In most cases, the internal representations that the child establishes of his or her attachment experiences leads to the emergence of a secure base, a function that organises the child's behaviour, also in other social relationships later in life.

The English psychologist Peter Fonagy (Fonagy et al. 2002) argued that psychological principles are naturally bound by neurophysiological limitations; he also pointed out that this does not mean that human psychology can be reduced to mere biology. There is a close link between nature and nurture, and no resources or weaknesses can unfold without a genetic predisposition. Our genetic predispositions unfold within the framework of environmental influences. As the American psychiatrist and Nobel Prize laureate Eric Kandel (2005) pointed out, even the most socially

conditioned disorder is ultimately biological. All psychological disorders reflect specific changes in nerve cells and their synapses. He also describes how microbiological studies show that both genetic and developmental processes govern neural connections. Of course this is true, but we have to keep in mind, that nerve cells and synapses are the condition for our human ability and acquirement, but not their cause (Bennett/Hacker 2003). Our genetic material alone does not determine variations in personality – social and developmental factors play an equally important role. The attachment that the child forms with his or her caregivers is a biological structure, which is necessary for the child's emotional potential to unfold. For example, the attachment relationship is a prerequisite for the child's ability to regulate affect, since we are not born with an innate ability to regulate our emotional responses.

The expression of our genes are affected by the stimuli we are exposed to, and it is therefore crucial to consider how we can best support the stimulation of the neural connections that are possible based on the child's genetic make-up. Without a suitable environment to shape, support and encourage them, the changes would either not take place or take a maladaptive course. In the world of research, there has until recently been little interest in uncovering how nature and nurture interact in shaping personality development. With regard to the development of human emotional life, this understanding is particularly difficult to attain, since human development is a very fluid and intuitive process, where the mutual synchronization processes occur subtly and with many repetitions and variations. With a traditional scientific approach, it is difficult to chart emotional development with a very high degree of specificity; this leaves us with an important challenge, because a greater understanding of emotional development and personality resiliency has the potential to bring more humanity into the world and help us solve some of the complex issues that the world is facing.

The focus of neuroaffective developmental psychology is how personality, emotions and social functions develop, and how we can generalise this important knowledge. A greater understanding of personality development would in turn give us a better basis for supporting a healthy personality development in people who have been exposed to highly stressful or traumatic events, for example through psychotherapy. Thus, neuroaffective developmental psychology brings together brain research, the understanding of trauma, modern developmental psychology and attachment theory. This relatively new focus stems from a renewed interest in the complexity of personality development and the recognition that personality is shaped both by our innate temperament and close personal relational experiences, and that it is thus vulnerable to overwhelming life events (Hart 2011b).

The potential that is present within the nervous system from birth determines the individual's development, and the child's innate biological capacity puts him or her in a position to engage in social interactions and emotional communication, because humans are biologically predisposed to establish attachment. The child's ability to self-regulate enables the child to develop confidence and self-esteem in a process where trust in the caregiver forms the basis for trust in oneself with the caregiver and ultimately confidence and self-reliance. If the opportunity to attach is lost, the opportunity to develop regulatory mechanisms for assessing and reorganising mental content is also lost. The later developed mentalising capacity enables the child to distinguish between internal and external reality and to understand conscious and unconscious mental states in him-/herself and others. The vulnerability associated with insecure attachment, according to Peter Fonagy et al. (2007), is primarily related to the child's inadequate mentalising capacity, resulting from an emotional development process that was never quite completed, and which can never be maintained completely in all situations.

The development and maturation of the nervous system depend on complex neuroanatomical and neurobiological development processes that occur at specific times in child development (Hart 2008, 2011a). The course of this development is shaped by the highly complex interactions that take place in the child's close relational contact with attachment figures. This understanding is important for grasping what is needed in psychotherapy in order to achieve personal integration and overcome trauma, as the intervention method must be determined by the individual level of personality development, regardless of the person's biological age. My focus in this chapter is on how we can use neuroaffective developmental psychology as a framework for understanding healthy emotional development, the nature of trauma and interventions aimed at helping traumatised children, parents and other adults recover from traumatic states.

The impact of attachment

The child needs to be recognised in order to develop emotionally, which means that the child's primary caregivers are emotionally available and able to empathise with the child's needs. It is this recognition that gives the child a sense of being entitled to have feelings, regardless what they are, and for the child to develop appropriate strategies and relational social competencies (Hart 2008, 2011a). It is only in recent years that trauma research has begun to integrate with attachment research; this has enabled a fuller understanding of the seriousness of trauma that occurs in childhood, and which is caused by the people who matter most to the child, especially when the abuse occurred during early childhood.

Parents' interactions with their children have a great influence on the child's development of coping skills and abilities to engage in social interactions with others. In a research project involving families with 4-6-year-old children, Kahen, Katz and Gottman (1994) found that children raised by parents who are positive and who frequently engage with the child through emotional communication have a much easier time establishing friendships and engaging in creative play with peers. Mothers who often express negative emotions or who are neutral in their contact with the child typically create more anxiety and less facial expressiveness in the child. Children whose parents are unpredictable, shifting erratically between positive and negative communication, or parents who constantly interfere with the child's actions or use sarcasm, are typically included in fewer play relationships, are more negative and encounter more conflicts. The child's ability to engage in social interaction and, later, in sophisticated role play seems to depend largely on the parents' ability to nurture the child through synchronised interactions (Pellis/Pellis 2010).

Empathy depends on one's ability to match the other's affect and to make a synchronised response. This positive attunement builds confidence and serves as the driving force in establishing interpersonal ties. Apparently, what the other person does has an emotional impact on one's nervous system, which Daniel Stern (2004) has described as the basis for empathy. When two persons interact, they are mutually attracted to one another's emotional world and attune emotionally with one another, which in turn enables them to influence one another. When the primary caregivers are unable to protect the child in an appropriate way, to understand the child's needs and to mentalise the child, there is real risk that the child will be traumatised. Traumatization of mental functions implies that the child either fails to develop emotional skills, regresses easily or tends to dissociate, all of which are self-protective responses to overwhelming events which the mental system is not able to assimilate. Thus, positive attunement with significant others makes it possible to recover from a difficult childhood or mental trauma and to develop mental flexibility and self-regulation capacities.

Emotional development

Through inter-subjective experiences, infants begin to organise their sense of themselves. Infants need to experience and internalise that their parents perceive them as loveable and unique and enjoy being with them. It is the precision of the interaction and the liveliness of the interactive process that drive sense of engaged pleasure. Moments with communicative exchanges in connection with play activities contribute to the child's ability to develop and maintain emotional ties while developing the capacity for self-regulation, which ultimately leads to the development of a mentalising capacity. Mentalising allows us to 'read' other people's minds as well as understanding and reflecting both our own and others' feelings (Fonagy 2003; Fonagy et al. 2007; Trevarthen 1979, 1998; Hart 2014).

When the dysregulated emotional states of insecure and traumatised parents – fear, anger, emptiness, sadness, meaninglessness etc. – are internalised in the infant, this can produce a generational transfer of trauma, described as attachment trauma or vicarious traumatising. Through the interaction with caregivers, the child internalises the co-created meaning that parents pass on to the child through their emotional reactions. If parents, for example, respond to a stranger with fear, the child will perceive the stranger as dangerous. If parents react to objects, people and events with confusion, emptiness, sadness etc., the child experiences that this is what the world is like. When children are not able to establish a positive interaction with their primary caregivers, they either lose control and react in maladaptive ways or withdraw and seek reassurance through self-stimulation or passivity. The failure to connect intersubjectively often sparks anxiety and mobilises defensive or self-protective strategies. The child needs to feel capable of dealing with the world and needs to know that a clear authority figure is in charge. If the child experiences contact as either neutral or threatening, he or she will withdraw and fail to receive the necessary stimulation for developing emotional, empathetic and mentalising skills; as a result, the child risks falling back on self-protective responses described as traumatic psychological reactions (Hart 2012).

Attunement processes and present moments through micro-regulation

In the 1950s, Louis Sander (Amadei/Bianchi 2008) introduced the concept of micro-regulation and explained that the feeling of being connected is established through mutual temporally synchronised regulation, which plays a key role in brain organisation and regulatory processes in the central nervous system. The micro-regulation processes are the small interaction sequences that arise between human beings and make us feel that we are on the same wavelength. These synchronised interactions may give rise to so-called 'present moments'. For example, when a mother and a child engage in a well-regulated interaction, a certain smile from the child, which the mother finds surprising or funny, will make her look at the child with a big smile, which causes them both to erupt in laughter.

Micro-regulation processes are the often almost invisible synchronisations, which were first exposed by the invention of cinecameras and camcorders. Micro-adjustment, a prerequisite for personality and emotional development, is hard to describe and requires a trained eye to observe. Already during the first year of life, a rhythm is established between the infant and caregiver through the caregiver's intimate care, his/her emotional expression and his/her hands, eyes, face and voice. Ways of being with another person are reflected in both parties' behaviour, and when they meet in a present moment, the result is an enhanced experience for both of them (Trevarthen/Panksepp 2014). It is these moments that develop neural connections and create emotional resilience and flexibility.

Most of the time, the instantaneous present moments are positive, and mismatches are transient. Mismatches nevertheless play an important role by enabling the infant to differentiate him- or herself from others, and the repair of mismatches is particularly important for developmental processes and mental resilience (Tronick 2007). Most mismatches are resolved so quickly that they are not registered consciously. In many cases, it is the repair of a mismatch, for example the surprise that makes the mother and baby break out in shared laughter, that creates a present moment. The present moment is experienced as an authentic meeting, which gives the nervous system the important stimulation for development; however, it may also consist of confrontations, for example when a one-year-old child *must* learn not to throw food on the floor or open the freezer door. All present moments, pleasant as well as unpleasant, consist of getting into..., being with... and getting away from... . The transfer of emotional information is reinforced by the present moments that develop the nervous system's emerging capacity for self-regulation and attention control. Attachment-based trauma occurs in relationships where mismatches are never repaired (Sander 1988, 1992; Schore 2003a, 2003b; Sroufe 1997; Stern 1990, 1998a, 1998b, 2004).

The importance of shared and coordinated experiences can be illustrated by Tronick et al.'s (1978) famous 'still face' experiment, where infants initially engage their mothers in a mutual interaction, but after a short while the mothers are instructed not to respond to the infant's initiative and to make their faces expressionless in the middle of an interaction. The experiment showed how infants with a good attachment to their mother took the initiative to vitalise her and sought strategies to bring her out of this expressionless state. The experiment also showed the severity of the child's reactions when the mother remained expressionless despite the child's efforts. Although the mothers in Tronick et al.'s experiment only remained expressionless for two minutes, the infants found the temporary violation extremely disturbing. When the child is not offered a joyful interaction, he or she loses interest in the surroundings; and in the absence of sufficient joyful stimulation, the child will not be encouraged to enter into the engaging experiences that are needed to unfold his or her creativity. The child cannot engage in the external world without the caregiver's immediate involvement but needs engaged and authentic relationships. The less self-confidence and self-esteem the child has developed, the more external recognition he or she will need in the future through micro-regulation processes (Tronick 2007; Hart 2008a).

Learning in the Zone of Proximal Development

All higher personality features, such as bonding, self-regulation, impulse control, reflection and mentalisation, are established through countless social micro-interactions that are internalised and become part of the child's intra-psychic habits and patterns, making the nervous system both more resilient and flexible in its ability to daily frustrations and develop coping and self-regulation skills. These interactions need to be present from the beginning of life through interactions with the primary caregivers. Somewhat later, micro-interactions are trained through peer interactions but structured and regulated by adults. As the child gets older and more mature, he or she requires progressively less adult control.

The late Russian psychologist Lev Vygotsky (1978) emphasised that the higher psychological functions are learned in interactions; only later are they internalised as mental skills. The internalisation process takes place in what he called the zone of proximal development, which he defined as features under development. What the child can only manage with help from the caregiver today, he or she will be able to manage independently in the future. This may seem obvious for acquired skills such as riding a bike, reading, arithmetic etc., but it also applies to social interaction and personality formation. Vygotsky thus argued that all learning takes place in the zone

of proximal development and that all higher mental functions have their origin in real interpersonal relationships. What is implicitly shared between two in an external interaction becomes an inner intrapersonal mental skill. The child's growing capacity to self-regulate promotes self-confidence and self-esteem, which goes from trusting the caregiver to trusting oneself with the caregiver and ultimately having an internal confidence and trust in relationships with others. There will always be a certain dialectic between inter- and intrapersonal regulation; an inner process is thus always regulated through both self-regulation and interpersonal regulation. Both processes are always present and influence each other, and one process is not more important than the other (Beebe/Lachmann 2002; Hart 2012).

In neurological circles, the term 'windows of opportunity' describes certain moments in child development where a competency is normally and ideally developed, marking the precise time when the nervous system is most accessible to the given type of learning. If the nervous system has the innate potential and receives appropriate stimulation, which normally happens through interactions in ordinary daily life experiences, the skill appears to be acquired 'automatically'. However, once the child moves past the 'window of opportunity' the nervous system is no longer as available for the given type of learning, and the child requires a focused effort to learn the skill. While the 'window of opportunity' for language development, for example, is from approximately 1½ to 12 years of age, the 'window of opportunity' for the development of emotional skills is from late foetal life to approximately 1½ years of age – long before the child has developed language skills. Consequently, if the child's attachment to the primary caregivers was not established sufficiently within the first 1½ years of life, the child's ability to develop the regulatory mechanisms that are needed to engage in appropriate interactions with others and to develop empathy, mentalising skills etc. later in life will be reduced, regardless of the child's language skills. The child or adult will have no problem talking about events but will not be able to verbalise emotions; this is called alexithymia. The child will have difficulty self-regulating and will struggle to develop coping skills through narrative dialogues (Hart 2012).

There can be a huge difference in a person's cognitive and emotional levels of development. In psychotherapy with both children and parents whose cognitive capacity is more developed than the emotional capacity, the therapist has to be able to interact with the child or the parents in a way that meets both their cognitive development needs and their immature emotional development needs. When an emotional skill has to be learned outside the 'window of opportunity', the intervention must be based on accurate knowledge about the emotional level of development in order for the child or the parents to receive the right support to develop relational skills that will support personality development. There is a wide variation in the types of interventions that are needed in relation to trauma healing, as a traumatic reaction will have a different impact on the nervous system depending on the personality structure and self-protective responses that were developed before the external trauma happened.

The child's natural development processes through three mental organisation levels

Paul MacLean's (1990) theory of the brain's hierarchical structure as expressed in his triune brain model has been a great source of inspiration for understanding human development processes and for the development of neuroaffective developmental psychology. The triune brain model, which MacLean developed in the late 1950s, describes the brain as structured in three layers, which he viewed as quantum leaps in the evolutionary development of the human brain. MacLean's understanding of the brain as a hierarchical structure is often used as a tool for understanding the brain's hierarchical functions.

MacLean attributed the three brain structures, which interact intensively, to three different mentation levels. He called the most primitive layer proto-mentation the middle layer emotional mentation and the third layer rational mentation. In recent years, Jaak Panksepp (Panksepp/Biven 2012) has called the three levels the primary, secondary and tertiary levels, and in neuroaffective developmental psychology, the levels are labelled the autonomic-sensing, the limbic-emotional and the prefrontal-mentalising.

The mental organisation of the three levels defines three primary maturing interaction forms, which the caregiver should offer and take part in:

1. At the autonomic-sensing level, the maturing interactions occur in the synchronised 'dance' with the child's sensory impressions.
2. At the limbic-emotional level, the maturing interactions occur in the attunement processes with the child's emotions.
3. At the prefrontal-mentalising level, the maturing interactions occur in a verbal dialogue with the child.

Development of arousal-regulation and synchronisation at the autonomic-sensing level

From the age of 0-3 months, the child needs to enter into interactions that enable him or her to feel pleasure and displeasure and regulate arousal. The development of the regulation of autonomic functions helps the child to regulate and coordinate arousal and maintain awareness. The child develops these regulatory skills through attuned interactions, acquiring skills that help the child to develop self-reassurance and find inner balance. Sensations of pleasure and displeasure experienced through the autonomic nervous system form the foundation of experiences and assessments that are later going to play an important role in regulating thoughts and behaviour. The earliest and most basic type of stimulation occurs through the body, i.e. through bodily reactions, which are triggered by stimulation that affects the autonomic nervous system. It is the development of this body-competence that most body-psychotherapies seek to regulate and refine.

Meltzoff and Moore (1977, 1999) described how the child, shortly after birth, imitates the caregiver's gestures and facial expressions. The child imitates the caregiver's posture, facial expression and prosody, and through deep-seated brain areas, imitation skills and body sensations are connected with others' attuned support. Synchronising with others through imitation and body sensations gives the child a sense of others' emotional state. Through the so-called mirror neurons, the child is able to share other people's actions and emotions simply by observing the action or the emotional state, without necessarily imitating it. We perceive the other as if one were to carry out the other's action, feel the same feeling, express the same vocalisation or be affected, as the other is affected. This inner mirroring makes the interaction interesting and lays the foundation for curiosity and engagement. This non-verbal synchronisation is one of the most important non-specific factors in all secure attachment relationships. As Trevarthen and Panksepp (2014) point out, children have the wonderful gift of being able to share rhythms and emotions without using words. They learn by examining the sensory effects of moving around and thereby achieve self-confidence and knowledge of intimacy by playing with others, both with caring adults and supported by them. This attachment ability allows us to find engagement through community and the joy of collaboration, which is a resource we often take for granted, but which is highly likely to help vulnerable children develop coping skills. Often, severe mental trauma at this deep neural level leads to a lack of skills in relation to arousal regulation and development of body sensations.

Development of affect attunement – emotional attunement

The limbic system matures when the infant is approximately 2-3 months of age. From this age, the child gets a sense of the difference between their own and others' feelings. The limbic system enables the development and refinement of social interactions, such as playfulness, delight or sadness. Humans have developed so-called categorical emotions, which can be read through facial expressions. Categorical emotions are universal emotion categories, for example joy, surprise, sadness, fear etc. From these emotional states, action impulses are formed, and the limbic system is therefore sometimes referred to as the motivation system (Hart 2008, 2011a, 2011b, 2012, 2014).

Children begin to experience that feelings both vary in intensity and valence, and they learn to alternate between feelings that are perceived as positive and negative. Similarly, children learn to alternate between a healthy self-centred interest in matters that concern and satisfy them and an interest in other people's actions and, later, internal states. Children thus develop an ability to engage in social interactions by first paying attention to the other, that is, to experience what the other is experiencing, as if their orientation and perspective were centred in the other. The limbic system makes it possible for children to distinguish themselves from others, that is, to combine self-awareness with an awareness of others and to regulate themselves emotionally. Already at this early stage, the child is capable of a primitive form of self-regulation (ebd.).

In the limbic maturation period, the parents will make use of various emotional expressions through play, with an initial focus on positive emotions such as joy, surprise and curiosity, and later through playful interactions with joint expressions of negative emotions such as sadness, anxiety or anger. Both children's positive and negative feelings must be regulated and handled to ensure that they get repetitive and distinct experiences that the adults are reliably capable of challenging them while providing empathic care and support. Through the interactions and forms of play that unfold, integrating autonomic synchronisation with the limbic capability of emotional exchange, the child begins to develop healthy internal representations of time spent with reassuring adults, thus developing regulated ways of interacting with other children. At this level, attachment-related trauma disables the emotional self-regulation capacity, and the child requires interventions that target autonomic and emotional regulation through play, for example in *Theraplay* (ebd.).

The development of mentalising – bonding through dialogues

By far the longest neurological development period is that of the frontal lobes. The child's ability to mentalise develops in a gradual process that is not fully completed until the age of approximately 20 years. The prefrontal cortex is critical for the maintenance of emotional stability, and its development creates our capability to control primitive behaviours and basic emotions by inhibiting impulses and overriding the reflexive and instinct-driven system and the limbic structures. The development of the prefrontal cortex enables us to achieve a sense of continuity between past, present and future, which is a prerequisite for stable friendships. It is in this area that we experience shame, embarrassment, remorse or regret. Another result of the development of the prefrontal cortex is the ability to reflect on our own and others' emotions, thoughts and actions and to understand what is likely going on in others. This structure is a prerequisite of mental flexibility and lets us alter thoughts and actions on the basis of associations. When this area matures, there is an integration of cognitive and emotional areas, that is, the ability to mentalise (Fonagy et al. 2007).

The development of a mentalising capacity occurs around 3-5 years of age, when the child begins to reflect on others' internal mental states and actions. Through the narrative process, the child makes sense of the world, and it is through the narrative organisation that raw emotions are transformed

into symbols. Verbal symbols ascribe meaning to experiences acquired through sensations and feelings by interactions with and perceptions of the environment. Mentalisation is the process that makes us aware that we have our own view of the world that is not necessarily identical to other people's perception. This capability lets us 'read' someone else's mind and predict and make sense of other people's behaviour. Because mentalisation is such a crucial aspect of human social functioning, the development of mental structures for interpreting interpersonal actions is crucial for the development of social skills (Hart/Schwartz 2008; Hart 2014; Fonagy et al. 2007).

A precondition for developing mentalising skills is that the autonomic and limbic areas are activated. Thinking about feelings and thoughts develops mentalisation and is an integral part of a more nuanced understanding of oneself. Language seems to be a key mechanism for this integration; for example, language combines actions with sensations and emotional perception, and through storylines, we interlink sensations, feelings, thoughts and actions in ways that organise both our inner and outer reality. The aim for all narrative-based psychotherapeutic methods is to develop a mentalising capacity (Fonagy et al. 2007).

The relationship between emotional development, attachment problems and trauma

Human beings are social creatures, and the development of either psychological difficulties or healthy self-regulation strategies depends on our interactions with the social environment throughout life. In 1889, Pierre Janet wondered whether the nervous system may stop maturing at a specific point in development, without being able to develop further and add new elements, which would lead to a lack of integration of emotional structures and thus negatively impact personality formation. When the nervous system shuts out external stimuli, it encapsulates, and is inaccessible to interpersonal communication, which prevents cognitive and emotional development (Kolk 1987, 1994, 1996; Kolk/Fisler 1994; Kolk/McFarlane 1996).

Many have been inspired by Mary Ainsworth and Mary Main's understanding of how children develop different attachment patterns during their first year of life, and how it is possible, at this early stage of life, to distinguish between secure and insecure attachment patterns. What they found was that in children who are in a secure attachment relationship will have received predictable and attuned care, which have made them more autonomous and only inclined to seek the caregiver when the challenges are greater than they can handle on their own. These children exhibit more imagination and complexity in their play, and they are better at cooperating with others (Sroufe 1989a). They are able to generalise the experiences into an expectation that others will be responsive and accessible, and they often have positive expectations and a trusting attitude towards others. They develop self-worth and competence, and they have faith in their own ability to master life's challenges. They appreciate good relationships with others and have an internalised template for empathy and reciprocity in relationships.

Children with insecure attachment patterns show less enthusiasm and persistence in problem-solving situations, less curiosity and lower self-esteem, and they tend to either show greater emotional dependence or to isolate themselves and are far less competent in their social relationships with peers. They are easily frustrated, take a negative view or withdraw, both in play and in problem-solving situations, even with relatively simple tasks. Their thinking is more concrete and they talk less about their feelings. When children with an insecure attachment pattern are placed in an environment without stress or challenges, they adapt, but they are easily affected by minor stressors and quick to respond with adaptive self-protective strategies. Many authors point out that an inability to regulate emotions is one of the most profound and persistent consequences of early

neglect, and that it causes vulnerability to psychological trauma (Sroufe/Fleeson 1986; Sroufe 1989b, 1997; Schwartz/ Hart 2013; Hart 2011c).

As previously described, relational trauma has a particularly profound negative impact on the development of the child's brain – much more than trauma caused by non-human factors such as natural disasters. As the development progresses, previous behaviour integrates hierarchically with more complex behaviour. When the new behavioural capabilities are developed, the earlier capabilities become subordinate to the more mature behaviour, but the earlier forms are still potentially active. Under intense stress, past behaviours are activated, while the behaviours that have matured later are deactivated. Later matured behaviour patterns are more vulnerable to disturbances and deactivate more rapidly than earlier matured behaviour patterns. An insecure attachment pattern may in some cases be dormant, so that it is only activated during periods of increased stress. Past behaviour patterns may also be manifest in the present behaviour as part of the child's way of adapting to a stressful environment. Sometimes, the child's behaviour may be an appropriate way to adapt to the environment, while at other times, it will prevent further development. The presence of less differentiated early behaviours is often evident as apparent rigidity or anxiety, which can interfere with continued adaptation (Santostefano 1978; Sroufe/Rutter 1984; Schwartz/Hart 2013). The potential for development in any intervention method is that every interaction holds is a potential for a mutual capacity for developing self-regulation. In the normal development process, the child's growing capacity for self-regulation dampens the arousal associated with overstimulation and helps the child maintain his or her attention and inhibit unfavourable behavioural expressions. It is this potential for learning that is exploited in psychotherapy.

Vicarious trauma and dissociation as a self-protective strategy

As previously mentioned, there are three reasons why personality, empathy and the ability for mentalisation might fail to unfold. One is that the nervous system, for example due to early deprivation, has never received the stimuli needed to achieve its potential. The second reason is that the nervous system has experienced one or more events that it could not assimilate, because the experience was too frightening, incomprehensible or chaotic, which has caused a symptom reaction in the form of either traumatic dissociation or PTSD. The third reason is that the nervous system is exposed to overwhelming situation-related stress, causing a regression to an earlier level of development. The human brain is 'user-friendly' and tries to adapt to possible options in the environment (Hart 2012).

Trauma research has been especially concerned with dissociation phenomena. Pierre Janét, who in the late 1880s thought that some people were genetically unprepared to cope with overwhelming stress evoked by emotional trauma, developed the idea of dissociation. He believed that mental functions derived from anatomically distinct but related neural circuits, and that severe traumatic experiences can dissolve the mental 'glue', which causes the neural circuits to be torn apart. Janét believed that adaptive behaviour depends on an ability to synthesise and make sense of the environment through sensory and affective stimuli. An adaptive response to extremely stressful events requires the ability to synthesise sensory, emotional, cognitive and behavioural responses. When a person is overwhelmed beyond the capacity to integrate experiences, the integration process is disturbed, and the self-protective responses are evoked. There are two psychobiological reactions to trauma: either experiencing too much (invasion of sensations and affections), often referred to as PTSD, or experiencing too little (avoidance, denial and distancing), often described as traumatic dissociation. Both reactions impair the ability to mentalise – in other words, with regard

to experiences and feelings there is a general rule of thumb: If you can't step into them, you can't mentalise them; if you can't step out of them, you can't mentalise. Thus, mentalising capacity is the flexibility of stepping into and out of experiences and the emotions they create. Both traumatic dissociation and PTSD are possible responses to trauma (Steele et al. 2009; Hart 2011c, 2011d).

Whether people survive an earthquake or are exposed to repeated sexual abuse, what matters most is how they are supported by close relationships. The worst disassociation occurs when the people who should love and protect the child are the cause of the trauma, that is, abuse or rejection. Children who never have felt safe and valued will be much more vulnerable to attachment and dissociative disorders later in life – even in adulthood. If the capacity to mentalise is undeveloped, the person will be extremely vulnerable to future stressors (Hart 2011a, 2011b, 2011c, 2011d; Fonagy/Target 2003).

Healing trauma

The human brain is extraordinarily malleable, and with the proper understanding and support, the human nervous system is never completely fixed. In most cases, it is always possible to develop healthier ways to relate to others, which means that any type of interaction, for example in trauma therapy with parents, family therapy and therapy with children, can make a difference (Beebe/Lachmann 2002; Hart 2011a, 2012).

We need manageable challenges to develop feelings of competence, self-confidence and belief in our own agency. For children, play is important for acquiring this type of expertise. For example, play based on physical, motor and sensory activity is an important precursor for as-if and role play, which involves planning, rehearsing, imagination, problem solving, social flexibility, language, communication and empathic processes, all of which are important for human contact (Burghardt 2006). Through play, children learn to be part of life's many exchanges and challenges. The content of the play is not important; the important part is the way in which the child interacts with others. The developing aspect in play is that the child gets to test boundaries and learn in the safe context of play. An important element of play is smile and laughter. Smile and laughter are important ways of showing the child that he or she is not exposed to danger or threats. As the English paediatrician and psychoanalyst Donald Winnicott (1964) explained, the potential playful space builds self-esteem in the child, because without hallucinating, here the child can fulfil his or her dreams in a relational context. As Winnicott explains, it is easy to see that children play to have fun, while it is much harder to see, but no less important, that children also play in order to master anxiety or to master the ideas and impulses that cause anxiety, if one has no control over them.

The basis for emotional attunement and emotional integration lies in the symmetric synchronisation that occurs through body language, facial expressions, tone and rhythm of voice and touch in mutual relationships. Through the engaging contact with a person that the child perceives as trustworthy, safe and calm, and who is able to synchronise with the child, he or she begins to self-regulate (Hart 2013). Relationships with others are crucial for the development of identity and self-understanding, but without emotions, other people do not mean anything.

As David Cohen (2006) points out, active, energetic and spontaneous physical play stimulates neural circuits in the frontal lobes and Panksepp (1998) points out that physical play builds our self-regulatory capacity. Through play, children develop social skills, as they learn turn-taking, engaging in various roles, taking care of each other, expressing care and closeness etc. Children's emotional development through play is a long process, and play competence can also be used in psychotherapy with adults – as humans are never too old to play. In psychotherapy with both

children and adults, the aim of the intervention is always to address the person's zone of proximal emotional development and develop interactions through the micro-regulatory interactions that generate present moments. The goal is not to avoid spontaneous feelings but rather to learn to be aware of them and decide whether to act on them or not. This is a skill that it takes time to develop, because it requires a mentalising capacity. All forms of Attention Deficit Disorder can be traced to reduced activity in specific parts of the frontal lobes, and delay of gratification, awareness functions etc. is learned through playful activities.

Closing remarks

There is now extensive research-based evidence that it is possible to develop personal capabilities, regardless whether the mental imbalances stem from experiences of neglect from the caregivers or other forms of traumatic experiences. A classic study by Werner and Smith (2001) followed a group of children born in 1955 for more than 40 years. The study looked specifically at children who performed well in spite of several social risk factors. One third of the children were born in at-risk families, including families marked by instability and numerous conflicts. The study showed that at 10 and 18 years of age, the majority of these children and youths had developed behavioural and learning difficulties and mental disorders. However, a third of the children and youths could be described as resilient, and they grew up to be harmonious, efficient, happy and helpful. The study identified three key factors in the resilient children, now adults: they had normal intelligence, they had developed an emotional attachment to a close relative or another significant person, and they had access to an education system that rewarded their skills and gave them opportunities to collaborate with other youths and adults.

The human nervous system consists of innate structures that define the interactions we invite other people to join into, and the answers we get from the environment in turn alter these structures. Integration and reintegration of neural circuits in the affective structures of the nervous system require that the child's nervous system is connected to another, more mature nervous system, which it synchronises with. That is a primary principle in all psychotherapy, whether aimed at children or adults.

Empathy and compassion do not develop by themselves or in isolation but are founded in the early parent-child attachment and, later, through children's play with each other. Motivation to establish emotional affiliation is an innate ability, and early in the infant's life, the parents provide psychological coherence in a process where both arousal and affect regulation unfold from second to second. The basis of emotional and social development can be found in the optimal caregiver-infant relationship and transferred to other contexts later in life. Self-regulation skills initially develop in the child's interaction with the closest caregivers and later in interactions with other authority figures and peers.

Virtually all studies of children who have managed well despite difficult circumstances show that these children have benefited from contact with adults or peers who have supported them and helped them develop adaptive strategies and manage difficult behaviour by providing structure, nurture and care. Children with good emotional, personality and social resources very often gain a high mentalising capacity, which is one of the most crucial capabilities in a post-modern society that values efficiency, competitiveness and adaptability as well as more nurturing aspects such as democracy, solidarity, cohesiveness and compassion.

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