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THE PARADIGM SHIFT:
THE RIGHT BRAIN AND
THE RELATIONAL UNCONSCIOUS

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- Schore (*Monitor, 2009*): “the emotional revolution”
- “The emergence of noninvasive brain imaging technologies has opened the door to pinning down the fundamental connections among psychology, biology and emotion. Now the challenges are more conceptual than technical. We need an overarching theoretical model of development across the lifespan.”
- “With the current flood of neuroscience data, only an interdisciplinary perspective can interpret that data effectively. That model will involve cross-collaboration between psychology and neuroscience, as well as researchers and clinicians. At this point, no theory can be purely psychological.”

- This interdisciplinary perspective involves an integration of psychology, the study of the mind, neuroscience, the study of the brain, and biology, the study of the living organism.
- Until recently there was a seemingly immense divide between psychological and biological sciences. New integrative paradigm is emerging as a result of more direct contact between psychological and biological domains, and it bridges and overarches both.
- Why now? Over the last 2 decades science has finally undertaken a deeper study of emotion, essential adaptive processes that are by definition psychobiological.

- But over this same recent time period (commencing with the Decade of the Brain) neuroimaging technologies have allowed for studies of the rapid processing of cognitive and emotional information by brain systems in real time.
- The shift in part is coming from cognitive neuro-science. But even moreso, affective neuroscience, social neuroscience, and developmental neuroscience are engines for paradigm shift.
- *Paradigm shift:* from explicit, analytical, conscious, verbal, rational left hemisphere to implicit, synthetic, integrative, unconscious, nonverbal, bodily-based emotional right hemisphere.

- Kuhn (*The Structure of Scientific Revolutions*,1970): paradigms consist of sets of propositions or hypotheses that order investigator's observations. When paradigm is overthrown, new one replaces it. Paradigm shift is by definition simultaneously expressed across scientific disciplines.
- Now seen in dramatic increase in interdisciplinary studies. But also in increasing communication of shared knowledge between disciplines. Enhanced dialogue between psychology and sciences that border it, neuroscience, developmental science, psychiatry etc. Common goal of more complex models that integrate psychological and biological realms.

- Intense dialogue also within psychology subdisciplines (developmental, physiological, experimental, social, clinical etc.). Paradigm shift may alter the self-definition of psychology.
- Definition of psychology (*Shorter Oxford*):
- "The science of the nature, functioning and *development* of the human mind, including the faculties of *reason, emotion, perception, communication*…
- The branch of science that deals with the (human or animal) mind as an entity and its *relationship to the body* and to the *social context*, using observations of *individuals in particular circumstances.*"

- Latter half of 20th century major paradigm was behavioral. Then shifted into cognitive paradigm, and thus back into covert processes of human mind, where it emphasized studies of *reason and perception*.
- But in the last 15 years both science and the clinical professions have increasingly focused on emotion.
- In the current paradigm shift psychology is moving more directly into the problems of *emotion, development, and communication*, as well as the *relationship of the mind to the body, individuals in particular circumstances,* and to *the social context*.

- Here demonstrate paradigm shift by citing parallel presentations of actual voices of authors in different scientific disciplines. I will include journal citations to show the breadth of the paradigm shift over all fields.
- Although I will cite individual studies and individual voices, they represent the fundamental themes of a body of research in each area.
- This interdisciplinary dialogue is converging on the unique functions of the emotion processing right brain.
- A large body of research now shows that the right brain hemisphere differs from the left in macrostructure, ultrastructure, physiology, neurochemistry, and behavior.

- Neuroscience experiments and clinical studies of the right brain have recently increased rapidly, fueling paradigm shift.
- The change in paradigm spans the theoretical and applied sciences, facilitating not only integrative research but more rapid translation of recent advances in science to more effective clinical models.
- “Emotional revolution” and the paradigm shift: deeper understanding of emotional processes central to current advances in more complex models of development, psychopathology, and psychotherapy.

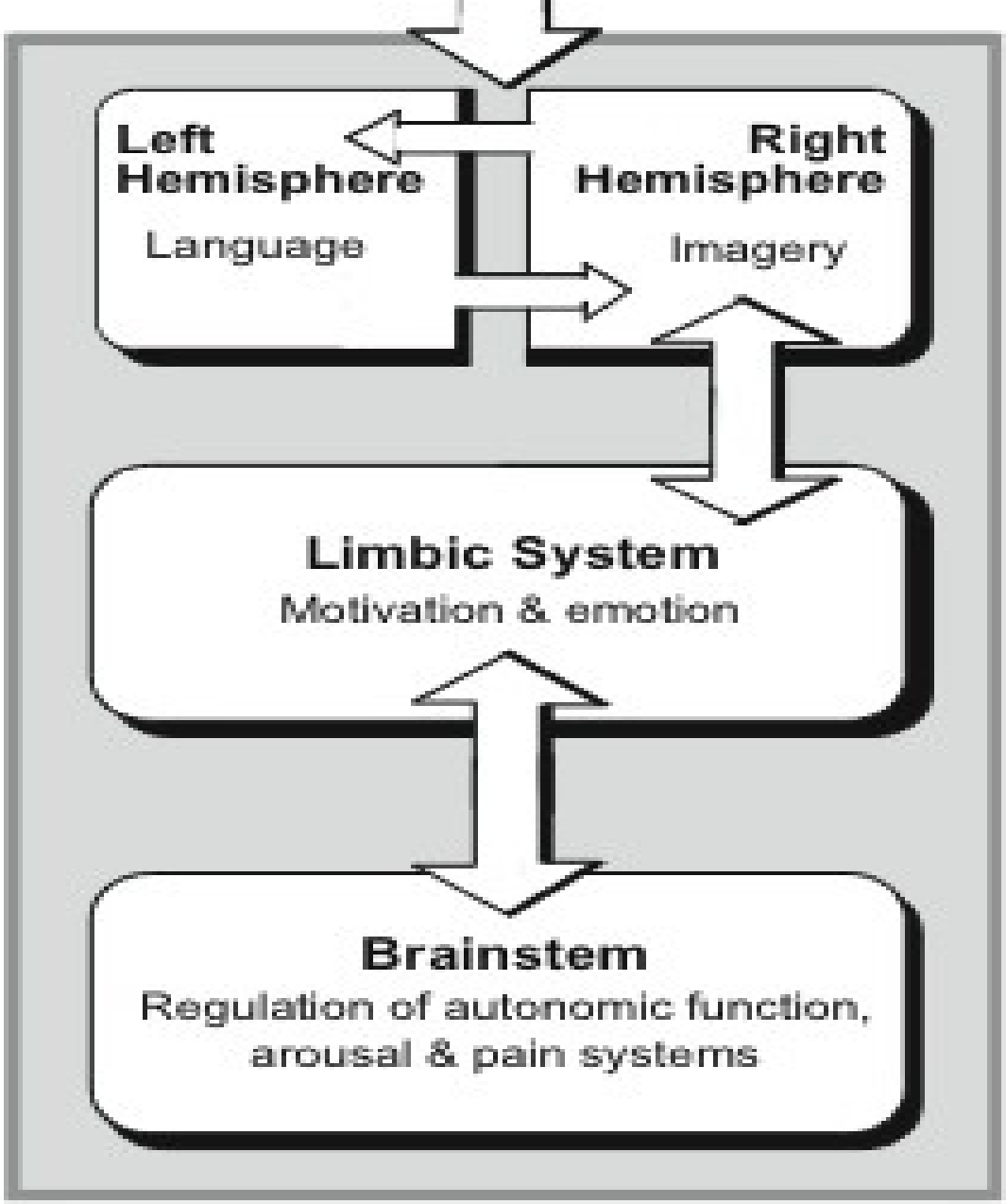
- *Paradigm shift*: conscious cognition to nonconscious processing of affect
- Ryan (*Motivation and Emotion*, 2007) on primacy of affective processes in the human experience:
- “After three decades of the dominance of cognitive approaches, motivational and emotional processes have roared back into the limelight.”
- “Thus, we are living in an epoch where motivation and emotion ‘matter,’ not only in an abstract theoretical sense, but also as they inform applied work in areas such as health-care, psychotherapy, education, sports, religion, or other domains.”

- *Paradigm shift*: from cognition to affect
- Panksepp (*Brain and Cognition*, 2003): “Now that the cognitive revolution is gradually giving way to an emotion revolution, investigators are gradually exhibiting a new taste for the pursuit of what was once deemed scientifically unpursuable - an understanding of what affective processes really are…”
- Panksepp (*Integr. Psych. Behav.*, 2008): “The cognitive revolution, like radical neuro-behaviorism, intentionally sought to put emotions out of sight and out of mind. Now cognitive science must re-learn that ancient emotional systems have a power that is quite independent of neocortical cognitive processes.”

- *Paradigm shift*: irrational to adaptive emotion
- Lane (*Psychosomatic Medicine*, 2008): "Primary emotional responses have been preserved through phylogenesis because they are adaptive. They provide an immediate assessment of the extent to which goals or needs are being met in interaction with the environment, and they reset the organism behaviorally, physiologically, cognitively, and experientially to adjust to these changing circumstances."

- *Paradigm shift*: adaptive aspects of emotion:
- LeDoux (2000): “The broader the range of emotions that a child experiences the broader will be the emotional range of the self that develops.”
- Dorpat (*Psychoanal. Inquiry*, 2001): “In adults as well as children, emotions are the central medium through which vital information, especially information about interpersonal relations is transmitted and received.”
- Cacioppo & Decety (*Perpsect. Psychol. Sci.*, 2009): “It is now widely accepted that cognitive, affective, and behavioral processes often unfold unconsciously and that this unconscious processing is adaptive and frees up limited processing resources.”

- *Paradigm shift*: neurobiology of emotion
- Buklina (*Neurosci. Behav. Physiology*, 2005): "The right hemisphere…performs simultaneous analysis of stimuli…the more 'diffuse' organization of the right hemisphere has the effect that it responds to any stimulus, even speech stimuli, more quickly and, thus earlier."
- "The left hemisphere is activated after this and performs the slower semantic analysis and synthesis…the arrival of an individual signal initially in the right hemisphere and then in the left is more 'physiological.'"


Left
Hemisphere
Language
Right
Hemisphere
Imagery
Limbic System
Motivation & emotion
Brainstem
Regulation of autonomic function,
arousal & pain systems

- *Paradigm shift*: neurobiology of unconscious emotion
- Schutz (*Neuropsych. Rev.*, 2005): "The right hemisphere operates a distributed network for *rapid responding* to danger and other urgent problems. It preferentially processes environmental challenge, stress and pain and manages self-protective responses such as avoidance and escape. Emotionality is the right brain's 'red phone,' compelling the mind to handle urgent matters without delay."
- Sato & Aoki (*Brain and Cognition*, 2006): "Right hemispheric dominance in processing of unconscious negative emotion."

- *Paradigm shift*: neurobiology of unconscious emotion:
- Price (*J. Comp. Neurology*, 2005):
  Basic research shows that the emotion of fear "is not necessarily conscious; a fearful response may be evoked even when one is not fully aware of being 'afraid'…As with emotion itself, the enhanced memory for emotional experiences may proceed at a relatively subconscious level, without clear awareness."
- Neisser (*Psyche*, 2006): "Approaches to emotion require a theory of unconscious subjectivity to handle the case of unconscious emotion"

- *Paradigm shift*: from LH conscious to RH unconscious
- Mlot (*Science*, 1998): UCS processing of emotional stimuli activates right and not left hemisphere. "The left side [of the brain] is involved with conscious response and the right with the unconscious mind."
- Balconi & Lucchiari (*Int. J. Psychophysiology*, 2007): "We found that the left hemisphere more than the right can mediate conscious elaboration…This result is in line with previous research, that underlined a left-conscious/right-unconscious dichotomy."
- *Paradigm shift*: not 2 halves of one brain, but 2 lateralized cortical-subcortical systems (UCS-CS minds; right mind vs. left mind).

- *Paradigm shift*: from LH conscious to RH unconscious
- Larsen (*J. Psychosom. Res.,* 2003):
  "In most people, the verbal, conscious and serial information processing takes place in the left hemisphere, while the unconscious, nonverbal and *emotional* information processing mainly takes place in the right hemisphere."
- Happaney (*Brain and Cognition*, 2004):
  "The right hemisphere has been linked to implicit information processing, as opposed to the more explicit and more conscious processing tied to the left hemisphere"

- *Paradigm shift*: from LH conscious to RH unconscious
- LeDoux (*Science,* 2002): “That explicit and implicit aspects of the self exist is not a particularly novel idea. It is closely related to Freud’s partition of the mind into conscious, preconscious (accessible but not currently accessed), and unconscious (inaccessible) levels.”
- Origin of psychoanalysis: at end of 19th century Freud, after decades of practicing as a neurologist attempted to integrate a brain mind model in *Project for a Scientific Psychology,* goal of which was to “furnish a psychology that shall be a *natural science*.”

- *Paradigm shift*: current return to Freud, the most important single source of modern psychology and psychotherapy. From conscious to unconscious functions *and* structures that underlie behavior, cognition, and emotion.
- Freud (1917): The unconscious is “a special realm, with its own desires and modes of expression and peculiar mental mechanisms not elsewhere operative.”
- Schore (1991-2009): Right brain represents biological substrate of human UCS.
- Theoret (C*ognitive Brain Res.*, 2004): RH involved in “processing of self-images, at least when self-images are not consciously perceived.”

- *Paradigm shift*: from irrational to adaptive UCS
- Bargh & Morsella (*Perspectives Psychol. Sci.,* 2008): "Freud's model of the unconscious as the primary guiding influence over every day life, even today, is more specific and detailed than any to be found in contemporary cognitive or social psychology."
- Cortina & Liotti (*Int. Forum Psychoanal.* 2007): Refer to "a paradigm shift that has been developing in psychoanalysis…This shift is from conceptualizing the unconscious as serving primarily a defensive and regressive function, to seeing unconscious processes as serving much broader adaptive functions."

- *Paradigm shift*: from irrational to adaptive UCS
- Schore (2003): unconscious acts as “a cohesive, active mental structure that continuously appraises life’s experiences and responds according to its scheme of interpretation.”
- Wilson & Bar-Anan (*Science*, 2008):
  “Social psychologists have discovered an adaptive unconscious that allows people to size up the world quickly, make decisions, and set goals - all while their conscious minds are otherwise occupied.
- Without such an efficient, powerful, and fast means of understanding and acting on the world, it would be difficult to survive.”

- *Paradigm shift*: relational communicating UCS
- Schore (2003): “In contrast to a static, deeply buried storehouse of ancient memories silenced in ‘infantile amnesia,’ contemporary intersubjective psychoanalysis now refers to a ‘*relational unconscious*,’ whereby *one unconscious mind communicates with another unconscious mind*.”
- Anderson, S.M., Reznik, I., & Glassman, N.S. (2005). The unconscious relational self. In *The new unconscious*. Oxford University Press.

- *Paradigm shift*: conscious verbal language to unconscious affective nonverbal communications
- Blonder et al. (*Brain*, 1991): RH centrally involved in nonverbal emotional communications.
- van Lancker & Cummings (*Brain Res. Rev.,* 1999): "While the left hemisphere mediates most linguistic behaviors, the right hemisphere is important for broader aspects of communication."
- Schore (2001): "Just as the left brain communicates its states to other left brains via conscious linguistic behaviors so the right nonverbally communicates its unconscious states to other right brains *that are tuned to receive these communications."*

- *Paradigm shift: development* - from cognitive to social-emotional development, neurobiology of attachment
- Bowlby (1969): attachment communications are "accompanied by the strongest of feelings and emotions," and occur within a context of "facial expression, posture, tone of voice, physiological changes, tempo of movement, and incipient action."
- Schore (1994-2009): in nonverbal right brain-to-right brain visual-facial, auditory-prosodic, and tactile-gestural emotional communications, caregiver regulates infant's arousal and affective states.

- RH visual-facial attachment communications
- Le Grand et al. (*Nature Neuroscience*, 2003): "Expert face processing requires visual input to the right hemisphere during infancy."
- Grossmann et al. (Social Cognitive and Affective Neuroscience, 2007): 4-month-old infants presented with images of a female face show enhanced gamma electrical activity over right prefrontal areas.
- Nakato et al. (*Human Brain Mapping*, 2009): recent near-infrared spectroscopy research reveals that specifically the 5-month-olds' right hemisphere responds to images of adult female faces.

- RH tactile-gestural attachment communications
- Nagy (*Infant Child Develop.*, 2006): study human neonates in their first 3-96 hours of life, and find a "lateralized system for neonatal imitation."
- "The early advantage of the right hemisphere (Chiron et al.,1997; Schore, 2000; Trevarthen, 2001) in the first few months of life may affect the lateralized appearance of the first imitative gestures."
- Sieratzki & Woll (*Behav. Brain Sci.*, 2005) on touch and RH: "The emotional impact of touch, the most basic and reciprocal mode of interaction is also more direct and immediate if an infant is held to the left side of the body."

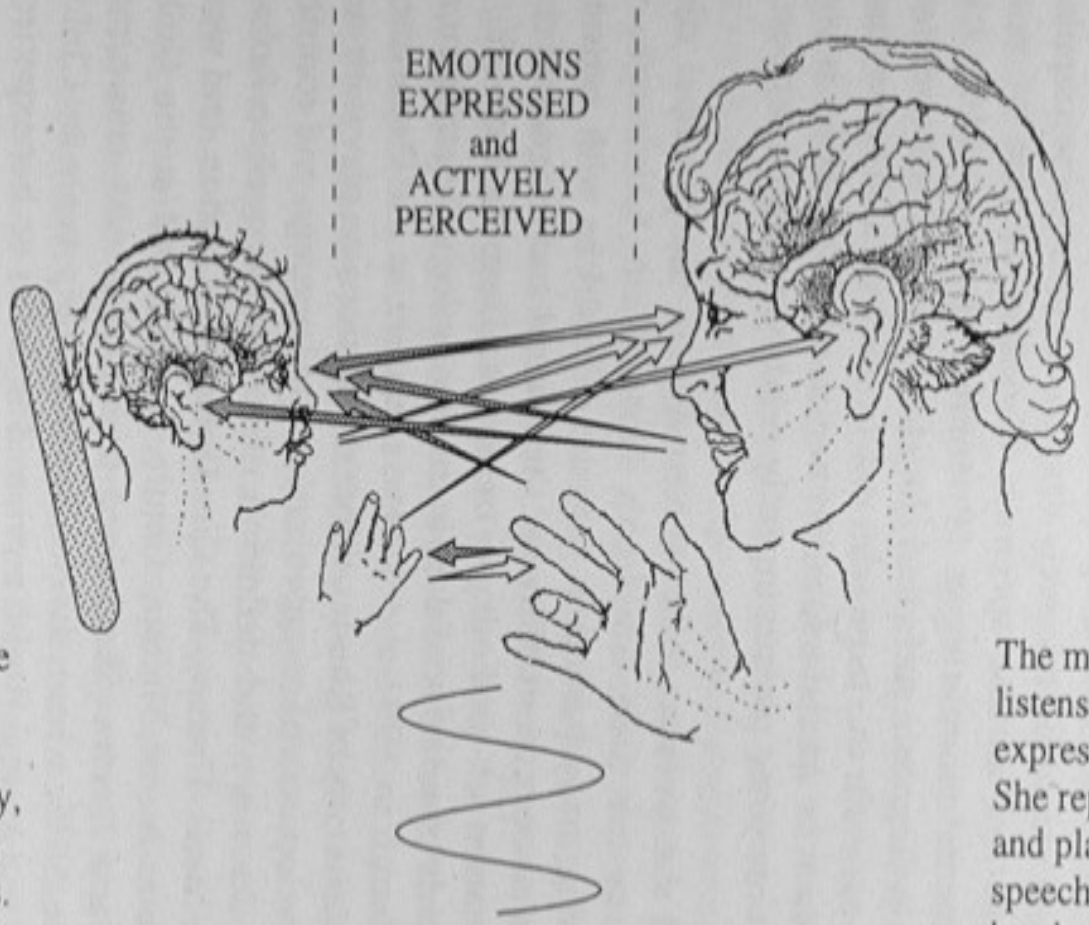
- RH auditory-prosodic attachment communications
- Bogolepova & Malofeeva (*Neurosci. Behav. Physiol.*, 2001): “The right hemisphere of the neonate is actively involved in the perception of speech melody and the intonations of the voices of mother and surrounding people. The pre-speech stage of child development is characterized by interactions of the descriptive and emotional components due mainly to mechanisms operating within the hemispheres on the principle of non-verbal communication.”
- Homae (*Neuroscience Research*, 2006): “Prosodic processing in 3-month-old infants is subserved by the right temporoparietal region.”

- In order to regulate infant’s right brain state crescendos and decrescendos of mother's affective state must be in resonance with similar crescendos and decrescendos of the infant’s internal states of central and autonomic arousal.
- Tucker & Pribram (1995): “It is now thought that the most basic level of regulatory processes is the regulation of arousal.”
- Winnicott (1986): “The main thing is a communication between the baby and the mother in terms of the anatomy and physiology of live bodies.”

- Pipp & Harmon (*Child Development*, 1987):
  "It may be that throughout the lifespan we are biologically connected to those with whom we have close relationships…Homeostatic regulation between members of a dyad is a stable aspect of all intimate relationships throughout the lifespan."
- Bradshaw & Schore (*Ethology,* 2007):
  right brain evolutionary mechanism of attachment, interactive regulation of emotion, represents the mutual regulation of biological homeostatic states between and within organisms.

- Ovtscharoff & Braun (*Neuroscience*, 2001): "The dyadic interaction between the newborn and the mother...serves as a regulator of the developing individual's internal homeostasis. The regulatory function of the newborn-mother interaction may be an essential promoter to ensure the normal development and maintenance of synaptic connections during the establishment of functional brain circuits."
- Schore (1994): attachment impacts experience-dependent maturation of right brain, including cortical areas that regulate subcortical emotion processing limbic and autonomic circuits.

Primary Inter-Subjectivity



The baby, attracted to the mother's voice, face expressions and hand gestures, replies playfully, with affection; imitating, and provoking imitations.

The mother watches and listens, anticipating the baby's expressions intuitively. She replies sympathetically and playfully, with 'motherese' speech, touches and face and hand expressions

PROTOCONVERSATION
Rhythmic Turn-Taking
of Expressive Acts

- Lenzi et al. (*Cerebral Cortex*, in press):
  fMRI study of mother-infant emotional communication offer data "supporting the theory that the right hemisphere is more involved than the left hemisphere in emotional processing and thus, mothering."
- Minagawa-Kawai (*Cerebral Cortex*, 2009):
  near-infrared spectroscopy study of infant-mother attachment, "our results are in agreement with that of Schore (2000) who addressed the importance of the right hemisphere in the attachment system."

- *Paradigm shift*: *relationship of the mind to the body*
- Luria (*The Working Brain*, 1973):
  "The right hemisphere is directly concerned with the analysis of direct information received by the subject *from his own body* and which, it can easily be understood, is much more closely connected with direct sensation than with verbally logical codes."
- Damasio (*Descartes' Error*, 1994): RH generates "the most comprehensive and integrated map of the body state available to the brain."
- RH (moreso than LH) deeply connected into sympathetic and parasympathetic components of the ANS that generate the somatic aspects of emotions.

- Attachment impacts essential RH adaptive functions:
- Recognition/expression of facially expressed affect.
- Regulation of central and autonomic arousal.
- Reception, expression, and communication of positive and negative affects and pain.
- Detection of threat; regulation of HPA and SAS stress response systems.
- Processing novelty and unexpected stimuli.
- Sustained attention and impulse control.
- Control of vital functions supporting survival; enabling organism to cope actively and passively with stress.
- If attachment traumatic, these functions impaired.

- *Paradigm shift*: abnormal psychology - attachment trauma and right brain psychopathogenesis
- Bowlby (1969): “In the fields of ethology and psychopathology attachment theory can be used to frame specific hypotheses which relate different family experiences to different forms of psychiatric disorder and also, possibly, to the neurophysiological changes that accompany them.”
- Schore (*Infant Mental Health J.*, 2001): relational attachment trauma interferes with organization of right brain cortical-subcortical limbic-autonomic circuits, inhibiting its capacity to cope with future stressors.

- Schore (*Attach. Human Develop.*, 2000): attachment trauma encoded in right brain implicit/procedural memory; later expressed in unconscious insecure internal working models.
- Schore (*Austral. N. Zeal. J. Psychiatry*, 2002): RH disorganized attachment associated with later pathological dissociation and predisposition to PTSD.
- Schore (*Pediatrics in Review*, 2005): RH interpersonal developmental neurobiology supports a model of the "developmental origins of health and disease."
- Schore (*Ann. New York Academy of Sciences,* 2009): most stressful forms of RH attachment trauma are abuse and neglect. Etiology of personality disorders.

- *Paradigm shift*: psychotherapy shifts from left brain explicit cognitive to right brain implicit affective realm
- Bowlby (1969): insecure internal working models that encode strategies of affect regulation and operate at UCS levels can be altered by psychotherapy.
- Bradley (2000): “All psychotherapies, psychodynamic, cognitive-behavioral, experiential, and interactional, show a similarity in promoting affect regulation.”
- Beauregard (*J. Neuroscience*, 2001): “The ability to modulate emotions is at the heart of the human experience [and] the use of emotional self-regulatory processes constitutes the core of several modern psychotherapeutic approaches.”

- Schore (1994-2009): relevance of developmental attachment studies to psychotherapeutic treatment process lies in commonality of nonverbal, unconscious, implicit right brain-to right brain affect communicating and regulating mechanisms in the caregiver-infant and the therapist-patient relationship (therapeutic alliance).
- Saffran & Muran (2000): “After approximately a half century of psychotherapy research, one of the most consistent findings is that the quality of the therapeutic alliance is the most robust predictor of treatment success.”

- Romano (*J. Consult. Psych.*, 2008):
  "There is a growing consensus in the field of psychotherapy that the personalities of the client and the therapist, together with the therapeutic relationship, play a critical role in psychotherapy processes and outcomes."
- Schore (1994-2009): RH-to-RH *implicit*, *nonverbal* visual-facial, auditory-prosodic, tactile-gestural emotional communications between therapist and patient are regulated within attachment relationship embedded in therapeutic alliance.

- APA Presidential Task Force (*Amer. Psychol.*, 2006):
- "Central to clinical expertise is interpersonal skill, which is manifested in forming a therapeutic relationship, encoding and decoding verbal and *nonverbal* responses, creating realistic but positive expectations, and responding empathically to the patient's explicit and *implicit* experiences and concerns."
- "Psychological practice is, at root, an interpersonal *relationship* between psychologist and patient."
- Note critical role of nonverbal and implicit (UCS) communications in therapeutic relationship.

- Recall RH centrally involved in nonverbal emotional communications. 60% of human communication is nonverbal (Burgoon, 1985).
- Hutterer & Liss (*J. Amer. Acad. Psychoanal. Dynam. Psychiatry*, 2006): “While the value of verbal interventions should not be discounted, care should be taken that they be couched in emotionally appropriate and empathic climates…Accordingly, such nonverbal variables as: tone, tempo, rhythm, timbre, prosody and amplitude of speech, as well as body language signals may need to be re-examined as essential aspects of therapeutic technique.”

- RH functions activated in emotional exchanges within therapeutic relationship.
- Decety & Chaminade (*Conscious. and Cog.*, 2003): “Mental states that are in essence private to the self may be shared between individuals... self-awareness, empathy, identification with others, and more generally intersubjective processes, are largely dependent upon...right hemisphere resources, which are the first to develop.”
- Keenan et al. (*Cortex*, 2005): “The right hemisphere, in fact, truly interprets the mental state not only of its own brain, but the brains (and minds) of others.”

- Gainotti (*Psychoanalysis and Neuroscience*, 2006): "the right hemisphere may be crucially involved in those unconscious memories which must be reactivated and reworked during the…treatment."
- Mancia (*Int. J. Psychoanal.*, 2006): RH represents "seat of implicit memory."
- "The discovery of the implicit memory has extended the concept of the unconscious and supports the hypothesis that this is where the emotional and affective - sometimes traumatic - presymbolic and preverbal experiences of the primary mother-infant relations are stored."

- Diener et al. (*American J. Psychiatry,* 2007): Research shows more therapists facilitate affective experience /expression of patients in psychotherapy, more patients exhibit positive changes; therapist affect facilitation powerful predictor of treatment success.
- "An affective treatment focus represents a relevant mechanism of action for short-term dynamic psychotherapy, as research indicates that contemporary psychodynamic therapies place greater emphasis on encouraging experience and expression of feelings compared with cognitive behavior therapies."
- Therapy = affect experience + affect regulation

- Greenberg (*Clinical Psychology Sci. and Pract.,* 2007) describes 2 forms of affect regulation:
- A “self-control” form of emotion regulation involving higher levels of cognitive executive function that allows individuals “to change the way they feel by consciously changing the way they think.”
- This *explicit form of affect regulation* is performed by the verbal left hemisphere, and unconscious bodily-based emotion is usually not addressed in this model.
- In contrast to this conscious emotion regulation system, Greenberg describes a second, more fundamental *implicit affect regulatory system* is performed by the right hemisphere.

- Greenberg (2007): this system rapidly and automatically processes facial expression, vocal quality, and eye contact in a relational context.
- This form of therapy attempts not control but the “acceptance or facilitation of particular emotions,” including “previously avoided emotion,” in order to allow the patient to tolerate and transform them into “adaptive emotions.”
- Citing my work he asserts, “it is the building of implicit or automatic emotion regulation capacities that is important for enduring change, especially for highly fragile personality-disordered clients.”

- Sullivan & Dufresne (*Brain Research*, 2006): describe “the right hemispheric specialization in regulating stress - and emotion-related processes.”
- Perez-Cruz et al. (*European J. Neuroscience*, 2009): “The reaction of medial prefrontal cortex to stress is lateralized, in that responses to minor challenges stimulate the left hemisphere whereas severe stress activates the right medial prefrontal cortex…These findings highlight the importance of analyzing the two hemispheres separately and suggest that pooling data from the two hemispheres may confound reliable effects of a treatment.”

- *Paradigm shift*: therapy changes mind *and* brain.
- Etkin, Pittenger, Polan, & Kandel (*J. Neuro-psychiatry Clin. Neurosci*., 2005): “There is no longer any doubt that psychotherapy can result in detectable changes in the brain.”
- Glass (*JAMA*, 2008): “Recent research in brain imaging, molecular biology, and neurogenetics has shown that psychotherapy changes brain function and structure. Such studies have shown that psychotherapy effects regional cerebral blood flow, neurotransmitter metabolism, gene expression, and persistent modifications in synaptic plasticity.”

- *Paradigm shift*: therapy changes mind *and* brain.
- Critical affective relational processes operate at implicit levels of therapeutic alliance, beneath the exchanges of language and explicit cognitions. Core of the change mechanism at nonconscious level.
- Schore (1994-2009): effective psychotherapy promotes expansion of right brain, biological substrate of the human unconscious.
- Schore & Schore (*Clinical Social Work J., 2008):* clinician's knowledge of and access to her right brain is critical to the science of the art of psychotherapy. Model of clinical expertise: regulation, not insight.

- *Paradigm shift*: relevance to self definition of psychology and implications for psychological research and clinical applications.
- Psychology (*Shorter Oxford*): the science of the nature of the human mind, including *emotion.*
- Over last 2 decades, science finally moved into direct study of emotional processes. Primacy of bodily-based affect: adaptive use of *emotion* (and thereby arousal) in human experience is essential to survival.
- Damasio (1998): emotions are the highest order direct expression of bioregulation in complex organisms.
- In this same period neuroimaging studies have increasingly focused on the RH, “emotional brain.”

- MacNeilage, Rogers, & Vallortigara (*Scientific American*, 2009): “the left hemisphere of the vertebrate brain was originally specialized for the control of well-established patterns of behavior under ordinary and familiar circumstances. In contrast, the right hemisphere, the primary seat of emotional arousal, was at first specialized for detecting and responding to unexpected stimuli in the environment.”
- Most current psychological research is on “well-established patterns of behavior under ordinary and familiar circumstances” = left brain functions of voluntary behavior and verbal cognitions.

- Paradigm shift from research of subjects in state of optimal (mid-range, neutral) arousal (pleasant emotion) to current studies on trauma (intense emotion) and right brain's UCS detection of stressful unexpected stimuli inducing states of hyperarousal and/or hypoarousal and rapid response to danger.
- Deeper knowledge of right brain essential to advances in fundamental problems of human condition (psycho-biological health, capacity to love, violence, etc.)
- No psychological function can be understood without appreciation of rapid nonconscious affective-arousal processes that precede overt behavior, conscious thought or subjectively experienced emotion.

- Psychology (*Shorter Oxford*): the science of the *development* of the human mind.
- Schore (1994): “The understanding of early *development* is one of the fundamental objectives of science.” No problem in psychology can be addressed without understanding early *development* of function.
- Chiron et al. (*Brain*, 1997): “The right brain hemisphere is dominant in human infants.”
- Howard & Reggia (*Brain & Cognition*, 2007): “Earlier maturation of the right hemisphere is supported by both anatomical and imaging evidence.”
- The stage of human infancy studied by developmental psychology is a period of right brain dominance.

- Psychology (*Shorter Oxford*): the science of the human mind, including *communication*.
- Essential transactions between humans not left brain language but right brain nonverbal *communication*.
- Buchanan (*Nature,* 2009): “It is incredible naïve…to take conscious verbal communications as the primary way that people respond to each other.”
- Further study of the nonverbal channel offers “a richer, more complete and more objective view of human interaction - with our inherent bias toward what’s conscious and verbal taken out of the equation.”
- Psychology’s overemphasis on voluntary behavior and verbal cognition (questionnaires) is restrictive.

- Ross & Monnot (*Brain and Language*, 2008):
- “Over the last three decades, there has been growing realization that the right hemisphere is essential for language and communication competency and psychological well-being through its ability to modulate affective prosody and gestural behavior, decode connotative (non-standard) word meanings, make thematic inferences, and process metaphor, complex linguistic relationships and non-literal (idiomatic) types of expressions.”
- “Thus, the traditional concept that language is a dominant and lateralized function of the left hemisphere is no longer tenable.”

- Psychology (*Shorter Oxford*): “deals with the mind as an entity and its relationship to *the body.*
- Psychology is more than the study of behavior, or cognition, or a disembodied mind. The field must create models that overcome Descartes’ error. The fundamental unit is not mental but psychobiological. Not the mind but the human organism, mind/body.
- No function of the mind studied by psychology (e.g., child psychology, personality theory, social psychology, abnormal psychology, physiological psychology etc.) can be understood without considering not only the the brain but the bodily systems that underlie the function.

- Glass (*JAMA*, 2008): “There is increasing evidence from studies of the 2-way relationship between brain structure and function on the one hand and emotion and behavior on the other indicating that such a notion of separate biological and psychological treatment effects is simplistic and inaccurate.”
- Lane (*Psychosomatic Medicine*, 2008): “The physiology of emotion is arguably the cornerstone of psychosomatic medicine…aversive emotional states are associated with adverse health outcomes.”
- Paradigm shift from left brain conscious cognition into right brain unconscious affect allows for creation of more effective treatment of psychosomatic disorders.

- Psychology (*Shorter Oxford*): science that deals with the mind and its *relationship to the social context.*
- Social context is intersubjective, and impacts the brain/mind/body in rapid, nonconscious implicit psychobiological affective processes.
- Schore (1991-2009): intersubjective nonverbal right brain-to-right brain communications and relational unconscious operate within cultures.
- Psychology needs to return to the scientific studies of subjectivity (and intersubjectivity).
- Paradigm shift: neuroscience demonstrates that right and left hemispheres differentially affect two major social psychological processes, power and morality.

- Kuhl & Kazen (*J. Person. Soc. Psych.*, 2008): "Instrumental planning and linear thinking (presumably associated with the left hemisphere) may be more typical of power motivation, whereas (right hemispheric) holistic and intuitive processing may be more conducive to affiliation-relayed motivation involving sharing in close relationships."
- "Persons with high levels of power…tend to perceive others as a means to satisfying one's personal goals and desires…Alternatively, Schore (2001) summarized studies of right hemisphere involvement in empathy (which can be regarded as a correlate of the need for affiliation)."

- Mendez & Shapira (*Cognitive Neuropsychiatry*, 2009):
- Clinical data “supports the presence of a “morality” network in the brain, predominantly in the right hemisphere.”
- Current studies distinguish “reasoned” moral dilemmas based on logical reasoning (Kohlberg) from automatic “emotional” moral dilemmas, where moral judgments result from fast and automatic intuitions of the actions of self and others.”
- “There appears to be a greater role for the right hemisphere, compared to the left hemisphere, in mediating these sociomoral responses.”

- *Paradigm shift* - right brain and relational UCS: from explicit, analytical, conscious, verbal, rational left hemisphere to implicit, synthetic, integrative, unconscious, nonverbal, bodily-based emotional right hemisphere.
- Keenan et al. (*Consciousness and Cognition*, 2003): "By casting the right hemisphere in terms of self, we have a revolutionary way of thinking about the brain. A new model of the brain, therefore, must take into account the primary importance of the right hemisphere in establishing and maintaining our sense of awareness of ourselves and others."