

# ATTACHMENT THEORY, BRAIN DEVELOPMENT AND TRAUMA: THE INTERFACE

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## ACT

Participant  
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Notebook

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## ATTACHMENT

**Definitions:** “an affectionate bond between two individuals that endures through space and time and serves to join them emotionally” (Kennell, 1976).

“a relationship that develops between two or more organisms as their behavioral and physiological systems become attuned to each other” (Field, 1985).

### Purposes of Attachment

1. In animal kingdom as a whole the primary purpose of attachment is providing safety and protection for the vulnerable.
2. Gradually in humans attachment has taken on additional roles such as socialization, stimulation of intellectual development and identity formation.
3. In humans attachment is now the foundation for some aspects of physical and cognitive growth, as well as virtually all of the child’s psychological development.

### Long range effects of attachment

#### A. Safety and protection

1. Development of trust for others.
2. Developing age appropriate balance between dependency and independency

#### B. Enhancing the organization of the nervous system

1. Attainment of full intellectual potential
2. Aid in sorting out sensory perceptions
3. Learn basic cause and effect which becomes foundation for additional logical thinking skills and abstract thinking
4. Learn to modulate arousal
  - a. Learn self-soothing
  - b. Increases ability to cope with stress and frustration
  - c. Increases ability to cope with fears and worries

#### C. Socialization skills

1. Early relationship(s) become prototypes for subsequent relationships
2. Learn reciprocity in relationships
3. Development of social emotions (embarrassment, shame, guilt, empathy, pride)
4. Foundation of conscience development
5. Decrease jealousy

#### D. Identity

1. Increase feelings of self-worth
2. Learn boundaries
3. Development of a healthy sense of self-worth

### Relationships are cyclical, each individual influencing the other

1. Each partner provides meaningful stimulation for the other.
2. Each partner has a modulating effect on the other’s arousal level.
3. The relationship facilitates an optimal growth state.
4. This optimal growth state is threatened by changes in the individuals, their relationship, or by separation.

5. Attachment seems to be a regulator of body functions and, as such, in humans the early infant-caregiver relationships influence the development of rhythmicity.
6. Stein reports that 48% of maternal behaviors mirror infant's behaviors. He attributes this to a matching of inner states rather than to an imitation of external behaviors.
7. Brazelton notes that mothers can respond to their infant's needs by adjusting her rhythm to his; by not responding to infant's rhythm but continuing her stimulation (thus reinforcing the amount of time the child disengages); or by attempting to establish her own rhythm to regulate his which results in shorter periods of interactions between the two.

**Key factors in developing attachment:**

1. The caregiver's sensitivity to the child's signals—related to modulation of arousal
2. The caregiver's initiation of a variety of interactions—related to stimulation

**Types of attachments (Ainsworth, 1969):**

- A. Group B—Secure:** Ainsworth described the securely attached child as one who seeks his primary caregiver when distressed; as easily comforted, absorbed in play, curious and responsive to environmental cues.
- B. Group A—Insecure/Avoidant:** These children are friendlier with strangers than with parents; they do not look to caregivers for comfort; they pay more attention to the environment than to people. Gradually they become hostile and distant with peers and teachers alike, socially isolated, less compliant with rules, and more expressive of negative emotions. As they grow older these children are frequently very independent; sullen and oppositional; not likely to seek help when injured or disappointed; angry and distant; lacking in empathy; omnipotent in their approach to the world and rejecting of nurturing. Avoidantly attached children are disproportionately represented in samples of abused or neglected children.
- C. Group C—Insecure/Anxious or Ambivalent:** These children alternate between seeking proximity and resisting contact; they have problems directing attention to the environment; anxiety and fear is prominent. As they grow older the insecure/anxious child is likely to be clinging and shadowing with adults; whiny, dependent and demanding; eager to please; intrusive on adult space; pouty when limits are set; have excessive separation problems and to lack confidence. They easily feel rejected or betrayed and exhibit regressive or immature behaviors when craving love or affection. Although they are likely to sabotage the relationship when parents are feeling emotionally close, the child tries to engage the parent through manipulation when the latter is distant. Waters, Vaughn, and Egelund (1980) reported that differences in the Brazelton neonatal assessment scores differentiated between secure vs insecure/anxious at one year of age even though the observed neonatal differences had themselves disappeared by 10 days of age. Mothers of these children are both behaviorally and physiologically less sensitive to their infants.

**DEVELOPMENT AND NEUROPHYSIOLOGY OF THE BRAIN**

Each organ system has a **critical period** of development during which it is both highly **sensitive** to growth-stimulating influences and vulnerable to disruptive ones. The brain develops upward and outward—from brainstem to midbrain to limbic system to cortex. In general, complexity and plasticity (ability to change once formed) increases as you go up this scale. The brainstem is organized in utero and during the first month of life. For the midbrain and limbic systems the critical and sensitive periods are from prenatal period to age 3.



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The **brainstem** is responsible for basic body functions—heart and respiration rates, temperature control, blood pressure, etc. The **midbrain** is where arousal resides as well as the basic rhythmicity of body needs—i.e. appetite and sleep. The **limbic system** contains the parts of the brain associated with emotions, affiliation, and sexual behaviors. Concrete and abstract thinking have their locus in the **cerebral cortex**.

### **Prenatal development**

1. The development of neurons starts by the fourth-fifth week of gestation and is essentially completed by 24 weeks.
2. The sex of the child has an impact on brain development, stimulated by the outpouring of male sex hormones in male embryos, at 6-7 weeks gestation.
3. There is suggestive evidence that the mother's emotional state influences the unborn child's development.
  - a. Emotional arousal--->physiological changes. The endocrine and neurohormonal products of arousal associated with severe or prolonged stress can affect the infant's development.
4. Nutritional deficiencies and toxic substances will influence brain development.

### **Early life**

1. Although the component parts of the nervous system are largely formed by the time the baby is born, cell growth, connections, and specialization will continue, especially during the first three years of life, when brain growth is most rapid.
2. All experiences lead to changes in the neurochemical activity of the brain; the brain basically internalizes external information and therefore, the brain will be influenced by external experiences.
3. Panksepp, et al (1985) speculate that social affect and bonding are opioid neurochemical adaptations.
4. Animal studies indicate that sensory stimulation influences neural growth while deprivation leads to atrophy and a decrease in the growth of neurons.
5. In deprivation the degrees of lasting impairment are related to the stage of development when deprivation occurred. The evidence from primate studies indicates that some recovery from early deprivation is possible but that some effects are permanent. Lewis notes that although severe stimulus deprivation leads to developmental delays and depression, lesser degrees of neglect are associated with poor peer relationships and aggressive behaviors.
6. CAT scans of deprived children showed cortical atrophy—probably disuse atrophy (Perry, 1993). We know of other forms of disuse atrophy in humans (vision).
7. According to Perry, consistency, predictability, and nurturance are the three necessary conditions for optimal brain development, no matter what the age.
8. The early caregiving relationship—its synchrony with the infant; effectiveness in soothing the child; and the stimulation it provides—all have a major impact on the early organization of the brain.
9. According to Gesell et al, one of the major tasks of the first year of life is for the infant to learn how to learn.

## **THE IMPACT OF TRAUMA ON BRAIN DEVELOPMENT**

According to Dr. Bruce Perry, usually the neurophysiological changes seen in stress are rapid and reversible. However, extreme or prolonged stress during the critical and sensitive periods can change the development of the brain. “The experience of the traumatized child is fear, threat, unpredictability, frustration, chaos, hunger, and pain. Therefore, this child's template for brain



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organization is the stress response.” He goes on to state that “**Their brains develop as if the entire world is chaotic, unpredictable, violent, frightening, and devoid of nurture.**”

According to Coe, et al (1985), psychological stimuli can also be potent elicitors of autonomic and endocrine activation, particularly in situations that contain elements of novelty, uncertainty, and conflict. These situations lead to physiological arousal with norepinephrine release and increased cortisol. The norepinephrine release impacts on cardiovascular and respiratory functioning as well as the organism’s arousal level. Prolonged high levels of cortisol may negatively impact on the immune system. The hormones and neurotransmitters involved in the stress response play a key role in influencing the process of differentiation of neurons during the early years (Perry).

The areas of the brain which are involved in the acute stress response also mediate:

- motor behavior
- affect regulation
- anxiety
- arousal
- sleep
- cardiovascular and respiratory function.

Sensitization of these systems is likely to lead to symptoms involving the above. Therefore, “it is not surprising then that the traumatized child over time may exhibit motor hyperactivity, anxiety, mood swings, behavioral impulsivity, sleep problems, tachycardia, and hypertension.” (Perry) The resting heart rate of traumatized children is higher than that of normal children. Traumatized individuals have marked problems in calming down after they become aroused. Lewis points out that trauma seems to reduce concentrations of brain serotonin (which ordinarily helps modulate emotions) and to increase concentrations of dopamine and testosterone which both enhance competitive and retaliatory aggression and contribute to hypervigilance and paranoia.

Perry notes that different kinds of memory are different one from another because they are regulated by different parts of the brain. Cognitive memory is located in the cerebral cortex; affective and emotional memories are located in the limbic system; motor and vestibular memory is located in the midbrain while reflexive memory has its locus in the brainstem. Progressing upward and outward, different parts of the brain are activated by different arousal states varying from terror (which activates the brainstem functions) to fear, alarm, vigilance. It is only when one is relatively calm that one is able to make maximum use of cortical functioning for more complex abstract thought processes. When an individual is in the alarm states, he is much more attuned to nonverbal cues than to words as he is processing at the affectual rather than conceptual level.

van der Kolk points out that traumatized children repeatedly reexperience their traumas behaviorally, affectively, interpersonally, psychophysiological and neuroendocrinologically. These children keep interpreting current life as though their past is recurring right now. However, trauma will have a different effect on development depending upon when it occurs. For example, early life traumas are more likely to have a long-term impact on self-regulation and self-identity than similar traumas occurring later in life. Memories at this stage are encoded on a sensory-motor level rather than on a verbal level.

**PTSD** basically a condition of storing multiple memories in the affective/emotional senses or midbrain. It reflects an abnormal persistence of what was once a normal reaction to stress (Perry). It is a physiologically based diagnosis in which responsivity is altered. Not all abused children have PTSD; however, early disruption of bonding, suicide in a child’s home and physical assault of either the child or parent, when combined with physical abuse of the child are highly associated with PTSD (Chaffin).



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Two of the major symptoms of PTSD are accompanied by definite changes in the brain chemicals. The arousal symptoms primarily involve increased secretion of norepinephrine, whereas dissociative symptoms lead to the excretion of opioids which leads to a decrease in heart rates. According to Perry, the limbic system which is associated with attachment and affiliation is also the part of the brain involved in dissociation. The limbic system is different and more prominent in females than in males. In general the brains of females store more fat, tolerate more pain and dissociate easier. Hyperarousal symptoms respond to Clonidine. There is no drug which is very effective for dissociation.

## RELATIONSHIP BETWEEN TRAUMA AND ATTACHMENT

### **Most normal children:** (Briere, 1993)

1. Have many opportunities to experience manageable amounts of frustration and pain.
2. Learn how to contain (manage) affect and cope with pain.
3. Develop a strong sense of self.

### **Traumatized children:** (Briere, 1993)

1. Experience pain which is so great that they either dissociate or become hyperaroused and develop a series of tension release behaviors (which may be confused with obsessive-compulsive rituals).
2. Do not learn affect modulation or how to contain their pain.
3. Abuse impacts affect modulation in three ways
  - a. Interface with development of attachment and trust for others
  - b. Decreased self-awareness because of hypervigilance
  - c. Less exploration of the world
4. Have a poorer sense of self.

### **A healthy attachment helps counteract against the effects of trauma**

1. The child has learned a basic sense of trust
2. The child has learned self-soothing skills which work for him/her
3. The child looks to trusted caretakers for comfort post-trauma

Children with poor attachments prior to traumatic experiences are more severely affected by the trauma. The effects of the trauma per se subsequently interfere with the development of healthy attachments, even when the child is removed from the environment in which the trauma occurred.

## IMPLICATIONS FOR TREATMENT

**Therapeutic approaches must appreciate the persistent fear state that traumatized children experience and must be directed at the areas of the brain which mediate this alarm-fear-terror continuum.** To alter the memories, one must be in the state that regulates that part of the brain (Perry, 1993).

1. Cognitive and verbal interventions won't affect these parts of the brain.
2. The major way to affect the primitive parts of the brain is to provide predictability, nurturance and support—to help the child feel safe, comfortable and loved.
3. Relationships allow access to the mid-brain and limbic systems.
4. If it is possible to develop a true attachment (with the accompanying physiologic and behavioral attunement) then the brainstem and mid-brain are also being affected.
5. In general, because the areas of the brain affected have much less plasticity than the

cortex, interventions will have to be of much longer duration before they can be effective.

6. The less anxious the child feels, the more likely one will be successful in interventions.
  - a. Traumatized children may “freeze” when they feel anxious. This is often labeled as “oppositional-defiant” behavior.
  - b. When a traumatized child has a tantrum they often are in a state of terror and the physical aggression accompanying the tantrum is the “fight” response. The child will need help to feel contained, held, calmed, and ultimately reintegrated.
  - c. Perry notes that it is important to differentiate between the regressed terrorized disintegration and physically assaultive re-enactment.
  - d. Traumatized children are likely to feel more vulnerable and anxious when they have no control over a situation. When adults around them take away all of the child’s sense of control the children are likely to become more anxious, oppositional, and fearful. This in turn is more likely to lead to the primitive regressed state.
  - e. Periods of dissociation
    1. Are the childhood equivalent of “flight.”
    2. After periods of dissociation, the youngster is not aware of behaviors during the dissociative interval. This may be the underlying cause of “crazy” lying.
    3. A dissociated child is not capable of using the current environment and interactions, no matter how therapeutic they may be.
    4. To be therapeutic one must keep the child in the here and now so they can profit from the interventions.
7. Because traumatic memories are more likely to be held in the visual, as opposed to verbal, domain many can draw their traumas easier than talk about them.
8. Very early life memories are encoded on a sensory-motor level. Traumas at this time affect self-regulation and self-identity.
  - a. Sensory-motor integration therapies may be useful.
  - b. Action type therapies—drama, movement, etc.
  - c. The rhythm of certain music may be helpful in accessing feeling states.
  - d. Smells may stimulate memories
  - e. Naming, categorizing and classifying objects may all be helpful
9. According to van der Kolk, people do have to remember to heal. “If they don’t remember they don’t know why their body keeps playing tricks on them.” They continue to see and feel things that others are not experiencing. However, Perry points out that in the course of psychotherapy traumatized individuals are very susceptible to the therapist’s interpretations because the individual is only processing retrospectively.

Mary Main (1985) identifies five steps in the resolution of childhood issues.

1. Face the pain.
2. Acknowledge the ongoing influence of one’s early life.
3. Arrive at an understanding of why caregivers behaved as they did.
4. Identify what the individual wants to repeat and not repeat.
5. Muster resources for support of change.



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