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Memory Access to our Earliest Influences

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Abstract: An adult in hypnotherapy can age regress to a pre-episodic childhood experience, e.g., age one or two or the womb, and can nevertheless 'know' certain information about the experience. Commonly, people experience in such regressions that the environment is toxic, or that they are unwelcome, or that their parents wanted a child of the other gender. They *know* it to be true, without being capable of *remembering* it. We explore how this phenomenon happens, including the role of implicit-procedural memory and factors influencing memory retention or loss. We review the literature on traumatic memory, and the reliability of hypnotic age regression to pre- and perinatal experience. We assess documentation that the fetus and neonate do have sentient experience, and that they record the experiences in memory which is accessible later. We review current neurobiology research to trace the way in which early deeply encoded memories persevere over time and profoundly influence behavior in later life. And we consider the implications for psychotherapy with children and adults.

"One of the central concepts in this field is the notion that mind pre-exists the nervous system; that there is a level at which the conceptus is aware of essential qualities of feeling present in its inception; and that this awareness records its struggles to survive the hazards of implantation, the history of its gestation, and the detailed drama of its birth at an energetic and cellular level" (Emerson, 2002, p. 68).

" . . . the mind emerges in a rudimentary form during gestation and then develops prenatally, continuing postnatally into its adult form" (Hepper & Shahidullah, 1994, p. 143).

Outline

- *Prenatal awareness*
- *Earliest memories*
- *Procedural and implicit memory*
- *Factors influencing memory retention*
- *Reliability of hypnotic age regression experience*
- *Traumatic memories*
- *Dissociation and repression*
- *Implications for psychotherapy with children*
- *Implications for psychotherapy with adults*

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Practitioners of Heart-Centered Therapies and many other regression therapists have anecdotal evidence of the individual's ability to hypnotically follow an affect or somatic bridge back to memories at or near birth, or even earlier back to experience in the womb. Barbara Findeisen describes this situation aptly (Mendizza): "Memories of early trauma are there, underneath the surface. They're there in our dreams, attitudes, even in our vocabulary. People unconsciously walk around in them all day but are not aware of where they come from. Many times after a birth regression clients say, 'I live this pattern every day. It never occurred to me that it might start that early'."

Some people may ask, how is it possible that a prenate or newborn could process and understand experiences and create memories of them? And how is it possible that such memories, if they were created, could significantly affect that individual later in life? In this paper, we address these two fascinating questions.

First, let's assess documentation that the fetus and neonate do have sentient experience, and that they record the experiences in memory which is accessible later. Then we review current neurobiology research to trace the way in which early deeply encoded memories persevere over time and profoundly influence behavior in later life.

Internal developmental influences

As early as 13 weeks gestational age, the fetus is showing individual behavior and personality traits that continue on after birth (Piontelli, 1992). She observed four sets of twins by ultrasound periodically over the course of the pregnancies. Each set of twins seemed to manifest a unique relationship together: one set was loving, another contentious, and another was passive. One pair consisted of a brother who was active, attentive, and affectionate, and his sister who would passively follow his lead. The boy in this pair kicked and wrestled with the placenta, actively pushing for space and looking disgruntled. However, at times he would reach out to his sister through the membrane separating them, caressing her face or rubbing her feet with his. His sister would reciprocate when he initiated contact.

Piontelli conducted follow-up observation of the four sets of twins through age four. She found that behavior after birth for each child, and in the relationship between each set of twins, continued remarkably unchanged. The twins just mentioned continued to be affectionate with each other. At one year of age they would play together, touch, hug and

kiss. The boy was self-starting and independent, and the girl passively followed his lead. The other twin pairs exhibited the same behaviors and relationship postnatally as they had in the womb. What accounts for the individual differences? One factor, of course, is the maternal environment in which each child lives. Another is its own genetic makeup. Could there be other factors that a child brings into the world – predispositions, prior agreements or commitments, or karmic debts? That question remains open for further investigation at another time.

By 20 weeks gestational age the fetus exhibits most of the movements that it will produce during its time in utero, and exhibits motor patterns similar to those observed in pre-term and term infants, including over 20 movement patterns (Prechtl, 1988).

It is well documented that fetuses dream, exhibited by rapid eye movement (REM), as early as 23 weeks gestational age (Birnholz, 1981). Studies of premature babies reveal intense dreaming activity occupying 100% of sleep time at 30 weeks and gradually diminishing to around 50% by term (Chamberlain & Arms, 1999). The dreaming activity, in both fetus and premature baby, is vigorous, involving apparently coherent movements of the face and extremities, and changes in heart rate and respiration, in synchrony with the dream itself. The dreams are, as with adults, expressions of inner mental or emotional conditions and are markedly pleasant or unpleasant (Roffwarg et al., 1966). While dreaming, babies exhibit their first smiles, and show their most frequent smiling in the dream state (Emde et al., 1971).

The first breathing movements are observed around 9 weeks gestational age, and are regular in nature (de Vries et al., 1985). Of course, the fetus is unable to breathe in the fluid-filled uterus. Yet it makes movements of the diaphragm and rib cage that will result in breathing after birth. By 30 weeks, fetal breathing movements are episodic in nature occurring around 30% of the time (Patrick et al., 1980).

Anand and Hickey (1987) specify the anatomical pathways and mechanisms for pain perception from the seventh week after conception onward. They point to the early origins of the neurochemical systems associated with pain, especially substance P, which appears in the brain and spinal column at 12 to 16 weeks. They note the consistent and predictable effect of prenatal pain on the cardiorespiratory system, on hormonal and metabolic changes, motor responses, facial expressions, crying and other complex behaviors including long term memory.

The fetus responds reflexively to touch around 8 weeks gestational age, and by 14 weeks most of its body (excluding its back and top of the head) is responsive to touch. The fetus responds to light with changes in body movements and heart rate from 26 weeks.

The fetus' eye and body movements have settled into predictable patterns of behavior by 36 weeks gestational age, representing a greater degree of integration between the various centers of the central nervous system. Nijenhuis et al. (1982) identified four 'fetal behavioral states' that are stable over time and observed repeatedly:

State 1: Quiescence, with only occasional startles; no eye movements; stable fetal heart rate
State 2: Frequent and periodic gross body movements; eye movements present; fetal heart rate shows frequent accelerations in association with movement
State 3: No gross body movements; eye movements present; fetal heart rate shows no accelerations and has a wider oscillation bandwidth than State 1
State 4: Continual activity; eye movements present; fetal heart rate unstable and tachycardia present

The fetus is capable of discriminative learning, which requires some form of sentient awareness. Memory for prenatal experiences is present immediately after birth. For example, newborns prefer a lullaby their mothers had sung to them in the womb to an unfamiliar one sung by their mothers (Satt, 1984; Panneton, 1985). After birth, babies prefer to hear stories which were read to them in the womb, rather than unfamiliar stories (DeCasper & Spence, 1982; Woodward, 1992). Hepper (1988, 1991) found that newborns of mothers who had consistently watched a particular television soap opera during pregnancy responded, when played the theme song after birth, by stopping crying, becoming alert, and changing their heart rate and movements. The newborns did not respond to other unfamiliar television tunes. "Human response to sound begins in the third trimester of life and by birth reaches sophisticated levels" (DeCasper & Fifer, 1980, p. 1174). Interestingly, Hepper found that the differential responding had ceased within 3 weeks of birth.

Prenates as early as 26 weeks learn intonations, rhythms and other speech patterns of the mother's voice, demonstrated in matching spectrographs (Truby, 1975). By the age of 4 days after birth, infants can distinguish language from other sounds, prefer their mother's voice to that of another female, and prefer their mother's language (Mehler & Christophe, 1995). They discern a language by its intonation and rhythm (Mehler & Dupoux, 1994), and have done so with the mother's voice during the third trimester of pregnancy (Childs, 1998). The prenate has

already learned neural patterns of language, including the emotional context for phonological rhythms, tones and sequences of mother's speech. That is to say that at birth, French infants already understand that their language is syllable-timed, English infants understand that their language is stress-timed, and Japanese infants understand that their language is mora-timed (Otake et al., 1993). These prenatal experiences are learning experiences, and are recorded in memory.

Prenate awareness

Based on fetal observation and age regression findings, we can piece together a dim outline of prenatal awareness. This is highly speculative, of course; however, it is an experience all humans have shared, and on which there is a burgeoning body of research. There is no sense of self, identity or autonomy for the prenate. Rather, it lives in an undifferentiated state, identified with its environment, absorbing the mother's emotions and belief system as its own (Givens, 1987). There is no sense of time, no reference to past or future. There is no defense against "negative" experience, i.e., the fetus is receptive and reactive to all experience, incorporating it into its growing blueprint of core beliefs. The fetus does eventually develop primitive defenses, or learned responses, in reaction to its experience, and in the process develops the beginnings of a self separate from the mother. The prenates in Piontelli's study developed characteristic ways of being, e.g., contentious or passive or loving. These behaviors expressed an underlying belief system: perhaps "the mother/ environment is unreliable" leading to self-reliance, or to adaptivity, or to withdrawal; perhaps "the mother/ environment is toxic and confused" leading to powerlessness, or to oppositional reaction.

The fetus actually begins the process of moving away from total identification with the mother, and establishing a rudimentary ego differentiation that continues through adolescence. An example is a study (Lieberman, 1963) in which pregnant habituated smokers were forbidden cigarettes for several days. When the women were allowed to resume smoking, prenatal monitors detected immediate stress reactions before the mothers had actually lit the cigarettes. Although the mothers' thoughts and physiological anticipation were positive and pleasant, their fetus' reactions were distressed and negative. Not only were the prenates reacting to their mothers' *anticipated* experience rather than an already accomplished one, they did so with a personal point of view (distressed) rather than simply absorbing the mother's experience (pleasant) unfiltered.

Perhaps more bewildering yet, recent research seems to document that a newborn brings with it from the womb information not derived from sensory sources at all. One study (Walton et al., 1992) shows that only minutes after birth, babies can pick out their mother's face from an array of enlarged portraits. These newborns' optic processing was so immature that their visual capability cannot explain the face recognition. Perhaps we need to keep an open mind regarding the existence in the prenate and neonate of a mind whose knowledge is not limited to its sensory experience, and whose memory is not limited to its central nervous system functioning.

Function of developing systems precedes their completion

A vital fact about human development is that components of a biological system come into use before the system itself is fully functional. In fact, use is necessary for development to proceed. For example, the first heartbeat is at about 23 days after conception, long before the heart's valves, chambers, and blood vessels are completed. The sense of taste begins at about 14 weeks gestational age, and fetuses prefer sweet tastes over bitter and sour tastes (expressed through increased swallowing). The fetus' nose develops between 11 and 15 weeks, and while its sense of smell develops for use after birth with the advent of airborne odors, it tastes odors in the amniotic fluid with chemosensory receptors in the taste buds. The fetus has access to an average of 120 odiferous compounds in utero, and learns to react to them (Schaal et al., 1995). A fetus is capable of behaviorally responding to sound at 16 weeks gestational age, long before the ear is structurally complete at about 24 weeks (Shahidullah & Hepper, 1992). At 20 weeks, the fetus is sensitive to light, and twins are able to touch faces and hold hands, even though the eyelids remain fused closed until about the 26th week. The central nervous system is completed long after the fetus begins processing information, responding to it, and recording it in memory.

Development of capacity to respond, remember, and make decisions

The unborn human develops the capacity to respond to the environment almost immediately upon conception. The central nervous system's limbic system is partially mature at 4 weeks of gestation and fully formed by the third trimester of prenatal life (Pert, 1987; Pert et al., 1985). The limbic system records the emotions and behaviors necessary for survival, and is critically involved with the storage and retrieval of memory (van der Kolk, 1996). The cerebral cortex, the highest level of brain

functioning, has been found operative by 32 weeks of gestation (Purpura, 1975; Vaughn, 1975), although it is far from fully functional.

With the capacity to respond comes the ability to store experiences in memory for future use. Recent research (Marquez, 2000) supports the capacity of the prenate to store very early traumatic experience in the bodymind (Pert's terminology), expressed permanently in psychosomatic conditions.

The capacity to respond and remember carries with it, by definition, the ability to make decisions and choices (Hull, 1986; Lake, 1982).

Maternal and paternal influences in utero

The fetus is preparing to deal with environmental stress early in its development: beta endorphins, a prime resource for responding to stress, are already in production by 7 weeks of gestational age, and are present in the fetal pituitary before 15 weeks (Facchinetti et al., 1987). We will see that the fetus is highly and immediately responsive to stress in its environment, which consists primarily of the mother's body, emotions, and beliefs.

It is well established that the mother's nutrition and exposure to toxins during pregnancy has lasting effects on the development of her baby (e.g., maternal malnutrition leads to low birth weight complications; zinc deficiency contributes to diabetes and schizophrenia; deficiency of folic acid leads to spinal defects). Exposure to toxic chemicals (e.g., carcinogens, teratogens, mutagens) can adversely effect the baby's development. Ingestion of alcohol, nicotine, marijuana or other illicit drugs can damage prenatal growth. High concentrations of estrogenic compounds (e.g., growth hormones in commercially processed meats and dairy products, contraceptive pills) may damage sperm and contribute to cancer of the sexual organs.

Perhaps not so obvious, but nevertheless profoundly influential in the fetus' development is the emotional environment provided by the primary caregivers. That environment includes the parents' mental and emotional states during the nine months of gestation (Turner, 1988). Whatever the mother and father experience at that time becomes part of the emotional repertoire of the baby, including that which may be toxic or polluting (e.g., Bleton & Sednaoui-Mirza, 1991). There is abundant research available on the lasting adverse effects of maternal stress on the unborn baby (van den Bergh, 1992). Indeed, we know now that the mother's stress in critical periods, even before conception, has a decided effect on basic

characteristics of the child (e.g., Dörner, 1991). The physical and the emotional are obviously intertwined; as the child's body is gestating, so too, are emotions and personality traits being developed and practiced that become manifest after birth.

Psychopathology in childhood and adolescence is predicted by certain prenatal and perinatal influences. For example, major depression in the child is predicted by maternal emotional problems during the pregnancy; anxiety in the child is predicted by a maternal history of miscarriage and stillbirth; and disruptive behavior disorder in the child is predicted by poor maternal emotional health during the pregnancy and birth complications; substance use disorder by the child is predicted by maternal use of substances during the pregnancy (Allen et al., 1998). Depressed maternal emotional health during the pregnancy also predicts conduct disorder and attention deficit disorder in the child (Downey & Coyne, 1990).

Another surprising aspect of maternal influence on the prenatal development of the child is reported by Ellis et al. (1988). This research team found that deficiencies and excesses in the flow of the maternal hormones androgen and estrogen in the fetal brain result in the formation of natural variations of sexual identity and orientation. Psychosocial stressors can influence this maternal hormonal flow to the fetus, and two periods of high vulnerability for upset have been identified: the 3 months immediately prior to conception and the second trimester of pregnancy. Dörner's (1991) research on the critical nature of brain sexual differentiation during gestation supports those findings.

Obstetrical complications have been found to be significantly related to psychopathology later in life, including schizophrenia (e.g., Cantor-Graae et al., 1994; Eagles et al., 1990; Kinney et al., 1994; Lewis & Murray, 1987; O'Callaghan et al., 1990, Parnas et al., 1982), personality disorders (Woerner et al., 1973), antisocial behavior (Szatmari et al., 1986), and bipolar disorder (Kinney et al., 1998).

Birth

A child's instinct to initiate and pursue attachment with its parents is universal and complex, and may be observed as a series of self-attachment sequences. It begins, we assert, at the moment of conception. It extends throughout the pregnancy. Then the baby initiates the onset of labor, moving in ways that signal the release of hypothalamic neuropolypeptides (HNPs). These HNPs in turn trigger the mother's neuroendocrine system to release the hormone oxytocin, causing her uterus to contract. Oxytocin is

the same hormone released during breast-feeding and is associated with pleasurable sensations for the mother and the baby, accelerating the bonding between them.

The birth process culminates in delivery, bringing further self-attachment sequences. Normally when the baby's head emerges from the birth canal, its head is turned in the direction of the shoulder that is closest to his/her mother's sacrum. The head then returns to a normal alignment with its body, which is now ready to be born. The baby is experiencing movement away from the mother, a process that culminates with the cutting of the umbilical cord. Following the dramatic separation, i.e., emergence from the mother's body, the baby's attachment need requires that he/she reconnect with the mother and stimulate her bonding by finding, attaching and sucking at her breast.

The "delivery self-attachment" (Righard & Alade, 1990; Righard & Franz, 1995) is every (mammal) newborn baby's instinctive and innate ability to find its mother's breast, latch on and suck. The human newborn, if placed on the mother's naked belly immediately after birth, begins the self-initiated journey to the breast within about twenty minutes, and completes it within about fifty minutes. "Delivery self-attachment is an integral part of the bonding and attachment process," and "the completion of the delivery self-attachment sequence at birth will have long lasting positive effects on the baby's neurological, somatic, and psychological development" (Castellino, 1997, p. 19).

Immediately upon birth, the baby enters a prolonged quiet but alert state of consciousness, averaging forty minutes duration. In this *quiet alert* state, babies look directly at their mother's or father's eyes and face, and can respond to voices (Emde et al., 1975). During this special time, in the state most conducive to eliciting the mother's bonding, motor activity is suppressed, and all the baby's energy seems to be channeled into seeing, hearing, and responding (Klaus et al., 1995). This period is a "sensitive period" for the installation of a personal relationship with the baby's mother. Bowlby (1969/1982) speculated on the issue of a "sensitive period" (i.e., a crucial, short period during which the individual learns a behavior or a string of behaviors at a very quick rate) for attachment behavior and referred to it generally as "the precursors of attachment" during the first 6 months of life. He borrowed the concept from Bateson's (1976) studies on perinatal "sensitive periods" in animal species other than human.

Robson's (1967) work clearly demonstrates how vitally important eye-to-eye contact is in the establishment and growth of a mother's relationship (bonding) with her infant. For example, Fraiberg (1974) found that mothers of blind infants, with unsatisfying eye contact, initially felt detached and distant from their babies. Eye contact is keenly accurate with a seemingly high image resolution at the baby's focal distance of 25-30 cm. (newborns are extremely myopic). If the mother even slightly averts full eye contact, the baby bursts into tears. Mothers are usually prone to stimulate their babies by stroking their foreheads and their cheeks, and talking to them in high-pitch tones, eliciting the first newborn's smiles. This usually triggers a positive feedback spiral which leads the dyad to intense, frequent interchanges of mutual expression. If uninterrupted, these mother-infant interactions terminate when the baby finally falls fast asleep.

The curtailment of this sensitive period immediately after birth, by early separation or by lack of mother-infant connection, seriously diminishes the bonding that would otherwise grow over time. For example, compare mothers who deliver by emergency cesarean with mothers who have spontaneous vaginal delivery (Trowell, 1982). The cesarean mothers have longer labors and more medication before, during and after delivery. They are unconscious during the delivery, and suffer a period of amnesia after the birth as they recover from major abdominal surgery. At one month, cesarean mothers show significantly less eye-to-eye contact, are more critical in their attitudes to the pregnancy and birth, more depressed, more resentful of the father, and more anxious with somatic symptoms. Clearly, curtailment of this sensitive period immediately after birth retards the onset of overt proximity-seeking behavior, and the setting up of an affectional-cognitive bond.

During the first week after birth, the normal baby spends about 10 percent of any twenty-four hour day in the quiet alert receptive state, promoting bonding from the parents. A dance of mutual curiosity and wonderment (and bonding), begun with the positive feedback spiral at birth, continues between parent and infant. "The interpersonal contexts created in mutual gaze transactions allow for the establishment of 'affect synchrony'" (Feldman et al., 1999).

During the early post-natal period, a mother's influence on her newborn may be largely attributed to the synchrony or dyssynchrony in their interactions, and to the degree of repair/ resolution that occurs upon dyssynchrony. Affect synchrony is observed in mother-infant interaction which is responsive and in tune during periods of social engagement,

during the quiet recovery periods of disengagement, and during the child's reinitiating cues for reengagement (Schore, 1999). The mother intuitively knows her infant's state of mind, and responds accordingly. She plays with him when he wants to play, empathizes with his discomfort when he complains, allows him time without interference when he wants reverie, and welcomes his signal that he wants to reengage. The heart rates of these infants and their mothers in stressful situations parallel each other, whereas they do not with insecurely attached infants and their mothers (Donovan & Leavitt, 1985). This affect synchrony is right-hemisphere to right-hemisphere energy transmission between the primary caregiver and infant (Schore, 1997). However, even the healthiest and most attuned mother misses or misinterprets her infant's signals some of the time (in fact, about two-thirds of the time). These moments of dyssynchrony are normal and healthy if they are immediately followed by the mother repairing her misunderstanding, bringing the momentary conflict into resolution.

Thus the repair of dyssynchronies, or mismatches between infant and mother are vitally important (Lewis, 2000). Mothers are correctly attuned to their infant's emotional state only about one-third of the time. The infant's responses to the frequent misattunements result in appropriate corrections by the mother in another one-third of the occasions (Tronick & Gianino, 1986). The successful repair of misattunements is crucial for the infant's normal development, turning despair into the positive emotions of a sense of mastery. The adverse consequences in infants for whom successful repair is absent or infrequent are feelings of helplessness (without mastery). These infants may turn away from non-reciprocal relationships and focus on self-regulation ("I'll do it myself. I don't need anyone"). Psychopathology may well be the outcome of repeated unsuccessful efforts to repair mismatches (Tronick & Gianino, 1986).

Excess dyssynchrony or insufficient dyssynchrony can create serious consequences for the infant through the lifespan. An example of excess dyssynchrony is that interactions between depressed mothers and their infants have a greater frequency of dyssynchrony and conflict, and less frequent repair than with nondepressed mothers (Tronick & Gianino, 1986). In these relationships, the infants and young children take on the burdensome responsibility for repairing dyssynchronies (Pound, 1982). These particular children are also predisposed to overdeveloped empathy and concern for others, as well as guilt and shame (Zahn-Waxler & Radke-Yarrow, 1990). Thus the child develops a hypervigilance for cues from others, and a style of relating that Bowlby (1980) referred to as

"compulsive caregiving." The child's vigilance to the subjective experience of others may lead to neglect or invalidation of her own subjective experience and the tendency to rely on external confirmation to maintain self-esteem and the sense of identity (de Groot & Rodin, 1994).

An example of insufficient dyssynchrony is parental overprotection, enmeshment, or "smother love." Some level of disengagement is necessary for the infant to develop autonomy and the capacity to be alone (Biringen et al., 1997). Rather than giving too much responsibility to the infant for maintaining synchrony and repairing dyssynchrony, these parents usurp the child's opportunities for self-regulation, allowing no experimentation or exploration. Such a child may develop low self-worth, helplessness, and depression.

Incidentally, research has shown a widespread gender difference in mother-infant interactions. In general, sons experience less dyssynchrony in their interactions with their mothers than daughters do (Biringen et al., 1994; Robinson et al., 1993; Robinson & Biringen, 1995). Mothers exhibit greater matching of infant sons' affect (e.g., the mother smiling at a smiling infant or showing sadness to a sad infant), while maternal sensitivity with infant daughters is associated with the infant matching the mothers' affect. In other words, sons are engaged in more child-directed interactions, and daughters are more engaged in mother-directed interactions. This common pattern may presage other gender differences that appear as children grow. One in particular, to be discussed later in this paper, is the gender-based difference in response to trauma, i.e., hyperarousal or dissociation.

When children know that their parents can and will survive their attempts at withdrawal or their expression of negative feelings, and welcome them back with unconditional loving acceptance, then that child can protest or separate without fear of abandonment, and return to intimacy without fear of engulfment. Not all children are so fortunate.

Lieberman and Pawl (1988) observed three major patterns of behavior in seriously disturbed anxiously attached infants. Each is an adaptive solution to the double-bind predicament faced by the severely disturbed infant, i.e., the parent's simultaneous indispensability and unavailability. The first is *recklessness and accident proneness*. The child frequently wanders away from his mother for prolonged periods, showing no distress, and makes no effort to restore proximity to connect with her again. Other examples of this behavior pattern would be to play with sharp objects, fall

while climbing, or crash into things while running. The child's exploration is unbounded by appropriately attentive caregiving, and therefore unsafe.

The second pattern observed was the opposite, namely, *inhibition of exploration*. These children hesitate to approach, touch or manipulate objects in their environment; withdraw from unfamiliar people; are often immobile in unfamiliar situations, regardless of the presence of the mother; and show decided constriction of affect. Some of these children cling to the mother for long periods. Their mothers encourage the dependency, and withdraw or become punitive when the child moves toward exploration (and by extension, autonomy).

The third group of seriously disturbed children show *precocious competence*, reversing normal child-parent roles in order to give care to the parent. These "parentified" children cannot rely on the attachment figure as primary protector and caregiver, so they learn to mimic the parental role. Because this option is survival-based, the pattern of role reversal becomes compulsive as a means of reducing anxiety, endures through time, and is highly resistant to change.

Fraiberg (1982) observed several other adaptive pathological defenses in seriously disturbed infants. *Freezing* occurs in infants as young as 5 months, in which the infant remains immobile and glassy-eyed for as long as 20 minutes. Older babies (12 to 18 months) fight to reduce anxiety, and others show giddy, almost manic behavior in response to frightening situations. Others cause self-injury without any signs of pain. Some of these pathological defenses are in use as early as 3 months of age, long before most psychologists believed that the ego and ego defense mechanisms could emerge.

The *over-regulation*, or inhibition, of emotion by avoidant children, and the *under-regulation*, or impulsivity, of emotion by resistant/ ambivalent children, if allowed to continue unmodified into adulthood, may well manifest as affective disorders or other pathology (Sroufe, 1996). Research findings are relatively consistent in suggesting that hyperactivating defenses, utilized by resistant individuals, are associated with the felt experience of distress, such as depression (Cole-Detke & Kobak, 1996), anxiety disorders (Warren et al., 1997), affective disorders (Rosenstein & Horowitz, 1996), or borderline personality disorder (Patrick et al., 1994). Deactivating strategies, employed by avoidant individuals, are associated with more externalized indices of distress, such as eating disorders (Cole-Detke & Kobak, 1996), conduct disorders (Rosenstein & Horowitz, 1996), and hard-drug use (Allen et al., 1996).

All these early patterns are recorded by the infant in deeply encoded semantic-implicit memories. Affect synchrony later in life through healthy marriage or therapeutic relationships provides the means for *accessing* these implicit memories and *changing* the dysfunctional ones.

Earliest memories

Examples of early (prenatal or perinatal) memories

Without the use of special memory retrieval techniques, most adults cannot remember events before 3-4 years of age (White & Pillemer, 1979), although some adults can remember one or two events that occurred at the age of 2 (Usher & Neisser, 1993). Incidentally, adult females have an earlier age of first memory, as much as 6 months earlier on average, than do males. This inability to consciously remember events in infancy has been referred to as "infantile amnesia." It has generally been attributed to the immaturity of the infant's brain mechanisms responsible for maintaining information over the long term (Nelson, 1995), i.e., long-term memory.

Rovee-Collier and Hayne (2000) assert that current research undercuts that traditional account of the infantile amnesia phenomenon, and suggest that the mechanisms that underlie memory processing are fundamentally the same in infants and adults. That is, memories are forgotten gradually, recovered by reminders, and modified by new information that overlaps with old. Memory processing, however, changes with age: with more maturity memories are retrieved faster and after longer delays, and generalize to novel retrieval cues. The longevity and specificity of young infants' memories contradict earlier beliefs that infants' memories are shortlived, highly generalized and diffuse, and devoid of place information.

For example, four-year-olds can recall some events that occurred before $2^1/_2$ years of age (Fivush & Hamond, 1990), and an infant who experienced a unique event at 6 months of age verbalized about it almost $1^1/_2$ years later (Myers et al., 1987). Australian researchers (Correia, 1994) showed pregnant women a particularly disturbing segment of a Hollywood movie. When their infants were briefly re-exposed to the same movie segment up to three months after birth, the babies showed recognition of the earlier experience.

While stored in an affective and somatic form, prenatal memories can eventually be accessed and retrieved. Mathison (1981) discovered that children as young as two or three years old could spontaneously report

their birth memories in words and gestures with startling authenticity. Bauer (1996) discovered the same capacity in one- to two-year old infants.

Feldmar (1979) studied a number of adolescent patients with a history of more than five suicide attempts each, always at the same time of year. He eventually determined that the suicide dates of four patients corresponded to the month in which their mothers had tried to abort them. The adolescents had no *conscious* knowledge of the abortion attempts that they were *unconsciously* acting out. Feldmar discovered that they had even used a method of suicide similar to the method of the abortion, for example, chemicals or instruments. After discovering that their suicide attempts were seasonal intrusions of prenatal memory, the patients were free of the suicidal compulsion. They never attempted suicide again, even when their 'anniversaries' returned.

Emerson (1996) surveyed a number of experts, among whom were R. D. Laing, Frank Lake, Barbara Valassis, Barbara Findeisen, Stan Grof, Michael Irving, and others, to determine the prenatal, etiological basis for violence and aggression. They reported on the kinds of regressive experiences that their aggressive and violent patients had uncovered, and that were central in the success of their treatment. Several common threads of consensus emerged: (1) pre- and perinatal experiences were paramount in aggression and violence; (2) childhood experiences seemed to reflect and reinforce prenatal traumatization; (3) aggression and violence were related to the severest levels of pre- and perinatal trauma; (4) consistently related to aggression and violence were themes of loss, abandonment, rejection, and aggression; and (5) certain pre- and perinatal traumas were consistently related to aggression and violence. A summary follows:

Conception. When aggressive and violent clients are regressed, they frequently encounter the experience of traumatic conception. The most frequent traumas involve forced or manipulated sex, rape or date rape, substance or physical abuse, dismal familial, social, or cultural conditions, and personal or cultural shame, such as being conceived out of wedlock.

Implantation. Regressed aggressive and violent clients often experience implantation, the biological process whereby the conceptus attaches itself to the uterine wall. They report experiencing the terror of being near physical death and/or the feeling of being unwanted with no place to belong. It is here that they first 'decide' that the world is a hostile and unsafe place.

Discovery of unwanted pregnancy. When aggressive clients regress to the prenatal period, they frequently go to the time the pregnancy was discovered, and that they were unwanted. The discovery of being unwanted typically leads to the realization that lifelong episodes of depression, self-destructiveness, or aggression are a direct expression of prenatal rejection. Typical responses to being unwanted are to collapse into helplessness and hopelessness, to rage at others and the world's injustice, and/or to refuse to engage in life.

Prenatal aggression. Many adults with problems in aggression learn that they were exposed to various forms of aggression during the pre- and perinatal period. Some common forms of aggression are warfare, gang fights, domestic violence, conception through rape, physical or sexual abuse of parents or siblings, annihilative energies, intrauterine toxicities, and/or abortion attempts. Prenates who experience one or more of these aggressive conditions are at risk for manifesting aggression and violence later in life.

Adoption. Adoption trauma refers to a broad range of painful experiences that are common to adoption. One is abortion trauma - there may have been direct attempts on life, abortion plans with no attempts, or abortion ideations but no plans, all traumatizing. Others are discovery trauma (child unwanted at the time of discovery), conception trauma (child unwanted at time of conception), or psychological toxicity (child exposed to mother's annihilative or ambivalent feelings, or to socio-cultural shame).

In summary, studies of the behavior of the human fetus indicate that the beginnings of mind predate birth (Hepper & Shahidullah, 1994). Areas of prenatal behavioral development include movement; auditory and visual sensory ability; and learning, including habituation, familiarity, generalization and classical conditioning. And what the fetus learns, it believes; its beliefs filter its perception of the world for its lifespan.

The complexity of memory

Today there is general agreement in the fields of psychoanalysis and cognitive psychology that what organizes human actions is stored in the form of operative or working models and implicit or procedural memories (Bonomi, 2001). Discovering more about memory helps to clarify the process by which these internal working models are developed and maintained through the lifespan. Research (Lockhart, 2001) documents a clear connection between the encoding of sensory (procedural) memories

in infancy and unconscious mentation later in life. The development of aversive episodic and procedural memories during the period between birth and 28 months of age are encoded neurologically in the brain. Additionally, Lockhart traces how the storage of aversive memories in infancy has lasting unconscious motivational significance for individuals.

Memory has several specific mechanisms: encoding, storage and retrieval. There exists a dichotomy between short and long term storage of memories. Long term storage is distinguished between episodic (specific), semantic (generalizations), and procedural (behavioral habits) memory; and between implicit (unconscious) and explicit (conscious) memory. The unconscious memory systems result in one knowing something to be a fact, but not linking a personal episode to this knowledge. These systems are operative very early in life, and are, in fact, "evident at birth or even earlier" (van der Hart & Nijenhuis, 2001). Implicit memory, according to Amini et al. (1996) is a learning system that is operative from birth. It "operates by extracting prototypes and rules from exposure to large amounts of complex information, and generates perceptual bias for later information processing and learning. The information learned in this manner is not available for conscious processing and reflection but rather guides behavior without impinging upon consciousness" (p. 229).

Explicit memory has been differentiated from implicit memory in this way: explicit memories, mediating the conscious recollection of a previous event, are subject to loss through amnesia; implicit memories, processing information automatically, remain intact despite amnesia. It has been generally accepted that these two separate and functionally distinct memory systems mature at different rates, with implicit memory being a more primitive system available at birth or before, and explicit memory maturing late in the infant's first year. Rovee-Collier (1997) asserts that evidence suggests both systems develop simultaneously, not sequentially.

Episodic memory stores recall of specific events or episodes, holding chronologically organized experiences, and is explicit. For example, "On my sixth birthday, my mother invited my friends and my sister to a party in our backyard. We ate watermelon and played hide-and-go-seek." Episodic memory is defined by the nature of conscious awareness that accompanies retrieval, i.e., autonoetic (self-knowing) awareness. The retrieval of episodic information, such as the recollection of a particular time that one drove one's first automobile, is not merely an objective account of what has happened. The recalled information is infused with the idiosyncratic perspectives, emotions, and thoughts of the person

doing the remembering. It necessarily involves the feeling that the present recollection is a reexperience of something that has happened before.

Episodic memory requires autonoetic awareness - the ability to mentally travel through time - whereas other forms of memory are tied only to the present moment. That is, one need not have any conscious awareness of the past or future to utilize these nonepisodic varieties of memory. Therefore, we need familiarity with the concept of autonoetic awareness. Individuals with autonoetic awareness are capable of reflecting upon their own experiences in the past, present, and future. Reflecting back on past happenings is named episodic memory. Related behaviors are the ability to introspect upon present experiences, and also to anticipate or imagine future experiences through imagination, daydreams, and fantasies (Tulving, 1983; Wheeler et al., 1997). Each of these autonoetic capabilities shares the feature of requiring the person to withdraw attention from the immediate sensory environment, and to reflect upon their own past, present, or future. The act of dwelling upon one's past is cognitively similar to the act of imagining one's future, although only the former is commonly labeled as "memory." In general, individuals who have selective losses of episodic memory, have a corresponding loss of the abilities to introspect upon the present, and to anticipate the future.

Semantic memory handles knowledge about the world; it underlies the acquisition of general knowledge that is not tied to any one specific personal experience and that can take a variety of forms, including words, facts, numbers, concepts and rules. When an individual reports that he was born in Chicago, or that Albany is the capital of New York, he is almost surely retrieving the information from semantic memory; he probably cannot recollect where, or how, the fact was learned.. It also stores generalizations or summaries of the meanings of recurring memories. For example, "My father always ridiculed the kids in the family during mealtimes" or "It's not safe to be alone with men." While episodic retrieval involves autonoetic awareness and the mental reexperience of a previous moment in the past, semantic memory, by contrast, is characterized by noetic (knowing) awareness only. There is no feeling of reliving a previous episode.

The process of creating semantic memories is referred to as "deep" encoding (Demb et al., 1995; Fletcher et al., 1995; Kapur et al., 1994). As Nathanson (1987) points out, the "growing child accumulates and stores experience as an image colored by the affect that accompanies it. This

leads to the clustering of memories linked by their relationship to specific affects" (p. 32). The efficiency of memory is dependent on the depth of encoding (Craik & Lockart, 1972).

Children between the ages of about 1 and 5 years are able to report about, and know about, both facts of the world and things that have happened to them, often without being able to consciously recollect the episodes upon which that knowledge is based. Young children have impressive memory abilities: they are voracious learners, and routinely take in and retrieve vast amounts of knowledge. They learn to speak and understand one or more languages. They also learn about the identity of people, animals, and things, and how they are expected to interact with those things. Because they are constantly updating and extending their knowledge, children above the age of 1 year must have, at a minimum, a functioning semantic memory that can be expressed through noetic awareness.

The semantic memory skills of young children are not limited to general, timeless concepts such as the meaning of the word bench or the way to behave around a houseguest. Infants as young as 8 months have shown impressive recall of information that was tied to a single event in their past. Evidence comes largely from a line of research called deferred imitation, in which an infant imitates what he/she has observed an adult do. Infants as young as 9 months are capable of imitating single actions that they had witnessed the previous day (Meltzoff, 1988). Performance on deferred imitation tasks becomes gradually more sophisticated throughout the next several months. Infants between the ages of 13 and 20 months at encoding later showed aspects of nonverbal and verbal recall of witnessed event sequences at retention intervals of up to 12 months (Bauer & Wewerka, 1995). Children younger than age 3, then, can reproduce complex, previously witnessed events in the correct temporal order after lengthy retention intervals (Bauer, 1996).

Young children are able to report about learned information before they can reflect back upon the learning episode. By the middle of the second year, a child can recognize and recall things that occurred several weeks before. However, such a child has not yet developed the capacity to experience her past autonoetically; she 'knows' many things and 'remembers' nothing. Four-year-olds are oblivious to differences between cases of remembering, knowing, and guessing. Five-year-olds show some ability to differentiate these mental states, while six-year-olds have a very good understanding of these terms (Johnson & Wellman, 1980).

Additional processing from the hippocampus is necessary for noetic semantic memory to become encoded as autonoetic episodic memory (Mishkin et al., 1997; Schacter and Wagner, 1999). The logistics of memory is envisioned by Moscovitch (1995a, 1995b) as traces of memory being stored randomly in brain cells like cherries in a bowl (Landauer, 1975). Some memory traces may be lost during retrieval of the traces. When sufficient aspects of a conscious memory are recovered, e.g., the spatial temporal context, multiply associated items, perceptual vividness, affect, and consistency with other episodic and semantic memories, then *remembering* occurs. When retrieval is impoverished by loss of too many traces ('cherries'), only *familiarity* remains. Once that is lost, all that can be sustained is an *implicit* (unconscious) memory of the event (Tulving, 1985).

The importance of the discussion of (autonoetic) episodic memory is this: Individuals may know many things about the world, including the personal past, but be unable to mentally travel back in time to recollect the experiences upon which the knowledge is based. Here is a key to the perplexing puzzle of how an adult in hypnotherapy can age regress to a pre-episodic childhood experience, e.g., age one or two or the womb, and can nevertheless 'know' certain information about the experience. Commonly, people experience in such regressions that the environment is toxic, or that they are unwelcome, or that their parents wanted a child of the other gender. They *know* it to be true, without being capable of *remembering* it.

Procedural memory refers to the learning of motor and cognitive skills, and is characterized by gradual, incremental learning (Cohen & Eichenbaum, 1993). Learning to ride a bike and acquiring reading skills are examples of procedural memory. It begins in infancy and is based on sensorimotor representations. Procedural memory is the only system available for the child up to about age one year. Procedural memory consists of recall of repeatedly enacted and experienced patterns of behavior that become generalized. When the same interaction has happened over and over again, the baby comes to expect the caregiver's familiar pattern of behavior. The expectation is behavioral, not conscious. For example, when the mother dresses her baby or toddler, the child seems to know when to lift an arm for the sleeve of the shirt or when to lean forward, etc. The little details of the sequence flow smoothly without conscious effort because they have become "procedurally memorized" through repetition. When a different caregiver dresses the child, the interaction is disrupted because the new adult doesn't proceed in the same

sequence. The baby is expecting the past to be recreated, and acts accordingly. The expectation is encoded in the unconscious as a script; it is held as an unchallenged "fact of life." The infant may encode procedural memories of abuse, neglect, or dominant parental attitudes as well, and they then become scripted.

Traumatic memories are different from ordinary clinical memories in the way they are encoded on the brain. There is evidence that trauma is stored in the part of the brain called the limbic system, which processes emotions and sensations, but not language or speech. For this reason, people who have been traumatized may live with implicit memories of the terror, anger, and sadness generated by the trauma, but with few or no explicit memories to explain the feelings. Research clearly indicates that subcortical implicit memories are highly resistant to extinction, and may be considered "indelible" (LeDoux et al., 1989). Trauma clinicians believe that implicit memories are not easily distorted. A full discussion of trauma memory follows later in this paper.

The acquisition of information outside of conscious awareness includes inferences, assumptions, and self-perpetuation of procedural knowledge. The nonconscious acquisition of information, i.e., procedural knowledge, is indispensable for such important aspects of cognitive functioning as encoding and interpretation of stimuli and the triggering of emotional reactions (Lewicki et al., 1992). These early memories are deeply and unconsciously encoded, and they have a profound influence throughout the lifespan on self-fulfilling beliefs (through unconscious selective interpretation), and on reflexive emotional reactivity.

Babies develop deeply embedded beliefs in the prenatal and perinatal period. In the words of one researcher (McCarty, 2002, p. 341), "I have been fascinated with how *the blueprint of core beliefs* is already actively shaping babies' lives in terms of their physical structure, physiology, their relationship to self, others, and to the world as well." Those beliefs, absorbed from the womb environment, are embedded and expressed in the body, on a micro level in the cells and on a macro level as well. The core beliefs, what eventually mature into internal working models, may be centered around fear, separation, violence, constriction, mistrust, unworthiness, confusion, or dissociation. McCarty (2002, p. 357) continues, "Although these early *belief blueprints* can become entrenched and continue for a lifetime, when brought to awareness and worked with directly, they are quite changeable."

We cannot know the personality or belief system of the unborn directly. We must listen to the language that they speak Prenates communicate their beliefs through posture, gestures and movement, facial expression, breath and heart rates, emotional reactions, the rhythms of physiological processes, and in focus of attention. For example, researchers (Kelkar, 2002) measured fetal heart rates in response to stress. The subjects were then divided into two groups: low and high reactors. Low reactors continued with a steady heart rate, reacting little to an environmental stress (a loud noise). High reactors, of course, experienced a spike in heart rate in response to the stressor. When tested fifteen years later, those who had been low reactor prenates tended to be rarely upset by the unexpected, remaining in control of their emotions. The babies showing high reactivity to stress in utero were as teenagers still highly emotional. The physiological response was an expression of a deeply embedded approach to life, of personality and belief.

An apt metaphor for this process of unconscious acquisition of influential knowledge is described in memory research by Bennett and colleagues (1981). They discovered that patients had the ability to remember things told to them during surgery in which they were administered a general anesthetic. Some of these patients remembered verbatim comments made during their unconsciousness, but only with the aid of hypnosis. More remarkable yet, without the use of hypnosis and without correlation to hypnotizability, many patients later carried out the behavioral suggestion to "touch your ear" when meeting with the researcher the following day. None of the patients could remember the suggestion verbally, even under hypnosis. The learning was deeply, unconsciously encoded. Yet it was capable of influencing behavior.

In the words of Allan Schore (2002, p. 250), the socioemotional events in the relationship between infant and its caregivers "are imprinted into the biological structures that are maturing during the early brain growth spurt, and therefore have long enduring effects." The human brain has a phenomenal growth spurt from the third trimester in utero through one year of age. The child's brain is *structurally* affected by the mother's endocrine system (stress hormones) in utero, and the resulting changes are permanently retained into adulthood (Dowling et al., 2000). The fetus' memory of negative or traumatic prenatal events is enhanced because as the mother's hormonal changes register her distress, her body is releasing (and flooding the fetus with) adrenocorticotropic hormone (ACTH), a critical substance in memory retention (Wade, 1998). Likewise, after birth

the infant's brain continues to be *structurally* affected by its environmental experience with caregivers (Cicchetti & Tucker, 1994). In other words, the mothering repertory of the caregivers influences the biological development of the infant's brain and nervous system (Connelly & Prechtl, 1981).

> The relationship with the primary attachment object has a critical effect on, as Bowlby speculated, the organization of the limbic system, the central nervous system brain areas specialized not only for the processing of emotion but for the organization of new learning and the capacity to adapt to a rapidly changing environment (Schore, 2002, p. 252).

These deeply embedded and unconscious memories might be conceptualized neurobiologically as *cellular memories*. In Verny's (Verny & Weintraub, 2002, p. 159) words, "Before our children have even rudimentary brains, they are gathering within the cells of their bodies their first memories." Graham Farrant (1985), an Australian medical doctor, referred to recollections of prenatal events as cellular memory. Buchheimer (1987) argues that cellular memories, i.e., records of precognitive experience dispersed throughout the bodymind (Pert, 1987), are retained in perpetuity. This conclusion is supported by other researchers (Achterberg, 1994; Rossi & Cheek, 1988; Woody, 1986). Anthony Lake (1980), a British psychiatrist, found that prenatal memories stemmed from viral cells, that viruses were primitive prenatal cells that formed during trauma and carried traumatic memories. He, too, referred to prenatal memories in terms of cellular memory. Bruce Lipton (2001) discusses the way that human beings, from conception throughout life, process incoming environmental information and store the results in the membrane of cells. These stored memories he calls learned perceptions, and they are outward-directed or inward-directed. Outward-directed learned perceptions control how we respond to environmental stimuli. Inward-directed learned perceptions provide us with beliefs about our 'self-identity.' "The learned perceptions acquired by an individual begin to arise *in utero*" (p. 176-177), and are carried by and implemented by the cells of the body. Lipton continues:

> Though every cell is innately intelligent, by communal agreement it will give its allegiance to the collective voice, even if that voice engages in self-destructive activities. For example, if a child is given a perception of itself that it can succeed, it will continuously strive to do just that. However, if the same child was provided with a belief that it was 'not good enough,' the body must conform to that perception, even by using self-sabotage if necessary, in order to thwart success (p. 177).

That individual cells in the body determine someone's behavior is more intuitively reasonable when one considers that each of the brain's 100 billion neurons (nerve cells) is connected to approximately 10,000 other neurons in a highly complex network. Thus, the "collective voice" is precisely that. As Amit (1998) states: "activity of large groups of similarly acting neurons . . . is the result of a bottom-up scenario in which individual cells, via their synaptic interactions, lead to the large scale phenomena" of a person's behavior (p. 231).

Birth trauma influences many subsequent conditions. For example, in at least 80% of children with developmental delays, including attention deficits and autism, there is a history of traumatic birth (Frymann). Recent research results estimate that, compared with those who had not experienced multiple traumas at birth, men who had experienced such trauma run an almost 5 times greater risk for violent suicide, and women run a slightly higher risk (Jacobson & Bygdeman, 1998).

Procedural and Implicit Memory

People generalize their experience into prototypes and rules, starting very early in life. The child, fetus or conceptus detects patterns and regularities in its environment and extracts them from the experiences themselves, forming "early conclusions" or "internal working models." These extracted generalizations are encoded and stored as implicit-procedural memories: "learning related to affect exchange within the attachment relationship is processed in procedural memory and is thus stored in an implicit manner" (Amini et al., 1996, p. 234). If the individual's early experience in relationships was unhealthy, toxic or aberrant, then they will proceed to extract unhealthy aberrant rules and generalizations: "garbage in, garbage out." Examples of implicit-procedural memories are: "When I touch fire, it hurts." "I like the attention I get when I compete successfully." "Men are dangerous." These personal rules are not conscious, and the original events upon which they were extracted are not available to conscious memory for processing. It is important to realize that these memories and the resulting "knowledge" are not unconscious because of repression, defense, anxiety, or internal conflict (Amini et al., 1996). They are unconscious because the brain system encoding them works at a level of awareness below consciousness. Nevertheless, they exert a profound influence on behavior over a lifetime

by initiating reflexive reactions, i.e., "repetition compulsion" or "recapitulation" of early patterns.

Implicit memories determine behavior in a second primary way. These implicit memories, again unconsciously, "exert a self-perpetuating bias for interpreting later experience in a light consistent with past experience, whether later experience is objectively consistent with past experience or not" (Amini et al., 1996, p. 228). This explains the phenomena of transference and projection. Emotional expectations which were validly learned in past relationships are transferred into present relationships without objective reality-testing for evidence of accuracy.

Statebound learning occurs in young children, including the fetus, not just in traumas but in every experience, resulting in internal working models. For example, fetuses of women with chronic stress have fast heart rates and are very active (Klaus & Klaus, 1998). The fetus may experience that its mother's constant stress level is lowered, bringing calming relief, *only* when it also experiences nicotine or sugar or alcohol in the blood supply. This lesson is learned at the deepest layer of the developing fetus' nervous system functioning, and re-enacted unconsciously later in life in the compulsive self-medicating use of nicotine, sugar or alcohol. The memory is not verbal or conceptual, it is viscerally imprinted. The only means of accessing it for possible change is to return to the state in which it was learned: re-living the original experience *as it was first experienced*, then re-living it with a "corrective experience," allowing the option of consciously changing the outcome.

The repeated 'mini stress' involved in the therapeutic sensory and emotional reviewing of the traumatic event in hypnosis can partially reactivate the stress-released hormonal information substances that originally encoded that event in a statebound condition. The body actually remembers physical sensations and recreates these *body memories* during hypnosis age-regressions or other deep experiential transpersonal experiences. The statebound information is brought into consciousness, where the client's ordinary cognitive and verbal ego can process it. This allows the statebound or dissociated memories of the traumatic event, the basis of internal working models, to be accessed, processed, and therapeutically resolved.

The concept of returning to the statebound memories of the womb and infancy applies neurologically as well. There are four fundamental states of awareness distinguished by the frequency of electromagnetic activity in the brain. These states of activity acquire predominance sequentially in a

child's development (Laibow, 1999). *Delta* waves (0.5 – 4 Hz), the lowest level of activity, are the principal waves expressed by the brain developing in the womb and through two years of age. An adult in delta is in an unconscious, sleep-like state. Children from age two to six primarily function in *theta* frequency (4 – 8 Hz). An adult just awakening, half asleep and half awake, is in hypostimulation, a theta-rich state. This is a very imaginative state of consciousness, specifically sought by Alva Edison for his most creative inventing. Around the age of six, children begin to experience predominantly an *alpha* frequency (8 – 12 Hz), which is in adults a quiet calm state. Finally, around the age of twelve children express predominantly the *beta* state (12 – 35 Hz) that is the customary active or focused state of normal adult waking consciousness. The awareness of self that is the hallmark of consciousness arises (at about age six) with brain activity in the alpha and beta levels, and occurs in the prefrontal cortex of the brain. Events are capable of being experienced consciously and recorded in episodic memory. Prior to that age, brain activity in the lower levels of delta and theta are functioning primarily in the 'old brain' limbic system.

The EEG pattern of high-voltage, slow-wave delta frequency, predominant in the womb and through two years of age, reflects the dominance of the parasympathetic nervous system, the same as found in certain trance states and other related portals to transpersonal experience. These include hypnosis, breathwork, the "shamanic state of consciousness" (SSC), out-of-body experiences (OBE), near-death experiences (NDE), and the lucid dreaming state. Each of these states generates an increase in primary process thinking, a feeling of acute increased awareness, a lowering of perceptual boundaries, and shares a unique psychobiological signature, namely high-voltage, slow-wave hippocampal-septal hypersynchrony (HSHH). Shannahoff-Khalsa (1991) has developed research evidence linking peaks of immune function, regeneration, and healing with the increased parasympathetic state of right brain dominance (p. 242). These states are associated with meditation and a transcendental state of consciousness (Wilbur, 2000), and with restorative and regenerative processes, deep creativity, hyper-learning and hypnotic suggestibility (Robbins, 2000). These states are the frontier meeting ground of waking and dream states, the balance of sympathetic and parasympathetic nervous systems (reaction and maintenance). A full discussion of this topic is found in Zimberoff and Hartman (1999). This state predominates in the womb and through two years of age.

Hypnosis is an altered state of consciousness in which one experiences the HSHH pattern: higher levels of alpha brain waves (London et al., 1969) and theta brain waves (Chen et al., 1981; Crawford, 1994). Hypnosis enhances an individual's ability to focus one's attention selectively. Crawford proposes that the hippocampus appears to be involved as a gating mechanism in selective attention, and that this gating function may be promoted "through a cortico-hippocampal relay [that] transmits information by theta wave modulation" (p. 667). Incidentally, she found that highly hypnotizable people generate more EEG theta than low hypnotizables whether they are hypnotized or not. In hypnosis, then, one experiences a state similar to that of childhood, and the deeper the hypnotic trance, the slower the brain wave activity, and the earlier in life is being approximated.

Relatedly, children utilize predominantly the right brain prenatally (Chi et al., 1977) and for the first three years (Chiron et al., 1997). The right brain is dominant for processing self related material, especially one's sense of emotional and corporeal self (Devinsky, 2000). Before cognitive, symbolic thinking develops, then, infants and toddlers have a sense of who they are, what they want and how others will treat them. Current neurobiological research summarized by Schore (2002, pp. 259-260) reveals the unique operations of the brain's right hemisphere:

> the storage of internal working models of the attachment relationship that are used as guides for future action, the processing of social-emotional information that is meaningful to the individual, the processing of information from within the body, the ability to empathize with the emotional states of other human beings, the mediation of the processes that underlie moral development, the appreciation of humor, a mechanism for coping with daily stress, the cerebral representation of one's own past and the activation of autobiographical memory, the establishment of a "personally relevant universe," and "the capacity to mentally represent and become aware of subjective experiences in the past, present, and future." The emergence of these adaptive right brain functions in the attachment relationship clearly represent critical aspects of the genesis of personality.

During the first years of life, then, the child is living in a highly suggestible state of *sub*consciousness dominated by the emotional brain. The child is being 'programmed' by its parents and other environmental influences without benefit of conscious discrimination. The learned perceptions, i.e., beliefs and generalizations about life, are being directly 'hard-wired' as synaptic pathways in the subconscious limbic system, and stored as deeply-encoded semantic and procedural memories. As Lipton (2001, p. 179) states, "By the time consciousness evolves to a functional

state, most of the fundamental perceptions about life have been programmed into the hard drive" of the subconscious. As older children and adults, we can access the subconscious database of programmed beliefs and reactions, bringing them to consciousness for review and modification. However, changing the original perceptions hard-wired into the subconscious is very difficult. Lipton goes on to say:

> No amount of yelling or cajoling by the consciousness can change the subconscious program. For some reason we think there is an entity in the subconscious that listens and responds to our thoughts. In reality the subconscious is a cold, emotionless database of stored programs. Its function is strictly concerned with reading environmental signals and engaging the hard-wired behavior programs, no questions asked, no judgments made.
>
> Through shear [sic] will power and intent, consciousness can attempt to override a subconscious tape. Usually such efforts are met with varying degrees of resistance, since the cells are obligated to adhere to the subconscious program. (p. 179)

Hypnosis takes an individual from everyday consciousness to deeper levels of brain activity, to the hypnogogic states of delta and theta, the state they experienced predominantly for the first five years of life. Returning to the original state in which events were experienced and the memory recorded provides access to what is otherwise inaccessible. Directly accessing the subconscious allows an opportunity to 'reprogram' the 'hard-wired' beliefs, generalizations and reactions.

The information in episodic memories can contradict the information in semantic memories, because children build their generalizations on selective episodes and on other significant input (such as how a parent interprets events). One might grow up with the semantic memory, "My mother always comforts me when I am scared" even though there were many specific events when she didn't. The child does not notice that this generalization contradicts her experience, because episodic memory usually does not emerge until after the child's second birthday. When children up to three years old are asked for episodic memories ("What did you eat for dinner last night?"), they tend to answer with semantic abstracted generalizations ("I like dessert best"). Only extraordinary events are likely to be recalled as episodic memories.

The connection between the specific memories and the generalized procedural script has implications for psychotherapy. Colin (1996) notes that

> memories of the specific experiences that led to the generalized script may be hard to recover. The same sort of information may not even be represented in any stored autobiographical episodes. In that case, the child will not be able to retrieve any episodic

> memories; there are no occasion-specific memories to retrieve. If the child's experiences have been benign, this is likely to be unimportant. When the experiences stored in scripts include pervasive unresponsiveness from a clinically depressed parent, routine incestuous molestation, or recurring family violence, the damage these scripts can do to the child can be painfully serious, and retrieving any occasion-specific memories for reinterpretation in psychotherapy can be painfully difficult" (p. 229).

This information on memory helps to clarify the process by which internal working models are developed and maintained through the lifespan. The semantic and procedural memories begin very early in life, based on the anticipated behavior of caregivers. "Bretherton, Crittenden, and Main have all argued that caregivers influence not only the content of the interactions the child experiences, but also the rules the child develops for deciding what information to store in generalized form, what information to keep as accurately as possible, and what information to discount altogether" (Colin, 1996, p. 239).

Relevant here is the distinction between *trauma* and *shock* (Castellino, 2000). Trauma is an injury that occurs during an event that, to some degree, propels an individual toward mental, emotional or physical overwhelm. Shock is a physiological process that occurs in response to trauma when the individual goes into overwhelm. Both levels of injury are deeply embedded in the body and unconscious, shock more pervasively so. When a current experience triggers the embedded shock memory, the body responds as if it is actually reliving the original imprinted experience, a recapitulation of the trauma. Because the response is a reaction to overwhelming terror, the recapitulation of it often is an activation of the parasympathetic nervous system, that is shutting down and withdrawal of attention, dissociated loss of conscious awareness.

When we therapeutically uncover defenses, we bring to awareness the terrible traumatic truth they were used to hide. To the degree that it was originally overwhelming, the response is to freeze like a deer caught in headlights. Changing a person's working models which were based on trauma and shock requires slow and steady reconnection with the inner resources which were left behind, abandoned in the tradeoff for the illusion of control. With sufficient safety and corrective attachment experience, the working models can be changed. How does that occur?

Infants are equipped with a functional memory system from before birth. During development, the cognitive, motor, emotional and state-regulating areas of the brain organize in response to experiences (Brown, 1994; Perry, 1988; Perry, 1997), and change in response to experience, a

process called brain plasticity, in which the physical properties of neurons are changed..

These changes in neurons are recorded as memory (Kandel, 1989). The degree of brain plasticity is related to the individual's stage of development and the area or system of the brain (Perry et al., 1995). Once an area of the brain is organized, it is much less responsive to the environment - it is less plastic. Also, the limbic system (brainstem and midbrain areas that mediate habitual stress response patterns) is less plastic than the cortex (reasoning). So, for example, after age three the infant's limbic responses are much less likely to change. The developing prenate and infant is highly malleable, generalizing experience into internal working models which become deeply embedded in the limbic system in unconscious procedural and semantic memory.

Because the stress response process works reflexively and unconsciously, and is based on many procedural memories unchanged since very early in life, an individual is vulnerable to false generalizations of threat. Incoming sensory information may be interpreted as danger and acted upon in the brainstem, midbrain and thalamus milliseconds before the information gets to the cortex. There it may be interpreted as harmless, or it may not be processed consciously at all. Not every loud bang is a gunshot, not every man is abusive, and not every social group will reject me. Yet these memories, or internal working models, are stored in and operate reflexively from the least plastic parts of the brain. They are the most resistant to change in response to new situations that dispute the deeply embedded generalization.

In traumatized children, exposure to chronic and repeated stressors literally alters a variety of brain stem related functions, including emotional and behavioral functioning (Courchesne et al., 1994; Perry, 1994; Perry et al., 1990). Over time, the thought of a recalled trauma may be sufficient to activate limbic and brainstem areas, no longer requiring a sensory input resembling the original event to trigger emotional, motor and arousal/state changes (Greenwald et al., 1996). The capacity to bring the automatic reaction into a state from which choice is possible, to internalize new cognitive information, depends on having portions of the cortex activated, which, in turn, requires a state of attentive calm (Castro-Alamancos & Connors, 1996). That is a state the traumatized child rarely achieves (Perry et al., 1995). Children in a state of fear store and retrieve information from the world differently than children who feel calm (Eich, 1995; Kim & Fanslow, 1992; McNally et al., 1990). Such children are in a

persisting state of arousal and anxiety, or are dissociated. In either case, the child is caught up in the hyperarousal, hypervigilance, startle response and sympathetic nervous system hyper-reactivity of posttraumatic stress disorder (Perry et al., 1990).

Procedural memory is highly durable through the life-span (LeDoux et al., 1989). For example, while explicit memory is impaired with the onset of schizophrenia, procedural memory is preserved (Watanbe et al., 2002). Also, advancing age into late adulthood brings a marked performance deterioration in working memory and episodic memory, but not necessarily for procedural and semantic memory (Baeckman et al., 2001).

Factors influencing memory retention

Influences that *enhance* encoding of prenatal, perinatal and infant memories:

1. *Intensity*. The more intensely experienced an event is, the more likely it is to be recorded as a long-term rather than short-term memory. Long-term memory is recorded in cells with entirely new proteins and new connections among nerve cells, whereas short-term memory is created when proteins in nerve cells are modified only temporarily. A dramatic example of the effect of intensity on creation of long-term memories is the phenomenon known as "flashbulb memories." Most people retain an enhanced memory of where they were and what they were doing when President Kennedy was assassinated, or when the space shuttle Challenger exploded. The dramatic intensity of the experience enhanced the memory storage as long-term (Bremner et al., 1996).
2. *Repetition*. Neural circuits in the brain are connections between cells, pathways created to record an experience. Increased traffic over that pathway, i.e., more frequent use of the connection, makes the connection stronger, faster, and more permanent. A connection used infrequently atrophies and is eventually abandoned: "use it or lose it." For example, children who are rarely spoken to, read to or played with in their early years will likely develop poor language and social skills. On the other hand, any experience that is repeated frequently will become deeply embedded in long-term memory.

3. *Fear*. When an experience is fearful, it is more likely to be recorded in long-term memory (Wilson & McNaughton, 1996). Memory of the fear is deeply embedded, and easily generalized to other stressful situations, even if they are unrelated to the initial fearful incident. The neurocircuits of fear may be difficult to access, but they are difficult to erase. According to Verny and Weintraub (2002, p. 167), "memories of abuse are different from normal memories, and research bears that out. Locked away in the recesses of our brain so we are shielded from their intensity, these memories are more difficult to retrieve than other memories, but also more difficult to alter and erase. Because these unconscious, implicit memories are so powerful, they influence behavior throughout life."
4. *Verbal processing*. A child's memories of anything are more enduring when they have been talked about reflectively with caregivers at the time of occurrence (Bauer & Wewerka, 1995).

Influences that *impede* encoding of prenatal, perinatal and infant memories:

1. *Hormones* (oxytocin and cortisol). Studies show that, in high concentrations, the maternal hormone oxytocin extinguishes memory (Bohus et al., 1978). The mother's body (and therefore the baby as well) is flooded with oxytocin prior to birth and continuing for as long as she breast-feeds. Oxytocin facilitates uterine muscle contraction for birth and lactation, and serves also as an "anesthetic for the mind" (Verny & Weintraub, 2002), protecting us from remembering the traumas of birth. The mother also secretes the stress hormone cortisol at birth, which acts to extinguish recall of traumatic memories.
2. *Age of onset* of the trauma. The younger the child, the more likely to dissociate from traumatic events and repress memory (Bowman, 1996).
3. *Imposition of secrecy*. Being told not to tell effectively inhibits the child from speaking through immediate fear, and contributes to memory loss (repression) because it makes

unlikely any opportunity for verbal processing which would enhance the memory-making (Bowman, 1996).

4. *Degree of violence* of perpetration, including number of perpetrators. The more "unspeakable" the experience, the more violent, and the greater the number of perpetrators, the more likely the child is to dissociate from it, obscuring any memory (Bowman, 1996).
5. *Degree of intimacy* in the relationship between perpetrator and victim. The greater the sense of personal betrayal involved, i.e., the more intimate and trusted the perpetrator, the more likely a child is to dissociate from the abuse.

Reliability of hypnotic age regression to pre- and perinatal experience

How reliable are the memories obtained by adults in hypnotic age regression to womb experience? Assuming the validity of stored memories from early life experience, from infancy, birth, and the womb, how do we know that we are tapping into them through hypnotic age regression? Let's review some research.

Nash et al. (1979) studied the genuineness of hypnotic age regressions to emotionally charged situations at age 3. They verified that the hypnotic condition resulted in developmental (transitional object oriented) behavior indistinguishable from that of three-year-old children. One of the observed conclusions of the study was that age regressed individuals subjected to meaningful and stressful material evidence a more complete and accurate reinstatement of earlier emotional processes than experimental subjects who are age regressed but not to emotionally meaningful situations.

Raikov (1980) tested the authenticity of age regression to infancy. Regressed individuals exhibited several reflex responses that are unique to newborns and very young infants: the Babinski reflex (a fan-like dispersion of the toes), uncoordinated movements of the eyes (momentary movements of eyeballs up and down, independently of each other without the fixation of gaze), a characteristic high-pitched cry without tears, a grasping reflex (with the fingers bending around an object and the thumb remaining immovable), and a sucking reflex when the lips are touched. The subjects were unable to show any of the responses either before or after the hypnotic regression.

Age regressions to the birth experience itself were validated in a study by Cheek (1974) in which hypnotically regressed individuals

displayed head and shoulder movements obstetrically accurate for birthing babies. The postural changes reflected various alternative movements through the pelvic contours of a vaginal delivery. The subjects could not have known the medically sophisticated information. The subjects also displayed appropriate physiological concomitants of birth, such as respiratory distress, increased rate of neck pulsation, and the appearance of perspiration on forehead or fingertips. Cheek identified naturally occurring reactions when an individual recalls deeply repressed information, namely physiological responses such as perspiration, increased respiratory and heart rate, or other appropriate body reflexes and movements.

Ham and Klimo (2000) report on research showing that a high correlation exists between the womb experience recalled by individuals under hypnosis, and the birth mother's account of the pregnancy. In the study, the researchers verified that the relevant information had never been shared with the subjects, insuring that their only source for the information was their first-hand experience. In this study, subjects recalled, and birth mothers verified, a wide range of emotional states, including the emotions of happiness, joy, aloneness, sadness, frustration, resentment, disgrace, shame, disappointment, fear, and love.

There is a vast amount of anecdotal data, as well as a growing volume of research, that supports the claim of authentic pre- and perinatal memory retrieval by adults in clinical settings (Chamberlain, 1980/1986, 1981, 1987, 1988a, 1988b, 1990; Cheek, 1986; Wade, 1996).

Traumatic memories

How do memories of trauma differ from more standard narrative memories? We will summarize the mainstream interpretation of current research in the field.

When a child or prenate experiences repeated activation of a particular neural pattern (such as stress or fear), a process similar to tolerance to drug dosages occurs. The same neural activation can be elicited by decreasingly intense external stimuli (Kalivas & Kuffy, 1989). Eventually, apparently minor stressors can elicit full-blown trauma or fear responses. Thus, the more frequently a certain pattern of neural activation occurs, the more indelibly etched it becomes in memory. In an adult brain, repeated fear responses create learning, resulting in a *state* memory. In the developing brain of a young child, the same repeated fear responses organize neural pathways, resulting in *traits*. "In essence, the same unique molecular characteristics of nervous tissue that allow the mature brain to store new

information are those responsible for organizing the brain during development (Goelet & Kandel, 1986; Kandel & Schwartz, 1982)" (Perry et al., 1995, p. 275).

This process in traumatized children usually leads to one of two major response patterns: a constant state of hyperarousal, or the defense of dissociation (Perry et al., 1995). Generally, traumatized male children tend to exhibit hyperarousal response, while traumatized female children tend to exhibit heightened dissociative response. However, most children utilize some aspects of both patterns. The flexibility to use moderate levels of both hyperarousal and dissociation in response to trauma results in less time spent in either state for prolonged periods, decreasing the likelihood of persisting symptoms related to either state.

Animals have three substates of defensive reaction to imminent attack by a predator (Fanselow & Lester, 1988; Nijenhuis et al., 1998). A prey animal, sensing danger, first experiences *preencounter defense*, which involves a high state of arousal, narrowing of attention to potential threat cues, and interruption of any other activity, e.g., eating. Next the animal engages *postencounter defense*, consisting of short-lived flight, followed by freezing and silencing (predators have difficulty noticing immobile objects, whereas movement of the prey activates predatory behavior). Finally, *circa-strike defenses* are employed, characterized by analgesia, startle response, and short-lived flight and fight reactions. When these behaviors do not avert the attack, the prey returns to freezing. This sequence of natural reactions to attack are eerily similar to those of young children.

The hyperarousal response begins as the typical sympathetic nervous system response to threat (fight or flight): increased heart rate, blood pressure, respiration, a release of stored sugar, an increase in muscle tone, tuning out all noncritical information, and a sense of hypervigilance. With repetition, or with any event that is sufficiently similar to the original event, the child's nervous system is reactivated. The child may experience the same fear response when thinking or dreaming about the original event. Over time the specific stressors may generalize, so that, for example, the child becomes fearful in the presence of any man and not only the man who was abusive to him. The state of persistent hyperarousal has now become a permanent trait consisting of motor hyperactivity, behavioral impulsivity and hypervigilance. The catecholamine-generated (fear) arousal state facilitates the imprinting (habit-forming) process of learning in the child, exerting an enduring influence on neural development

(Schore, 1997). The more aroused the child is, the more deeply embedded are the memory tracks being laid down. Thus, generalized procedural-implicit memories from this developmental period are highly resistant to change. Moreover, the "toxic brain chemistry" of constant stress hormones (corticosteroids and catecholamines) circulating in the limbic area of the brain in a critical stage of growth actually destroys synapses and causes permanent lifelong impairment of the management of emotions (Schore, 1997).

The dissociative response also begins as a sympathetic nervous system response, i.e., to cry or call out for help. If the threat continues without help, however, (as it likely does when the parent is the abuser), the child transitions from activation to deactivation of the sympathetic system (i.e., freezing), initially becoming immobile and compliant, and later completely dissociated. The freezing response has adaptive advantages: immobility may provide camouflage from the attacker, and it provides time to "figure out" how to respond. Often children who have been traumatized exhibit this freezing mechanism when they feel threatened or anxious, and may act as if they "didn't hear" a parent's command or may "refuse" to comply. The caregiver may interpret the freezing response, not as one of fear but rather as one of defiance, and become more demanding. Hyperarousal or full dissociation may be the child's only remaining choice. As previously discussed, the child may become overwhelmed and respond with full-blown parasympathetic system "shock," a cessation of stress response. Alternatively, the child may dissociate without shock, with decreasing heart rate and blood pressure despite increases in stress hormone circulation. In either case, the observed behaviors include numbing, compliance, avoidance, and restricted affect.

Of course, a given individual experiences differing combinations of sympathetic (hyperarousal) and parasympathetic (dissociation) response to ongoing trauma. Children identified as having "disorganized-disoriented" insecure attachment respond to the traumatic environment with both: states of hyperarousal with long-lasting elevations of sympathetic catecholamine activity; and of parasympathetic dissociation associated with hypoarousal and increased cortisol production (Perry et al., 1995). These infants and toddlers experience extreme and rapid fluctuations between states, chaos in behavior as well as in the brain. These children develop deficits in the ability to interpret the emotions of others (Camras et al., 1983) due to the damage to limbic area synaptic connections in infancy, and are subject to extremely chaotic emotional swings, even under minimal stress. They are

vulnerable to PTSD (Rauch et al., 1996), and to panic states marked by terror and intense somatic symptoms (Heller et al., 1995).

The infant's experiences of emotionally unresponsive or abusive caregivers are stored in the developing limbic area of the brain as imagistic, visceral, and nonverbal procedural memories (Schore, 1997). This seems to be the case for children who were exposed to chronic abuse; however, Terr (1991) has found that memory is not impaired in children after a single trauma experience.

What factors determine whether a given child responds to threat with hyperarousal or dissociation? Perry et al. (1995) identify age, the nature of the trauma, and gender differences as determining factors. The younger the child, in general, the more likely he/she is to use dissociation. The child's age also determines, of course, what will be experienced as traumatic and what will be less so (e.g., separation from mother for a one-year-old or for a ten-year-old). The more immobile, helpless, and powerless children feel, the more likely they are to use dissociation. When the trauma involves physical restraint or injury, extreme pain or torture, or no escape, the child is more likely to use dissociation. Females tend to use dissociation and males tend to use hyperarousal. This gender-based pattern is starkly highlighted in the predominant psychiatric diagnosis for children. More boys exhibit aggression, inattentiveness, impulsivity, and combativeness, thus meeting the criteria for externalizing disorders such as ADHD, conduct disorder, and oppositional-defiant disorder. More girls exhibit compliance, numbness, and depression, meeting the criteria for internalizing disorders such as depressive, anxiety, or dissociative disorders.

These patterns of response to stress are also observable in prenates in the womb. Remember the twins that Piontelli (1992) reported on, with seemingly unique traits: loving, contentious, or passive. DiPietro et al. (1996) studied fetuses at 6 gestational ages beginning at 20 weeks gestation and found stable individual differences in neurobehavioral functioning prior to birth. They examined the temperament of the infants at 3 and 6 months after birth, and found correlation to the prenatal patterns.

The differences in children's stress or trauma response are significant to the actual development of their brains, and to the memory systems that store a record of the experience. Early dissociative patterns or early hyperaroused patterns become embedded in neural pathways, predisposing the child to continue with that same pattern while he/she grows up. For

example, exposure to childhood stressful events has been shown to influence the occurrence of PTSD in adulthood (Bremner et al., 1993).

Each of these predominant patterns also affects the child's memory system. The memories of early trauma are state-dependent, and are associated somatically with the specific nervous system (sympathetic or parasympathetic) which is activated at the time of the trauma. Later retrieval of the memories will be facilitated by a return to the original state.

Traumatic memories tend to be recalled, at least initially, in the form of dissociated mental imprints of sensory and affective elements of the experiences; that is, as visual, olfactory, affective, auditory, and kinesthetic experiences, "without any semantic representation ... experienced primarily as fragments of the sensory component of the event" (van der Kolk & Fisler, 1995, p. 513). In addition to their fragmentary nature, sensory memories of trauma differ from more standard narrative memories in that they (1) are relatively invulnerable to change (van der Kolk & van der Hart, 1991), and (2) are not under conscious control, but instead are invoked automatically in response to certain experienced cues (Brewin, 1989; Brewin et al., 1996).

LeDoux (1992, 1995) has demonstrated that the amygdala is critically involved in the learning of fear responses, and thus plays a central role in traumatic memories. LeDoux has identified two pathways from the thalamus to the amygdala: one via the cortex and the other circumventing the cortex. When information, and the resulting learning and memory, travels through the cortex, it is subjected to conscious processing and all that goes with it (e.g., reality-testing, cognitive review, and deliberate choice). When the information bypasses the cortex, it is subcortical, and it could "generate emotional responses and memories on the basis of features and fragments rather than full-blown perceptions of objects and events" (LeDoux, 1992, p. 277). Memories thus created may be fragmented, but they may also be more indelible.

In moments of trauma, stress hormones enhance implicit-procedural memory formation in the amygdala (Nelson & Carver, 1998), "cementing emotional memory" (Post et al., 1998, p. 845). The same stress hormones limit explicit-episodic memory formation in the hippocampus. Traumatic memories are encoded in brain cells through high frequency activation, while low chronic and sustained stimulation actually reverses the effect (Post et al., 1998). As Wolf et al. (2000, p. 416) state: "This may suggest a

method of biologically decreasing the hypervigilant aspects of memory in trauma."

Activation of the amygdala is a manifestation of a neurobiological fear reaction, and enhanced amygdala activation is found in individuals with Borderline Personality Disorder (Herpertz et al., 2001), posttraumatic stress disorder (Rauch et al., 1996), and in obsessive-compulsive disorder patients (Breiter et al., 1996a; Breiter et al., 1996b) during fMRI scanning of their provoked symptoms. Further, the amygdala is activated by perseverative thoughts and memories (Aggleton 1992).

Van der Hart and Nijenhuis (2001) verified a long-standing observation in the field of psychiatry, referred to as Ribot's law of regression, that the recovery of lost procedural and semantic memories precedes the recovery of episodic memory, particularly in the recovery of trauma memories. It is common in therapy with trauma victims to observe their healing process begin with awareness of "body memories" and other procedural-implicit memories, and then gradually expand to include specific episodic memories of where, when, and how the trauma occurred.

Because traumatic memories allow the child access only to the right brain (and the left brain is responsible for organizing and making sense of information), memories of trauma can be confusingly disorganized. Normal (non-traumatized) people use both sides of the brain to store both positive and negative memories, and use the brain's limbic system to store memory until about age 3, and then higher-level brain systems take over memory functions. Traumatized children store positive memories in the left half of the brain, and negative memories in the right half and in the limbic system. For traumatized children, the limbic system is constantly triggered by emotions and arousal, so other areas of the brain never develop to store and make sense of memory, and they are unable to respond appropriately to current events because of being caught up repeatedly in traumatic memories. van der Kolk (1997) summarizes the effects of trauma on a child in this way:

> The tasks of normal infancy and childhood are to learn to attach to and trust others, to learn how to play and share with others, to have conflicts and learn ways to resolve them, to learn to dream and to imagine, to learn to have empathy for oneself and others, to learn how to settle oneself down when upset, and to learn how to regulate one's level of arousal. Serious, chronic trauma during infancy and early childhood dramatically interferes with each of these tasks.
>
> Healthy attachment cannot take place when a child's midbrain (the limbic system and amygdala primarily) is under a constant state of arousal, is constantly subjected to the demands of stress hormones, and is unable to go about the process of normal branching out

and connecting to other brain cells. As a result, traumatized children do not learn how to play, to relax, to regulate their own level of arousal, and how to understand and have empathy and compassion for either themselves or others.

Dissociation and repression

During the experience of a trauma, individuals may detach or dissociate themselves from the ongoing experience, radically altering the way in which the experience is encoded in memory and later retrieved (Meares, 1999). Individuals with extreme dissociative tendencies are known to manifest marked impairments of memory (Eich, 1995; Eich et al., 1997).

Dissociation is a complex mental process during which there is a change in a person's consciousness which disturbs the normally connected functions of identity, memory, thoughts, feelings and experiences (e.g., daydreaming during a boring lecture or disconnecting during an experience of abuse). Usually, the more chronic and the more bodily intrusive the trauma has been, the more extreme the dissociation becomes.

Repression is understood to be an after-the-fact defense in which memory for the traumatic event is impaired. Dissociation is a real-time defense in which consciousness is not fully engaged on the immediate event. Hilgard (1986) has proposed that repression may be considered as amnesia resulting from dissociation. Thus we might conceptualize a continuum of possible forms of dissociation, as discussed by Freyd (1996). At one end of the continuum are dissociations occurring early in the process that prevent information from being encoded and stored as episodic memories. Although information may be blocked from entering conscious awareness and episodic memory, procedural memories of somatic or sensory traces may nevertheless be encoded and stored. In trauma people experience "a significant narrowing of consciousness, and remain focused on only the central perceptual details" (Putnam, 1997, p. 285). One way of coping with overwhelming affect is to focus dissociatively on a sensory detail of a scene – a smell, sound or visual image - in order to ward off painful feelings. These visual or auditory stimuli may then become powerful triggers for flashbacks later on, or points of access to the deeper memories. Commonly, adults retrieve experiences of childhood trauma through a particular smell (e.g., the combination of tobacco and alcohol of an abuser), or visual (e.g., the wallpaper in the room where abuse occurred), or "body memories" of pain in the genital area or choking on an object in the throat. Research (Browne,

1990; Squire, 1992) documents how selective attention can produce amnesia for conscious episodic memories yet store intact sensory and affective memories.

At the other end of the proposed continuum of dissociation, in what resembles repression, amnesia can occur without disruption of mental processing of the initial event. An event is experienced and a memory of it is fully encoded and stored. This may happen if, for example, an event becomes identifiable as traumatic (e.g., a betrayal) sometime after it occurs. Dissociation occurs along this continuum as an individual dissociates from aspects of an event. For example, a person may dissociate from the emotional context of the experience while retaining the episodic memory for content. Bromberg (1998, p. 132) discusses just such a situation for an infant: "experiences too intense to be cognitively processed by the forming self were forced to be retained as traumatically unbearable mental states that were then dissociated. . . to preserve other areas of functioning and sometimes sanity itself." These states are then generalized into unconscious memory, lurking just outside of awareness until they are evoked by something that triggers them, or they can stay hidden from awareness indefinitely.

Let's examine how memory, working in several dissociated levels, allows some aspects of one's experience may be repressed while other aspects remain conscious. James Chu (1998) has offered the BASK model, according to which any one or any combination of the following may be dissociated: behaviors, affects, sensations, and knowledge. For example, a person may give a factual and full account of a traumatic incident, but tell the story like a robot because of not having access to the affective dimension of the terror or pain involved. In such a case, affect is dissociated while knowledge is not. Or, an individual may be fully and painfully conscious of a constant state of fear, and of the hypervigilance behavior it leads to, but have no conscious knowledge of the events which caused it. For this reason, the BASK model is useful: It enables one to ask what *part* of the experience is missing, and to focus on the reconstructive processes that address the best way of reaching each one. We might work cognitively to regain missing knowledge, and experientially to reconnect with missing affect or sensation.

The explicit memory system records facts and events, and the implicit memory records the more visceral emotions and sensations accompanying the events. A coherent, functioning personality relies on a relatively smooth integration of the different memory systems. However, trauma

changes the neurophysiology of the body and seems to break links between different memory systems, making it harder to integrate sensations and emotions into a coherent narrative. Explicit memory seems to fail more easily during conditions of stress, fear or pain, leaving a person as baffled and overwhelmed when triggered into recalling dissociated memories as he/she was in the original experience.

What determines whether a traumatic memory is carried cognitively, available to consciousness, or somatically, unavailable to recall? We have earlier outlined the factors that either enhance or impede encoding traumatic memory. Another explanation is proposed by Emerson (2002, p. 76): "Through close observation, I have come to find that if trauma is pre- or perinatal, these tonic patterns, postures, and movements actually contain the trauma and hold the memory. In contrast, post-verbal memories may not be contained by somatic patterns, but are contained by the central nervous system as cognitive memories. The exception is that post-verbal traumas may be contained by the somatic processes mentioned above, if they also reenact or symbolically represent prior pre- or perinatal traumas."

If a pattern of losing conscious awareness of specific mental contents (memories, ideas, feelings, perceptions) begins in infancy, it is likely to continue. A study by Ogawa et al. (1997) documents an increase in dissociative symptomatology among adolescents with early attachment patterns characterized as disorganized or avoidant, and with a history of infantile neglect. Seriously insecure attachment creates a dissociated core of the self, an absence of self. It reflects a breach in the boundaries of the self, creating in Peter Fonagy's words "an openness to colonization" by the mental states of other important attachment figures.

Newborns and infants are known to be capable of dissociation. Rovee-Collier (1997) reviews evidence that very young infants exhibit memory dissociations like those exhibited by adults. Main and Morgan (1996) describe the resemblance between infant behavior in separation situations and dissociative reactions in adults. Newborns are able to go into an analgesic trance at will, a primitive form of the more complex process of dissociation (Brazelton, 1962; Papousek, 1969).

How early in life is the dissociation defense available? The prenate, as we have seen repeatedly, is highly responsive to stress with activation of the sympathetic nervous system through its stress hormones. If the newborn is capable of dissociating, then it seems likely that the prenate is as well. Perhaps the 'fetal behavioral state 1' identified by Nijenhuis et al.

(1982), i.e., quiescence with only occasional startles, no eye movements, and stable fetal heart rate is, in fact, a state of prenatal dissociation.

Implications for psychotherapy with children.

The treatment of pre- and perinatal trauma in infants and children is an exciting prospect. William Emerson is a pioneer in this field, having begun his research and developing his methods in 1974. He summarized the importance of early treatment (1996):

> It is important that pre- and perinatal traumas be treated as early as possible. This is so because, as previously discussed, early traumas shape how subsequent events will be perceived and experienced. If treatment occurs early on, during gestation or the first year, then childhood experiences can be freed from prenatal influences, and children can live their lives unencumbered by the bonds of trauma. The effects of trauma have been described elsewhere (Emerson, 1992, 1994). Unresolved traumas affect the spiritual and psychological development of children. In contrast, children who had no trauma, or whose traumas have been resolved, are clearly unique in the following ways. They are more spiritually evolved, manifest higher levels of human potential, and are developmentally precocious. They exhibit higher self-esteem and intelligence test scores, and they are more empathic, emotionally mature, cooperative, creative, affectionate, loving, focused, and self-aware than untreated and traumatized children (Emerson, 1993).

Traumatized infants can be treated through many techniques of catharsis and empowerment. For example, Emerson's *Birth Simulating Massage* brings the somatic and visceral traumatic memories to awareness, in a loving and compassionate way, and assists the infant to release them, rather than hold them and continue to defend against them. Gentle massage is applied to the areas of the infant's body in which the birth trauma is stored, simulating the pressures of the uterus and pelvis during movement through the birth canal. The infant expresses the pain embedded there, and in so doing releases it from the body, from the emotions, and from memory.

When the emotional cathartic work is complete, the infant is facilitated to experience empowerment, a corrective experience that brings somatic confidence. An example is what Emerson calls *schematic repatterning*. Birth schemas are the deeply embedded procedural-implicit memories (stored somatically, viscerally) of the experience of moving from womb to delivery. Emerson uses the term birth schemas as essentially equivalent to Lipton's learned perceptions, Colin's generalized script, or the internal working models of attachment theory. If not dissipated through corrective experience, these deeply embedded prototypes for life will exert profound influence, as we have seen, over the individual's lifespan. The repatterning

provides an opportunity for the infant to discover any dysfunctional schemas remaining from the prenatal or birth experience, to release them, and to replace them with healthier, more functional patterns.

Treatment of trauma with young children requires establishing ways for the child to approach traumatic memory safely and gradually. A typical pattern is for children to begin exploring the least overwhelming part of the experience and gradually move into more painful aspects as they experience being accepted unconditionally regardless of what they reveal. The child's recall of a traumatic event involves not just the verbal, the narrative fragments as recalled using cognitive memory, but also the intense fear of the emotional memory, the motor agitation of the motor memories and the physiological arousal or dissociation of the state memory. The therapist must use play techniques, of course, to elicit the recall: e.g., sand trays, drawing pictures and painting, working with dolls or playhouses, storytelling, playing with toys, role playing, and gross motor stimulation with active games.

The ultimate resolution of many psychopathologies in childhood or, if untreated in childhood, then later in life, requires that relevant pre- and perinatal traumas be uncovered, encountered, catharted, repatterned, and integrated into consciousness.

Implications for psychotherapy with adults.

The work of experiential psychotherapy is to bring the unconscious (noetic) semantic memories, the internal working models, to (autonoetic) consciousness. Recall that certain aspects of a memory increase the felt quality of it, the autonoetic remembering of it. They include the spatial temporal context of the original event, multiple associations, perceptual vividness, intensity of affect, and consistency with other episodic and semantic memories (Tulving, 1985). In hypnotherapeutic age regression, we easily observe this phenomenon. The individual follows an affect or somatic bridge back to a source event. The more vivid the details of time and setting she is able to furnish, the more engrossed she becomes in *reliving* the memory instead of just *recalling* it. The less elaborate the details, the more it becomes a sense of familiarity without precise circumstances ("It was just always like that when I was a kid"). Of course, the unconscious generalized memories will remain unexamined until they can be accessed.

It will be helpful to the effective therapist to remember that recovery of memory varies for each individual, and to let go of expectations for the

form and specificity of memories or age regressions. Hansen and Hansen (1988) suggest that repressive individuals' memories are relatively inaccessible to them, because of the limited associative connections between emotional memories and memories for other life experiences. Generally, memories for emotionally significant events incorporate a complex mixture of *dominant* and *nondominant* emotional states. For example, the recall of a sad memory elicits the dominant emotion of sadness plus nondominant emotions such as anger, shame, or fear. Repressive individuals do not experience nondominant emotions as strongly as nonrepressive individuals do, suggesting that repressors' memories of emotional events are not tightly connected but are rather dissociated from each other. Repressors tend not to focus on nondominant emotions when initially experiencing an event.

Davis (1987, 1990; Davis & Schwartz, 1987) found that repressive individuals recall fewer early childhood memories, and take longer to retrieve the memories they do recall, and that the memories are available but not easily accessible because of the lack of associative interconnections. Once emotional memories are recalled by the repressive person, however, they can be retrieved later as easily as by the nonrepressive person. Mikulincer and Orbach (1995) found that avoidant adults took longer to retrieve early childhood memories of negative experiences, and that the memories recalled do not contain a diffuse array of nondominant emotions. They have a relatively dissociated memory system for experiences related to emotions, attachment, or relationships, indicating that they have structured their experience to minimize vulnerability to emotions that might trigger an emotional response.

Corrective experience ("old-old," "old-new," and "new-new")

The vital importance of creating a corrective experience for the individual who travels back into traumatic memories cannot be overstated. Without the corrective experience, re-experiencing earlier trauma is simply re-traumatizing. One cogent conceptualization of this process of recovery from trauma is presented by Shane et al. (1997) in their discussion of developmental systems self psychology. Developmental systems self psychology is a variation of self psychology that incorporates ideas from attachment theory, neurobiology, and nonlinear dynamic systems theory. This approach suggests a three-stage healing process that occurs in therapy, based on the therapeutic relationship which develops in a nonlinear fashion. Initially, the client experiences life, including the

therapy relationship, based on the deeply-embedded implicit-procedural memories of trauma and their generalizations (beliefs). This Shane et al. refer to as the "old (traumatized) self," reflexively and unconsciously in relationship to the projected "old (trauma-producing) other," i.e., the abuser. Such a configuration of relationship they call "old-old." This may occur either acutely in a flashback state, or continuously in a chronic state of traumatic hypervigilance (Wolf et al., 2000).

Through corrective experiences, or what Shane and colleagues call "positive new experiences" with the therapist, the client begins to enter a second phase of healing: the "old-new" configuration. Positive new experience is defined as experience that moves the client along the trajectory of developmental progression from an old traumatized self in relation to an old trauma-producing other to a healthy new self in relation to a new development-enhancing other (Wolf et al., 2000). The client, still suffering in the "old" traumatic state, perceives the therapist as a "new" non-traumatizing, appropriately responsive and safe relationship. Finally, the client experiences a shift in the self to a "new" non-traumatized, secure state, capable of accepting healthy relationship with the "new" non-traumatizing other: a "new-new" configuration.

Facilitating the client to re-experience early trauma provides the context, through corrective experiences in "new-new" relationships, for diminishing the continued influence of the deeply-embedded implicit-procedural dysfunctional memories. However, re-experiencing early trauma *without* corrective experiences simply revives and strengthens the old neural networks of traumatic memory. Research (Post et al., 1998) now shows that this repetition of "old" patterns actually reinforces the implicit-procedural neural pathways, making them more resistant to positive change: "repeated intermittent experiences of stress can lead to behavior sensitization rather than tolerance. The experience can leave behind neurobiologic memory traces at the level of gene expression such that upon rechallenge later in life, an increased rather than decreased reactivity will be evident" (p. 835). Conversely, research (Rizzolatti & Arbib, 1998) also now shows that implicit-procedural memory and its affective connections can be modified through corrective experience, and that traumatic implicit-procedural neural pathways thus can become minimized or extinguished, to be replaced by pathways that reflect a more positive experience. This latter point is reflected in the common practice in hypnotherapy and other experiential work of "rehearsing" and "anchoring" the new, corrective resource state to embed it in enduring neural pathways. After all, "The

more frequently a certain pattern of neural activation occurs, the more indelible the internal representation. Experience thus creates a processing template through which all new input is filtered" (Perry et al., 1995, p. 275).

For many of our clients, the deep experience of emotions has been blocked or repressed. Often in experiential therapy the key to unlocking those repressed emotions is to get the individual "into their body" and the energy in their body moving. Activating the flow of physical energy activates the flow of emotional energy. It may also release "body memories," which bring to consciousness any repressed memories of experience contained in them.

Integral to any corrective experience in clinical treatment of early trauma is accessing the state-dependent ego state that experienced the original trauma and empowering that self to express what couldn't be expressed at the time, to give back to others what was mistakenly internalized, and to reclaim what was thoughtlessly or abusively withheld at the time.

Ego states, particularly those created in moments of trauma, may be predominantly somatic. Stated another way, symptoms may be state-specific, and physical symptoms may contain dissociated memories. For example, the child physically shutting down to become totally still as a means of defense against the terror of abuse creates a "somatic ego state" of pervasive immobilization. Following the somatic bridge (body memory) of immobilization back in regression may lead to conscious access to the memory of the source trauma which created that ego state - the incident of terrifying abuse. The dissociated memories are "physically contained" within the somatic symptoms (Gainer, 1993). That wounded ego state can be dramatically healed by retrieving it for re-experience in age regression, abreacting the experience, and allowing a means of reintegration and transformation of the trauma experience into a *physically* corrected experience of empowerment (van der Kolk & Greenberg, 1987). A *physical* corrective experience activates psychophysiological resources in his/her body (somatic as well as emotional resources) that had been previously immobilized by fear and helplessness (Levine, 1991; Phillips, 1993, 1995). The regressed person is allowed to actually experience the originally immobilized voice yelling for help, and the originally immobilized muscles kicking and hitting for protection. These somatic and emotional corrective experiences *reassociate* the individual's originally dissociated body and emotion in positive ways to positive outcomes.

Changing a trauma-induced behavior (such as fears, phobias, self-defeating patterns, recurrent and intrusive dissociation, numbing of general responsiveness) is best accomplished *in the ego state in which the behavior was originally established*. Here we refer to recent research in state-dependent memory and learning (Rossi, 1986; Janov, 1996; Pert, 1997). Research shows that a person who learns a task or creates a memory while under the influence of a particular emotional state will repeat the task or recall the memory most efficiently when again under the influence of the same emotional state. We might use the hypnotic age regression to access a traumatic event for healing, assisting the person to reconnect with the state in which the state-dependent learning took place.

We have seen that the body, not only the brain, contains the unconscious mind. The body physically encodes its learned symptoms, neurotic coping mechanisms, and decisions in the limbic-hypothalamic systems. Healing occurs by accessing the encoded learned responses, following the affect or somatic bridge back to the state in which they were learned, and healing them through activating psychophysiological (physical and emotional) resources in the body that had been previously repressed or immobilized. The mind and the body are, in fact, one: the mindbody.

> Psychosocial interventions emphasizing emotional expression or active coping have evidenced survival benefits in breast cancer and melanoma. These findings suggest that emotional expression generates balance in the neuropeptide-receptor network and a functional healing system. Emotional expression is also a marker for psychospiritual vitalization (Pert et al, 1998, p. 30).

There is ample evidence of the vital importance of a somatic, or physical, experience for accessing deep trauma, and for healing that trauma. This principle operates on the cellular and hormonal level of the body, where memories are encoded and can be reframed. This principle also operates on the gross motor level, wherein body memories provide a somatic bridge to follow in the retrieval of repressed emotions and memories, and in the physical reframing of now-dysfunctional imprints.

In summary, the unborn child begins showing individual behavior and personality traits as early as 13 weeks gestational age, and these characteristics continue on after birth. Indeed, the experiences of womb life are recorded in deeply embedded memories which profoundly influence the individual over their lifespan. These learned perceptions, or generalized scripts, or internal working models remain unconscious until the individual

brings them to awareness, resolves any incomplete development, and releases the now dysfunctional patterns. Hypnotherapy is one of the most effective tools for facilitating this process of discovery and healing.

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