The Biopsychosocial Transactional Model of Development: The Beginning of The Formation of An Emergent Sense of Self in the Newborn

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Full Text: Headnote ABSTRACT: The rationale for providing an emotionally positive experience for both the infant's beginning "emergent sense of self (Stern, 1985) and for his return to the "Secure Base" (Bowlby, 1988) of his mother vis-a-vis his innate ability for "self attachment" within the first hour after birth (Righard &Alade, 1990) is explored.Giving birth and being born are both physiological and psychological processes. Since it is now known (Schore, 1994; Shore, 1997) that the interaction between the infant and his mother creates the structure and organization of the infant's developing brain, it is important to become aware of and responsive to the self attachment research regarding the Amazing Newborn (Righard &Alade, 1990; Klaus &Klaus, 1998). INTRODUCTION Knowledge about infant mental health and development has grown extensively in the last two decades. Through systematic observation, research and clinical intervention, there is now a more detailed and sophisticated understanding of the factors that contribute to either adaptive or maladaptive patterns of development. This knowledge, in turn, has led to an increasing awareness of the importance of prevention and intervention in creating (or restoring) favorable conditions for the infant's development and mental health (Zero to Three/National Center for Clinical Infant Programs, 1994). THE RELATIONSHIP BETWEEN SECURE ATTACHMENT AND THE PROTECTION OF BIOLOGICAL FUNCTION The development of new research tools, such as brain imaging technologies, have led neuroscientists to realize that the infant's development not only takes place within the context of the caregiving relationship (Siegel, 1998), but also that the quality of the developmental process of the brain-beginning even before birth is affected by environmental conditions, including the kind of nourishment, care, surroundings and appropriate stimulation the prenate and the infant receive from caregivers. It has also become more clear that human development and learning depend critically on the interplay between nature (an individual's genetic endowment) and nurture (the quality of the infant-parent relationship). Responsive caregiving not only meets the baby's basic needs for nourishment and warmth, but also takes into account rhythms, preferences and moods. The brain is a mirror reflection of the organization of the patterning, timing, nature, frequency and quality of both the interactional and relational experiences of the young child (Perry, Pollard, Blakeley, Baker &Vigilante, 1995). The qualities of both responsive caregiving and the ways hi which the caregiver mediates the infant's contact with his environment not only affects the developmental process, but even more importantly, directly affects the formation of neural pathways and patterns of neuronal connectivity within the brain (Shore, 1997). The neural systems underlying emotional, behavioral, cognitive, social and physiological functioning depend upon the inherent capacity of the brain to organize and give meaning to the experiences of infancy and childhood (Bleiberg, 1995). By age three, the brain is 90 percent the size of the adult brain and the majority of the key neural systems have been organized (Thoenen, 1995). As Eisenberg (1995) succinctly wrote, "the human brain is constructed socially." It now appears that the need for a strong, secure attachment to a nurturing caregiver (Ainsworth, Blehar, Waters &Wall, 1976; Bowlby, 1988) not only promotes healthy development, but also seems to have the protective biological function of "immunizing" an infant to some degree against the adverse effects of later stress or trauma (Gunnar, 1996 in Shore, 1997). Megan R. Gunnar of the University of Minnesota has gauged children's reaction to stress by measuring the levels of a steroid hormone called cortisol in their saliva. Traumatic events, whether physical or psychological, can elevate an individual's cortisol level. In turn, cortisol affects metabolism, the immune system, and the brain. Cortisol alters the brain by making it vulnerable to processes that destroy

neurons and reduce the number of synapses in certain parts of the brain. Children who have chronically high levels of cortisol have been shown to experience more developmental delays-cognitive, motor, and social-than other children (Gunnar, 1996). By six months prenatally, the nerve cells are in place in the brain. However, at birth, the brain is remarkably unfinished. The number of connections (synapses) from cell to cell depend on experience. The baby's experience (perception) of the quality of both the interactional process and the infant-caregiver relationship creates the connections between the cells and the infant's ability to process information. The fact that the brain matures in the world, rather than in the womb, means that young children are deeply affected by their early experiences and interactions which determine brain structure, thus shaping the way people learn, think, and behave for the rest of their lives (Reiner Foundation, 1997). THE ACTIVE ROLE OF THE BABY ON BIRTH The outside world of the infant is experienced through the senses-seeing, hearing, smelling, touching, and tasting-enabling the brain to create or modify connections (Reiner Foundation, 1997). Bonnie Bainbridge Cohen's work of "Body-Mind Centering" has explored developmental patterns and anatomical systems. She has identified the mind states and movement quality associated with the activities of specific patterns and systems both in the prenate and during the first year of life. Cohen (1993) states that this period of development "is when the relationship of the perceptual process (the way one sees) and the motor process (the way one moves or acts in the the world) is established". Cohen has also expanded the list of the five major senses to include the sensations of movement and visceral activity. Cohen believes that "all mind patternings are expressed in movement, through the body. And, that all physically moving patterns have a mind" (Cohen, 1993). To understand the active role of the baby in birthing one must enter the kinesthetic realm of the prenate (Cohen, 1993; Burns, 1998). Recent discoveries in the development and neurobiology of memory have given insights into the nature of how our minds respond to experience which influences later functioning (Milner, Kandel &Squire, 1998 in Siegel, 1998). Two major forms of memory have been described-implicit and explicit. For the purpose of this paper, only implicit memory will be discussed. Implicit memory includes a range of processes such as emotional, behavioral, perceptual and possibly somatosensory memory (Siegel, 1998). These forms are present at birth and are thought to be carried out in areas of the brain that include their functions such as the amygdala and other areas of the limbic system (emotional memory), basal ganglia and motor cortex (behavioral memory), and the sensory cortex (perceptual memory). These regions are relatively well developed at birth and capable of responding to experience by alterations in the synaptic connections within their circuitry, the essence of "memory encoding". Another aspect of implicit memory is the ability of the mind to form schema or mental models of experience. Such mental models are a fundamental part of how attachment experiences are formed and influence the child's later relationships (Bowlby, 1969; Siegel, 1998.) RECENT RESEARCH REGARDING THE AMAZING NEWBORN The fairly recent discovery of the newborn's ability to crawl up to the mother's breast, attach himself unassisted and to suckle correctly (Righard &Alade, 1990) was published in The Lancet, 1990, 336: 1105-07. Righard and Alade looked at two groups of newborn babies. In the first group, the infant was placed on the mother's abdomen and within 50 minutes most infants had self-attached to the breast and were suckling correctly. In the second group the newborn babies were removed from the mother's abdomen, bathed, measured and replaced on the abdomen. The infants in this group, from an unmedicated birth, self-attached but half of them had a faulty suckling pattern. Most of the infants from a medicated birth were too drowsy to be able to suckle at all. Righard and Alade's research has been extensively elaborated by Marshall Klaus, M.D. and Phyllis Klaus, C.S.W., M.F.C.C. in their recent (1998) exquisitely prepared book Your Amazing Newborn. Raymond Castellino, D.C., R.P.P. with Debby Takikawa, D.C. and Samantha Wood, M.A. has also elaborated upon Dr. Righard's research. Dr. Castellino's paper entitled "The Caregiver's Role in Birth and Newborn Self-attachment Needs," was presented at the 8th International Congress of The Association for Pre- and Perinatal Psychology and Health (APPPAH) on "Birth, Love and Relationships" in December of 1997. Castellino, et al., believe that "understanding the delivery self attachment behaviors broadens the perspective of the bonding/attachment process. That healthy bonding and

attachment are the outcome of a whole sequence of events that are somatic, neurophysiological and psychological in nature". In addition Castellino, et al., believe that "babies and mothers who are supported to complete the delivery self attachment sequence immediately after birth will bond more completely, initiate nursing more effectively and be more cooperative with each other as the baby grows". They also suggest that "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". The Castellino group also point out that the newborn self attachment behaviors are unknowingly and routinely interrupted by hospital obstetric and midwifery practices. Therefore, the possibility of long lasting negative effects may or may not be recognized or even connected to the self attachment experience. THE NEED TO INTEGRATE CURRENT INFANT MENTAL HEALTH CONCEPTS AND DEVELOPMENTAL NEUROBIOLOGICAL FINDINGS INTO CAREGIVING Utilizing the research concerning: (1) infant development and mental health (2) the awareness that the baby has an active role in the birthing process (3) the recent advances in understanding how the quality of both the caregiving relationship and the infant-parent interactional process affects the structure, organization, and neurochemical architecture of the brain (Schore, 1994). the following discussion will endeavor: (1) to make more explicit the concept of infant mental health as defined by Alicia Lieberman, 1998 (2) to investigate the significance of the management of anxiety not only for the developmental process of the infant, but also for the integrity of the formative phases of the "self (Horner, 1984; Stern, 1985) (3) to broaden Stern's (1985) concept of the formative phase of the "emergent sense of self to the beginning of the emergent sense of self outside of the womb as manifested in the self attachment experience (4) to discuss how the interruption of the self attachment process could be experienced as trauma by both the mother and her newborn, and (5) to urge the need for preventive intervention. An Infant Mental Health Perspective In writing about an "Infant Mental Health Perspective" Alicia lieberman (1998) has identified five main principles that define this point of view: 1. Babies are by nature social creatures 2. Individual differences are an integral component of babies' functioning 3. Every individual exists in a particular social, relational and environmental context that deeply affects the person's functioning 4. Infant mental health practitioners make an effort to understand how behaviors feel from the inside, not just how they look from the outside 5. The intervenor's own feelings and behaviors have a major impact on the intervention. The first four principles have to do with looking at external behavior as an inner, subjective experience. As mentioned before, babies develop within the context of relationships. The emotional bonds that are formed between the baby and his emotionally significant caregiver build the earliest foundations for mental health by helping the baby feel loved, valued, and competent, as opposed to feeling unwanted, burdensome, and ineffective. It is the passionate "only you" sustaining power of intimate relationships that is at the core of the baby's capacity "to love well and to grow well" (Lieberman, 1998). The Neuropsychodiological Significance of Self Attachment Surely, the baby's ability to self-attach gives both the mother and her infant the subjective experience of physical contact and social/emotional intimacy at the earliest kinesthetic, preverbal and neurochemical process of "falling in love" with one another. Since the brain is designed to be social and the limbic system is especially concerned with attachment, emotion and motivation (Shore, 1997), one could assume that the first "schema-of-being-with-another-in-a-certain-way" (Stern, 1995) is being formed that makes biological sense to the biologically "programmed" infant for secure attachment (Bleiberg, 1995). The limbic system, "comprised of cortical and subcortical structures actively selects, organizes and integrates pieces of information into the developing intrapsychic structure of the brain when reality matches the model in the mind", (Settlage, Bemesderfer, Rosenthal, Afterman, &Spielman, 1991; Bleiberg, 1995). A positive self attachment experience is certainly the antithesis of the experiences of the infant who is traumatized during the birthing process, separated from his mother and who is subjected to various uncomfortable procedures. Research indicates that infants do cope in various ways, depending on the continuity and degree of trauma, by adapting, becoming hyper aroused for "fight" or "flight", compartmentalizing or dissociating the experience of unbearable psychic pain from conscious awareness (Bleiberg, 1995; Perry, 1995; Fonagy, 1999). The baby's active

participation in his birthing process (Cohen, 1993) and his self attachment experience (Righard &Adale, 1990); Castellino, et al. (1997) and Klaus &Klaus (1998) can give the baby the experience of: (1) initiating an internal process on his own (Huffman, et al., 1998) (2) experiencing mastery and competence of his abilities (Grey, 1992) during the self attachment process, and (3) relieving whatever tension and anxiety the baby may have experienced during his birth journey. Consequently, the baby will feel relaxed, secure and at peace with himself (as evidenced by his affect and his behavior) and with his "emotionally significant other" who is "delighted" and proud of her newborn's accomplishment (Klaus &Klaus, 1998). This precious vignette i.e., the experience of both mother and baby is a lovely example of: (1) object relations theory (Moberly, 1985) (2) the beginning of the infant is capacity to experience, endure and regulate affect within a self structure, and (3) the beginning formation of an internal working model (Bowlby, 1969). The baby is essentially returning to what hopefully is to become his 'Secure Base' (Bowlby, 1988), back to the smell, the heartbeat, the warmth, and the rhythms of his interuterine experience with his mother. This self attachment process is also a good description of the beginning of Mahler's Separation-Individuation process as described in the book, The Psychological Birth of the Human Infant (Mahler, Pine &Bergman, 1975). The Beginning of an Emergent Sense of Self Being in tune with and empathic about the impact of the baby's birthing experience and being aware of his needs during the journey from inside the mother into the world which creates the need to reconnect with the mother is another core concept in infant mental health (emotional refueling from an emotionally available mother) (Mahler, et al., 1975; Akhtar, Kramer &Parens, 1996; Robinson, Emde, Korfmacher, 1997). Allowing and facilitating the newborn's ability to self-attach also enhances the developmental process of mutual emotional regulation between mother and infant which underlies the quality of the attachment process (Tronick, 1989). In order for the infant to develop the capacity for self-regulation, he has to experience the ministrations of a "self-regulating other" who soothes, comforts and contains the infant's tension, anxiety and distress (Horner, 1982; Winnicott, 1987; Akhtar, Kramer &Parens, 1996). Surely there is physiological and emotional relaxation in the relationship, when the newborn is able to complete his birthing process, his need to self attach, and to suckle, as Dr. Righard described, correctly. The Relationship Between Key Experiences and Trauma As mentioned previously, it is now known that the continuity of early experiences of trauma or abuse, whether in utero or after birth can interfere with the development of the subcortical and limbic areas of the brain, resulting in extreme anxiety, depression, and/or the inability to form healthy attachments to others (Shore, 1997). Therefore, it is important to minimize the possibility of experiential trauma. Researchers have now generally agreed that both the quality of caregiving and the security of attachment affect children's later capacity for empathy, emotional regulation, and behavioral control. Bruce Perry of Baylor University (in Shore, 1997) asserts that when key experiences are minimal or absent, the result may be an inability to modulate impulsivity, immature emotional and behavioral functioning, and (in combination with other developmental experiences) a predisposition to violence (Shore, 1997). Kennell and Klaus (1998), pioneers in researching parent-infant bonding since the 1970's, continue to reiterate that encouraging mother-infant contact from birth on and rooming-in could increase breastfeeding significantly and decrease the incidence of failure to thrive, abuse, neglect, and abandonment of infants. There can be little debate with Castellino, et al. (1997), Kennell and Klaus, 1998, and Klaus and Klaus, 1998 that the newborn's need to complete his birthing process and to initiate a successful breast feeding experience is most significant and is, in keeping with Bruce Perry's view, a "key experience" for both the mother and her newborn. The same researchers also deplore the common practice in the contemporary hospital birth which interrupts the self attachment process and interferes with the baby's transitional quest reconnect to his mother after birth. It would seem that the initial anxiety experienced by the infant upon his physiological separation from the mother is "traumatic anxiety" as defined by Horner (1984). Any experience that overwhelms the infant's emergent sense of self during the first three months causes psychic trauma (Horner, 1984), which not only interferes with the infant-parent relationship per se, and the initiation of a successful breast feeding experience (Righard &Alade, 1990; Castellino, et al., 1997; Kennell &Klaus, 1998; Klaus &Klaus, 1998), but also interferes with the

development of the subcortical and limbic portion of the brain in terms of neurological connections and neural circuitry (Siegel, 1998). The meaning of traumatic anxiety according to Schecter, (1980 in Horner, 1984) is that the infant misses someone who is loved and emphasizes the importance of the relationship per se. Horner, however, considers the significance of the relationship in terms of its developmental function of forming intrapsychic structure. Schecter does concur with Horner that "traumatic anxiety" occurs whenever the formative process of the self is overwhelmed or disorganized. With the advent of recent brain research, it does seem that there is a built-in psychobiological response to distress or trauma when reality does not match the model in the mind (Bleiberg, 1995). Since the newborn has the capacity to self attach fairly soon after birth, one can only assume that "this is the way it is supposed to be." The three to four year journey toward object constancy is a developmental process of slowly acquiring intrapsychic structure and psychic representations of the mother/caregiver, who has the capacity to modify the baby's emotional, physical or psychological pain (McDougall, 1989; Settlage, et al., 1991; Bemporad, 1995; Akhtar, et al., 1996; Fonagy, 1999). The obstetrical staff in the delivery room essentially become the "mother" to the mother (since caregiving is a parallel process). When the mother is incapable of shielding her infant from traumatic overstimulation and cannot prevent negative experiences (being weighed, measured, drops put into the eyes and heel sticks), the baby seems to become overwhelmed, confused, fragmented, and disorganized (as evidenced by his affect and behavior) and could experience the dissolution of any sense of self that may be in the formative stage. This dissolution, in itself, is terrifying and emotionally painful for the infant (Horner, 1982). In addition, the steroid hormone cortisol level is probably rising in response to the trauma (Gunnar, 1996) (a future area for research). Conversely, the mother feels "abandoned and helpless" (Castellino, 1997). The obstetrical team is in charge and the quality of the experience has been diminished and compromised. Since the infant's preverbal language is affect and behavior (Brazelton &Cramer, 1990) his "traumatic anxiety" is expressed by crying when separated from his mother as noted by Righard &Adale (1990), Castellino et al. (1997), and Klaus &Klaus (1998) as well as by psychic disorganization, and as a result the infant is not able to nurse effectively when finally put to the breast (Righard &Adale, 1990; Kennell &Klaus, 1998). This experience has also been imprinted at the somatic level of the newborn (Castellino, 1997; Siegel, 1998). The implicit memory of this experience can be evoked and expressed when the infant is confronted with a similar experience. The infant's future affective and behavioral expression of emotional/psychic pain and/or disorganization may be a puzzle to his caregivers. Perhaps, by not connecting the infant's subsequent behavior with the missing process of the self attachment experience and thus having difficulty with breast feeding, the mother may give up in frustration and puzzlement and decide to bottle feed instead. Fortunately, Castellino, Cohen and others are studying this process and are beginning to understand how to resolve some of the trauma that occurs during and after the birthing process.

CONCLUSION: THE NEED FOR PREVENTIVE INTERVENTION The process of giving birth (for the mother) and the process of being born (for the infant) is both a physiological and a psychological process. The possibility of providing an emotionally significant experience for the beginning of a secure attachment relationship between the infant and his mother does exist. The principles of both the MotherFriendly Childbirth Initiative (Coalition for Improving Maternity Services, 1996) and the Baby Friendly Initiative (Kovach, 1996) are designed to support consumers who want birth centers and hospitals to be more mother, baby and father friendly. Since development takes place within the context of a relationship, perhaps creating a "Relationship Friendly Initiative" could make an implicit process more explicit (Siegel, 1996, 1998). There is need for preventive intervention. The question of how to translate research findings and theoretical concepts into clinical practice provides both the opportunity and the danger. How these findings are presented to enhance growth and decrease resistance and defensiveness on the part of the health care team is now the challenge which needs to be explored in various settings, i.e., health care delivery systems, professional curriculum, preparation for childbirth and parenting classes, hospital and birth center staffs, and the general public. As so aptly put by one of the participants in one of the Continuing Education Seminars for The Program for Infant/Toddler Caregivers, "when there is enough

collective consciousness" about the significance of the competence of the newborn, the quality of caregiving relationships and the relationship between infant-parent interaction and brain development, then the possibility of change may occur. References REFERENCES Ainsworth, M.D.S., Blehar, M.D., Waters, E., &Wall, S. (1978). Patterns of Attachment: A Psychological Study of the Strange Situation. New Jersey: Erlbaum. Akhtar, S., Kramer, S., &Parens, H. (1996). The Internal Mother. New Jersey: Jason Aronson Inc. Bemporad, S. (1995). Babies can't wait. The Signal, Newsletter of the World Association for Infant Mental Health. 3 (3) page 1. Bleiberg, E. (1995). Transgenerational Transmission of Attachment Pattern. Audio Tape from Menninger Continuing Education #030395E 1-800-288-7377. Bowlby, J. (1988). A Secure Base. New York: Basic Books. Brazelton, T.B. &Cramer, B. (1990). The Earliest Relationship: Parents, Infants, and the Drama of Early Attachment. Reading, Massachusetts: Addison-Wesley Publishing Company. Burns, C. (1998). The Active Role of the Baby in Birthing, (unpublished paper) 2228 Seabury Avenue, Minneapolis, MN 55406. 612/339-4097. Castellino, R. with Takikawa, D. &Wood, S. (1997). The Caregiver Is Role in Birth and Newborn Self-Attachment Needs, (unpublished paper) 1105 North Ontare, Santa Barbara, Ca 93105. Coalition for Improving Maternity Services. (1996). International Journal of Childbirth Education 13(2): 26-28. Cohen, B.B. (1993). Sensing, Feeling, and Action. Contact Editions. Northhampton, MA. Eisenberg, L. (1995). The Social Construction of the Human Brain. American Journal of Psychiatry 152:11, 1563-1575. Fonagy, P. (1999). Attachment, The Holocaust, and The Outcome of Child Psyhchoanalysis: An Attachment-Based Model of Transgenerational Transmission of Trauma. Sophia Mirviss Memorial Lecture, San Francisco Psychoanalytic Institute and Society, Child Development Program. February, 7, 1999, San Francisco, Ca. Grey, K. (1992). Creating the Environment for the Infant I Toddler's Capacity to Experience Mastery and Competence of His Abilities. Student Handbook, Center for Child and Family Studies, Department of Human and Community Development, University of California, Davis. Gunner, M.R., Brodersen, L., Krueger, K. &Rigatuso, R. (1996). Dampening of behavioral and adrenocortical reactivity during early infancy: Normative changes and individual differences. Child Development, 67:877-889. Huffman, J., Popbla, L., &Duhalde, C. (1998). Early Stages of Initiative and Environmental Response. Infant Mental Health Journal, 19(4), 355-377. Horner, A. (1982) Object Relations and the Developing Ego in Therapy. New York: Jason Aronson. Kennell, J.H. &Klaus, M. (1998). Bonding: Recent Obsrvations That Alter Perinatal Care. Pediatrics in Review, 19: 1, 4-12. Klaus, M. &Klaus, P. (1998). your Amazing Newborn. Perseus Books: Reading, Massachusetts. Kovach, AC. (1996). An Assessment Tool for Evaluating Hospital Breast-feeding Policies and Practices. Journal of Human Lactation, 12(1): 41-5. Lieberman, A. (1998). An Infant Mental Health Perspective. Zero to Three. December 1997/January 1998: 3-5. Mahler, M.S., Pine, F., &Bergman, A. (1975). The Psychological Birth of the Human Infant. New York: Basic Books. McDougall, J. (1989). Theaters of the Body. W.W. Norton &Company. New York. Milner, B., Squire, L.R., &Kandel, E.R. (1998). Cognitive Neuroscience and the Study of Memory. Neuron, 20: 445^168. Moberly, E.R. (1985). The Psychology of Self and Other. New York: Tavistock Publications. Perry, B., Pollard, R., Blakeley, R., Baker, W., &Vigilante, D. (1995). Childhood trauma, the neurobiology of adaptation, and "Usedependent" development of the Brain: How "states" become "traits". Infant Mental Health Journal, 16(4) 271-289. Reiner, R. (1997). The First Years Last Forever. I Am Your Child. Publication from the Reiner Foundation. Families and Work Institute. New York, N.Y. Righard, L. &Adale, M. (1990). Effects of Delivery Room Routines on Success Of First Breast-feed. The Lancet, 336: 1105-07. Robinson, J., Emde, R., &Korfmacher, J. (1997). Integrating an Emotional Regulation Perspective in a Program of Prenatal and Early Childhood Home Visitation. Journal of Community Psyhchology, 25(1) 59-75. Schecter, D. (1980). Early Developmental Roots of Anxiety. Journal of the American Academy of Psychoanalysis 8:539-554. Schore, A.N. (1994). Affect Regulation and the Origin of the Self: The Neurobiology of Emotional Development. Hillsdale, NJ: Erlbaum. Settlage, C., Bemesderfer, S., Rosenthal, J., Afterman, J., &Spielman, P. (1991). The Appeal Cycle in Early Mother-child Interaction: Nature and Implications of a Finding from Developmental Research. The Journal of the American Psychoanalytic Association, 39:987-1015. Shore, R. (1997). Rethinking the Brain. Families and

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