KEYNOTE ADDRESS
MOVING FORWARD: NEW FINDINGS ON THE RIGHT BRAIN AND THEIR IMPLICATIONS FOR PSYCHOANALYSIS

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In April 1995 I presented an address to Division 39 100\textsuperscript{th} anniversary of Freud’s *Project for a Scientific Psychology*. Soon after I published “A century after Freud’s Project: Is a rapprochement between psychoanalysis and neurobiology at hand?” in *JAPA* (Schore, 1997), where I noted,

“In this endeavor “to furnish a psychology which shall be a natural science,” Freud introduced the concepts that to this day serve as the theoretical foundation and scaffolding of psychoanalysis:

- Primary and secondary processes, principles of pleasure-unpleasure, constancy, and reality testing;
• cathexis and identification; wish-fulfillment theory of dreams; psychical regression and hallucination; systems of perception, memory, unconscious and preconscious psychic activity; self-regulation.

• Freud also offered earliest thoughts about two problems he struggled with for the rest of his career, affect and motivation.

• Later repudiated the *Project* and over rest of 20th century connections between psychoanalysis and science were weakened and strained. Due to loss of its moorings to rest of science became easy target to criticism it was untestable (Popper, Grunbaum).
• Yet, Freud (1913): “we shall have to find a contact point with neurology.”

• Schore (Affect Regulation and the Origin of the Self, 1994): central theme – right brain emotion and self-regulation structures and functions represent such a contact point; time is right for a rapprochement between psychoanalysis and neuroscience.

• Schore (1991-2017) interpersonal neurobiological perspective of regulation theory describes how beneath levels of CS awareness, brains, especially right brains align and synchronize their neural activities with other brains, especially in emotional interactions.
Theory also describes how structure and function of right brain-mind are shaped continuously by social experiences, especially those involving emotional relationships (including therapeutic relationship).

Schore (1991-2017) extension of Project to modern neuropsychoanalysis, study of brain systems that process information at nonconscious levels. Right brain psychobiological substrate of human UCS.

Research on right brain source of essential origins, adaptive functions, rapid dynamics, and pathogenesis of the human UCS. These studies can elucidate invisible, omnipresent UCS in everyday life.
• Schore (1991-2017): recent discoveries in neuroscience of the right brain and neuropsychoanalysis of the UCS mind can act as an integrating force in psychoanalytic theory and clinical practice.

• Psychoanalytic **structure**, located in right brain integrates various psychoanalytic theories of different **functions** of the mind, all of which are centered in the **UCS**, the central organizing principle of the field.

• Brain research adds invaluable data to psychoanalysis, which Brenner (1980) defined as “the science of unconscious processes.” Neurobiologically-informed theory allows it to be “**heuristic** = “Serving to find out or discover something” (Oxford Dict.)
• Begin with changes within the consulting room and theoretical psychoanalysis and then advances and new directions in psychoanalytic psychotherapy.

• Next use regulation theory to discuss changes beyond consulting room, how 21st century psychoanalysis can offer deeper understanding of human problems in outside social and physical world.

• Then on invitation, how “interface of neuroscience and psychoanalysis will challenge us to think about how our field needs to change as we move forward?”

• Everything that follows is an expansion of regulation theory, theory of development, psychopathogenesis, and treatment of right brain UCS subjective self.
• Right brain, laterality research, and changes within the consulting room: psychoanalytic theory

• Theme of brain laterality (hemispheric asymmetry), now describing functional and structural differences between left and right brains, and thereby CS “left mind” and the UCS “right mind.”

• Large body of neuroscience research supports left brain surface, verbal, conscious, analytical explicit self vs. right brain deeper nonverbal, non-conscious, holistic, emotional corporeal, subjective implicit self.

• Right brain unique source of rapid spontaneous information processing of UCS mind.
L. Rogers (2014). Specializations of right and left hemispheres in not only humans but all vertebrates.

Right: **attention to unexpected/novel stimuli**; notices small differences between stimuli; attends to global/geometric cues; face recognition; social cognition, expresses intense emotion (especially aggression and fear); **bottom-up** processes/ stimulus driven.

Left: routine/established patterns of behavior in **familiar** circumstances; sequential processing; focused attention to specific targets or cues; **top-down** processes/guided by learned instructions.
• McGilchrist (2009): “The right hemisphere…has the most sophisticated and extensive, and quite possibly most lately evolved, representation in the prefrontal cortex, the most highly evolved part of the brain.”

• McGilchrist (2015): “The RH both grounds our experience of the world at the bottom end, so to speak, and makes sense of it, at the top end.”

• McGilchrist (2015): RH is more in touch with both affect and the body; “neurological evidence supports what is called the primacy of affect and the primacy of unconscious over conscious will.”
• RH UCS - contributions from neuropsychoanalysis

• Gainotti (*Neuropsychoanalysis*, 2005): “The right hemisphere subserves the lower ‘schematic’ level (where emotions are automatically generated and experienced as ‘true emotions’) whereas the left hemisphere the higher ‘conceptual’ level (where emotions are consciously analyzed and submitted to intentional control).”

• Gainotti (2012): UCS processing of emotional information subsumed by a RH subcortical route

• Confirmation of Freud’s hierarchical structural theory.
• Tucker and Moller (2007): “The right hemisphere’s specialization for emotional communication through nonverbal channels seems to suggest a domain of the mind that is close to the **motivationally charged psychoanalytic unconscious**.”

• Schore (1994): right brain involved in not only implicit processing of emotions and social information, but also in the communication of emotion via right brain-to-right operations of a **relational UCS**, via right brain-to-right brain communications, face, voice, gesture.

• Schore (in press): *Right Brain Psychotherapy*, and *The Development of the Right Brain Unconscious Mind*. Both show Freud’s original models now shifting on contents and processes of UCS.
• Changes in psychoanalysis central concept, dynamic UCS, which for its first century defined as repressed.
• Yet, Freud (1915): “the repressed does not cover everything that is unconscious.”
• Schore chapter, “The right brain implicit self.” UCS contains much more than what is repressed by CS mind. Right brain structural systems involved in rapid, spontaneous recognition, expression, communication, regulation of bodily-based emotional states beneath levels of awareness.
Chen & Hsiao. (2014). “Right hemisphere dominance in nonconscious processing.” “[T]he RH has an advantage in shaping behavior with implicit information whereas the LH plays a greater role in expressing explicit knowledge.”

Schepman et al. (2015). “Right-lateralized unconscious, but not conscious, processing of affective environmental sounds.”

• Psychoanalysis now changing to a mind/brain/body theory; UCS systems inextricably linked into the body. Spontaneous processes of “bottom-up” bodily-based autonomic (ANS) and hormonal systems (stress steroids, sex steroids, neuroendocrines) are also UCS.

• Meares (How People Change, in press): “Autonomic activity occurs at an unconscious level.”

• Porges (The Polyvagal Theory, 2011): ANS HPA axis of organismic homeostasis is asymmetrical, with “structures on the right side exhibiting greater control of physiological responses associated with emotion” (“top-down”).
“Stimuli that are processed primarily by the RH produce greater cardiovascular response than stimuli processed by the left hemisphere. Damage to the right hemisphere blunts facial expression, vocal intonation, and autonomic reactivity.”

Schore (2003): “Early damage” to UCS = enduring impact “relational trauma” (abuse/neglect) on developing right brain. More work needs to be done on neglect (“dead mother”) in therapeutic context.

Schore (2012): in histories of attachment trauma shift from left brain repression to right brain dissociation.
• Research on right brain UCS counters critique that psychoanalysis not testable / falsifiable, not “science.”

• Furthermore, neuropsychoanalysis reveals essential information about deeper levels of topography of the mind: Freud’s iceberg model of Conscious, Preconscious, and Unconscious. Recall, only 10% of Freud’s iceberg is visible (CS) whereas other 90% is beneath water (PCS and UCS). PCS allotted 10%-15%, UCS allotted an overwhelming 75%-80%.

• Jung (1963): “Man’s task is to become conscious of the contents that process upward from the unconscious.”
• Schore (2003): neuropsychoanalytic update of Freud’s topographic model of stratified CS, PCS, and UCS systems. Brain matures caudal to rostral, subcortical areas maturing before cortical areas. Similarly core of UCS develops before higher levels.

• Right lateralized UCS represents a hierarchical system with an outer later-developing cortical, orbitofrontal-limbic regulated core, an inner earlier developing cingulate-limbic regulating core, and an earliest evolving subcortical amygdala-limbic regulated core that lies deepest within, like nested Russian dolls.
SCHORE’S RIGHT BRAIN DUAL CORTICOLIMBIC-AUTONOMIC CIRCUITS

RIGHT CORTEX
CNS Exteroceptive sensory input, visual, auditory, tactile, gustatory & olfactory

3. Orbitofrontal:
- Online at 10-12 months
- Executive control system
- Expanded in the right
- Emotional regulation
- Joint Attention

VENTRAL TEGMENTAL CIRCUIT
Regulates positive emotions (approach)

2. Cingulate
- Online at 3-9 months
- Responsive to social cues
- Shared pleasure states
- Separation anxiety

3. Orbitofrontal:
- Online at 10-12 months
- Executive control system
- Expanded in the right
- Emotional regulation
- Joint Attention

LATERAL TEGMENTAL CIRCUIT
Regulates negative emotions (avoidance)

1. Amygdala
- Functional at birth
- Startle response/passive avoidance
- Inhibited/disinhibited temperament

Noradrenergic - Inhibitory
- Passive Coping
- Immobility & Withdrawal
- To reduce effects of stress

Dopaminergic - Excitatory
- Active Coping
- Fight-flight
- To remove source of stress

Mobilization or Calming input

Parasympathetic Nuclei
Hypothalamus
Sympathetic Nuclei

Medullary Noradrenaline Neurons
Reticular Formation
Catecholamine Neuromodulator
Ventral Tegmental Dopamine Neurons

Experience Dependent Maturation

Nucleus of solitary tract

ANS interoceptive information - Viscera regulation

RIGHT VAGUS NERVE

SUBCORTICAL STRUCTURES
• Three levels of organization of the right brain represent, respectively 3 levels of the system UCS: preconscious, unconscious, and deep unconscious. The unconscious systems of the hierarchical three-tiered cortical-subcortical limbic core thus reflect the early developmental history of the subjective self.

• Schore (J. Infant, Child, & Adolescent Psychotherapy, 2013): earliest developing “deep UCS” equated with Stern’s “core self” and Damasio’s “protoself.”

• Deep UCS of corporeal self connected into body: the autonomic nervous system termed “the physiological bottom of the mind” (Jackson, 1931).
• Research indicates involvement of right orbitofrontal system in **preconscious** functions of implicit perception, affect regulation, and controlling allocation of attention to possible contents of consciousness.

• Recall, Freud (1940) preconscious = “capable of entering consciousness.”

• Epstein (1983) described salience of “the preconscious level of awareness” in not only “emotions and moods” but in cognitively structuring experience. “It is here that the implicit beliefs and values reside, which automatically organize and direct out everyday experience and behavior.”
• Kantrowitz (1999): “It is in the realm of preconscious communication that the interwoveness of intrapsychic and interpersonal phenomena becomes apparent.” Refers to “preconscious resonance between patient and analyst.”

• Psychoanalytic theory should re-explore relational development of preconscious functions, its alterations in psychopathology, and its growth in psychotherapy. Preconscious as regulator of affect consciousness; which affects and at what intensities negative and positive affects enter into conscious awareness.
• But also more on the **deep UCS** – the unconscious functions of amygdala relevant to clinical models:

• Todd and Anderson (*Nature Neuroscience*, 2009): “Traditionally, the amygdala has gotten a lot of ‘bad’ press. Popular wisdom has portrayed the human amygdala as the center of an ancient animal id that drives us to rapid impulsive action before our more reasoned judgments can kick in.”

• “For a long time, it was considered to be a fear center or threat detector that is instrumental in allocating processing resources to potentially harmful events.”
• “More recent studies in humans suggest that it is responsive to positive and arousing rather than to strictly negative events, as well as to ambiguous events. . . The connectivity of the amygdala places it at the center of the brain, a physical hub linking numerous distant regions, and it is positioned to allow emotions to influence how the rest of the brain works, from the first stages of stimulus encoding to regulating social behavior.”

• Reformulation of deep UCS - not just cauldron of chaotic stressors and dense painful negative affects but also source generator of intense positive affects.
Todd and Anderson describe “the amygdala’s role in regulating interpersonal distance. People automatically regulate the distance between themselves and others on the basis of feelings of personal comfort.”

Refer to “invisible social force fields that regulate close physical proximity, suggesting that the amygdala is crucial for the sense of interpersonal space . . . the amygdala should be more active at close interpersonal distances.”

May elucidate mechanisms of deep UCS “uncanny” communications within co-created intersubjective field.
• Relevance of a communicating “relational UCS” to interpersonal neurobiology: brains align and synchronize their neural activities with other brains within social-emotional interactions.

• Hyperscanning: technological advance now allows study of two brains during real time social interactions; brain activities of each member of dyad simultaneously measured. Millisecond time scale.

• Stolk et al. (PNAS USA, 2014): simultaneous fMRI of both members of a socially interacting dyad reports establishing mutual understanding of novel signals synchronizes cerebral dynamics across both communicators’ right temporal lobes.
Right brain synchronization and interpersonal coherence occurred only in pairs with shared communicative history [as in therapeutic relationship].

Dumas et al. *(PLoS One, 2010)*: dual-EEG study of interactional synchrony during spontaneous, reciprocal nonverbal imitation and turn-taking. In this social interaction both share attention and compare cues of self and other’s actions. Document interbrain synchronization of their right temporoparietal and centroparietal regions in both interacting partners.

These RH areas activated in attentional processes, perceptual awareness, social interaction, empathy. See following figure.
THE SCIENCE OF THE ART OF PSYCHOTHERAPY

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• Right brain, laterality research, and changes within the consulting room: psychotherapy

• These data fit my interpersonal neurobiological model of right brain-to-right brain UCS communication and regulation across a co-created intersubjective field.

• Schore (Psychotherapy, 2014). “The right brain is dominant in psychotherapy.” Right brain-to-right brain UCS communications “beneath the words” in therapist-patient transference-countertransference relationship.

• Schore (1994): work in preverbal-onset developmental disorders, "follow the Ariadne's thread of transference affects" (Brierley, 1937).
• In therapy this right lateralized system used to access deeper UCS systems beneath surface left CS mind.
• Lehtonen (2006) on current advances in neuroscience and psychoanalysis: “Increasing understanding of the nature of the psychophysiological and neuroscientific aspects of the organization of the mental layers has several implications for developmental research and also for clinical work, i.e. how to listen, conceptualize and respond to the early layers of the human personality in the clinical setting.”
• Clinicians now using right brain-to-right brain concept
• Bromberg (2011): “Allan Schore writes about a right brain-to-right brain channel of affective communication...as ‘an organized dialogue’ comprised of ‘dynamically fluctuating moment-to-moment state sharing.’ I believe it to be this process of state sharing that allows ‘a good psychoanalytic match.’”

• Bromberg (*How People Change*, 2017): “The interface between my own thinking and his, when linked to the centrality we each place of the mind–brain–body interface, provides the core context that I believe will allow psychoanalysis as psychotherapy to become most genuinely therapeutic.”
Geller and Porges (J. Psychotherapy Integration, 2014): “[The] bidirectional influence between our brain and visceral organs explains how the therapist’s social and emotional responses to the client can potentially, by influencing the physiological state of the client, mediate either an expansion or restriction of the client’s range and valence of socioemotional responding.”

“Bidirectional communication between areas in the right hemisphere promote adaptive interpersonal functioning between therapist and client (Allison & Rossouw, 2013; Schore, 2012; Siegel, 2012).”
• Meares (2012): refers to “a form of **therapeutic conversation** that can be conceived...as a dynamic interplay between **two right hemispheres**.”

• “Although a therapist can foster beneficial change by means of natural talent, this propensity must be trained, honed, and enhanced. It involves a kind of **responsiveness** that is consistently **engaged**, in interchange after interchange, in a **disciplined** way. Change is seen to occur as a result of this continuing **relational milieu**, rather than as an outcome of intermittent contributions to the therapeutic conversations, such as ‘interpretations.’”
Meares (2012): “an interplay between two right brains provides a structure for the therapeutic engagement… right hemispheric language…is abbreviated, with the utterance often incomplete, and lacking formal syntactical structure. In particular, the subject of a sentence tends to be left out, including pronouns.”

“Furthermore, the language is emotionally expressive. As a consequence, the phonology is salient, the toning and inflections of the voice have a powerful communicative effect that is combined with facial expressions and the movements of the body.”
• “This kind of language creates the feeling of ‘being with’ in a way that is greater than a logical, completely syntactical left-hemisphere utterance, which sets up a different kind of relatedness.”

• Greenberg (Psychotherapy, 2014): “implicit affect regulation that results from a good therapeutic relationship occurs through right hemispheric processes, is not verbally mediated, is highly relational, and is most directly affected by such things as emotional communication, facial expression, vocal quality, and eye contact (Schore, 2003).”
“Therapeutic presence involves therapists being fully in the moment on a multitude of levels, physically, emotionally, cognitively, spiritually and relationally.

“The experience of therapeutic presence involves (a) being in contact with one’s integrated and healthy self, while (b) being open and receptive, to what is poignant in the moment and immersed in it, (c) with a larger sense of spaciousness and expansion of awareness and perception.”

“This grounded, immersed, and expanded awareness occurs with the intention of being with and for the client, in service of his or her healing process.”
• Creative therapist enhances patient’s integrative self

• Kuhl et al. (Social and Personality Psychology Compass, 2015). “Being someone: The integrated self as a neuropsychological system.”

• Distinguish right hemisphere UCS “integrative self” from a left hemisphere CS “conceptual self.”

• Properties of RH integrative self: “human beings developed extended capacities to store their life experiences in long-term memory. This autobiographical memory base allows people to access their prior experiences in relevant situations.”
• “The memory base grows each time that people encounter new (unexpected or undesired) experiences that are incorporated into the memory base. It is this extended memory system that forms the basis for the integrated self…”

• Functions of RH integrated self: unconscious processing, emotional connectedness, broad vigilance, utilization of felt feedback, extended trust, resilience, integration of negative experiences.

• Current emphasis on integration as a goal of psychotherapy. Integration not a function of left brain CS mind, but right brain UCS subjective self.
• Schore (2012): integration of past, present, and future occurs in psychoanalytic psychotherapy, a relational regulatory context that facilitates changes in patient’s right brain UCS systems.

• Alvarez (2006): “Schore points out…it is not a question of making the unconscious conscious: rather it is a question of restructuring the unconscious itself.”

• Beyond left brain cognitive insight - relational, affectively-focused treatment promotes changes in patient’s right brain in emotional intelligence, social intelligence, interpersonal competence, and affiliation motivational systems.
• De Pisapia et al. (*J. Cog. Neurosci.*, 2014): right-brain circuits responsible for “interpersonal competence,” “the capacity to interact and communicate with others, to share personal views, to understand the emotions and opinions of others, and to cooperate with others or resolve conflict should it occur.”

• Hecht (*Exp. Neurobiol.*, 2014): “[T]he right hemisphere has a relative advantage over the left hemisphere in mediating social intelligence, identifying social stimuli, understanding the intentions of other people, awareness of the dynamics in social relationships, and successful handling of social interactions.”
Psychotherapy effects dual motivational systems. Affiliation promotes feelings of togetherness and closeness; power - self-sufficiency and distance.

Hecht (2014): Cites extensive neuroscience research that RH mediates affiliation motivation, LH power motivation.

“Psychological theories on motivation postulate that human beings have an intrinsic need for affiliation - being connected with and accepted by other people. This fundamental need motivates people to seek warm, stable and intimate interpersonal relationships, form friendships, and affiliate with specific groups.”
“[H]umans also have an innate need to maintain their individuality and independence. This need motivates people to acquire power in order to achieve autonomy and freedom that will enable them to master and influence their environments and social relationships, instead of being influenced by them.”

“Ideally, these two coexisting needs - for affiliation and power - would complement and balance each other. Nevertheless, oftentimes they are in conflict and lead to opposite directions.”

Neuroscience data supports psychoanalytic (early) preoedipal deficit and (later) oedipal conflict models.
• **Changes** also occur in **therapist’s right brain**: right brain neuroplasticity of clinical expertise.

• Schore (*Psychotherapy*, 2014): “The professional growth of the clinician reflects progressions in right brain relational processes that underlie clinical seenls, including affective empathy, the ability to tolerate and interactively regulate a broader array of negative and positive affective self states, implicit openness to experience, clinical intuition, and **creativity**.”

• Mihov et al. (*Brain and Cognition*, 2010): meta-analytic review of lateralization studies “support the notion of right hemispheric superiority in creative thinking.”
Psychoanalysis and creativity

Kris (1952): “Common to all manifestations of creative imagination, in the first place, is subjective experience... Three characteristics of this experience seem outstanding. First: Subjects are aware of the limitation of conscious effort.

Second: They are aware of a specific feeling... There is always some, and frequently a very high, emotional charge involved. Third: Even if excitement rises, the mind tends to work with high precision and problems are easily solved. A further common element concerns...the reaction of others to him.”
• Earliest right brain stages of creative process are UCS
• Reik (1948): Creative individuals are more capable of shifting between secondary and primary modes of thinking, or to ‘regress’ to primary process cognition which is necessary for producing novel, original ideas.
• “If the analyst surrenders to the regression required to access an uncanny insight, a conscious intuition into the patient’s dynamics emerges. If insight originates in the UCS, then the only way to reach it is through some degree of regression to the primary process.”
Reik (1956): “As rational consciousness gives way to the primary process, it may feel as if ‘the ground’ is threatening ‘to slip away.’”

“It is critical that transient regressions be tolerated, as a rigidly rational consciousness will stifle nonrational hunches. As Reik puts it, ‘you have to mistrust sweet reason and to abandon yourself to the promptings and suggestions emerging from the unconscious.’”

Reik warned that in therapy creative insight can be displaced by technical machinations.

This proposal supported by recent neuroscience.
• Bogen & Bogen (1969): major obstacle to high creativity is LH inhibition of RH functions.

• Huang et al. (2013): “The left frontal lobe was negatively related to creativity…The right hemisphere’s predominance in creative thinking may be inhibited by the left part of brain in normal people.”

• Shamay-Tsoory (2011): “The right mPFC is part of a neural network that mediates creativity, while the left hemisphere language areas…may compete or interfere with creative cognition.” A release of right PFC from this competition facilitates the expression of an original creative response [= “surrender”].
• Mayseless & Shamay-Tsoory (2015): “Altering the balance between the right and the left frontal lobes can be used to modulate creative production… reducing left frontal activity and enhancing right frontal activity reduces cognitive control, thus allowing for more creative idea production.”

• McGilchrist (2009) on LH to RH shift: “We must inhibit one in order to inhabit the other.”

• Adaptive creative regression = disinhibition of Freud’s secondary to primary process. Left-right callosal shift in dominance. Temporary uncoupling of hemispheres; occurs in “adaptive regressions.”
Regression defined by Oxford as “The process of returning or a tendency to return to an earlier stage of development” and “the act of going back; a return to the place of origin.” Adaptive regression increases interpersonal creativity, new ways of being.

Construct of regression needs to be returned into the clinical literature. In adaptive synchronized “mutual regression” both shift dominance from later maturing LH to earlier developing foundational RH “origin of the self.” Both into RH “primary process communications” expressed in emotions, images, intuitions, and novel metaphors, all of which are fundamental to creative thought and expression.
• Synchronized regressions in dyadic (re)enactments, “expressions of complex, though largely unconscious self-states and relational patterns” (Ginot, 2007).
• Freud’s hierarchical concept of higher levels inhibiting lower levels of function in both his topographical (1900) model of stratified conscious, preconscious, and unconscious systems, and his structural model (1923) of a superego and ego which regulate the id.
• Two types of adaptive regressions: interhemispheric (topographical, CS left cortical to UCS right cortical), and intrahemispheric (structural, downward cortical to subcortical deeper UCS in lower levels of right brain).
• Over treatment patient more fluidly shifts from left to right brain (and back). Access to right brain interpersonal creativity expressed in ability to uniquely create novel, ways of being across the Eriksonian stages of human life. Increased ability to flexibly cope with the successive social and emotional challenges of right brain integrated self over different life stages, within changing cultural and social environments.

• This interpersonal neurobiological mechanism facilitates new growth and development of right brain subjective self, psychobiological substrate of the human UCS, throughout life.
• Right brain functions, operating beneath awareness, evolve over stages of human development.

• Recent neuroscience describing not only low right brain of the deep UCS beneath language, but also functions of the high right brain, source of the most complex human functions beyond language.

• “Emotional” “social” right brain centrally involved in not only affects and stress regulation, but also empathy, intuition, creativity, imagery, symbolic thought, insight, play, humor, music, compassion, morality, and love.

• Psychoanalysis has overvalued functions of CS left mind – highest in RH. Primacy of UCS in everyday life.
• Right brain, laterality research, and changes beyond the consulting room
• *Application of regulation theory to ongoing changes in the social environment:*
• Practical applications of right brain psychoanalytic right brain models of early human emotional and social development; updates on origins of UCS.
• Long tradition of developmental psychoanalysts: S. & A. Freud, Spitz, Klein, Winnicott, Mahler, Stern, etc.
• Currently, Beebe, Tronick, Lyons-Ruth, Steele’s, like myself are also researchers. Foundations of evidence-based developmental psychoanalytic science.
• Schore (1991-2017) relational model of development of infant’s right brain highlights **enduring impact of interpersonal interbrain synchronization over a right brain critical period**.

• Studying newborn infants **at the beginning of the first year**, Ratnarajah et al. (2013) conclude, “[I]n early life the right cerebral hemisphere could be better able to process...emotion (Schore, 2000; Wada and Davis, 1977). This idea appears consistent with our findings of rightward asymmetry in...limbic structures...These neural substrates function as hubs in the right hemisphere for emotion processes and mother and child interaction.”
• Tronick’s research on infants *in the middle of the first year* reports 6-month–old infants use left-sided gestures generated by RH in order to cope with stressful still face paradigm. This data is “consistent with Schore’s (2005) hypotheses of hemispheric right-sided activation of emotions and their regulation during infant–mother interactions” (Montirosso et al. 2012).

• Minagawa-Kawai’s (*Cerebral Cortex*, 2009) study of infant mother attachment *at the end of the first year* observe, “Our results are in agreement with that of Schore (2000) who addressed the importance of the right hemisphere in the attachment system.”
More recent studies moving earlier to fetal brain

Schore (*Children Australia*, 2015): “It has . . . become abundantly clear that . . . the in utero and immediate postnatal environments and the dyadic relations between child and caregivers within the first years of life can have direct and enduring effects on the child’s brain development and behavior . . . our in utero and our early postnatal interpersonal worlds shape and mold the individuals (infants, children, adolescents, adults and caregivers) we are to become.”

Note the allusion to psychoanalytic developmental models in the phrase “interpersonal worlds.”

Maternal-fetal origins of deep UCS (amygdala-HPA).

• “Rebeca Saxe of the Brain and Cognitive Sciences department at MIT captured the scan of a woman with her baby through an MRI machine (Figure 1, “Mother and child”). The image depicts the mother-infant bond at the level of its most basic neuroanatomy. Through a grainy spectrum of black and grey, the infant brain—seemingly exposed and vulnerable—is held by a larger and more robust adult brain.”
“The two are in close communication through a kiss to the infant’s forehead, giving merit to the statement of Allan Schore, certainly to apply to our little patients in the office, that the developing brain forms in the setting of a relationship—a bonding relationship, with “another self—another brain.”

[Image of brain-to-brain “quiet love” (Winnicott). The body-to-body contact and kiss of a loving mother triggers immediate brain neuroplasticity and development]
• Further applications of modern attachment theory.

• Schore (in press): “The development of the right brain across the life span: What’s love got to do with it?”

• An early bond of mutual love between mother and infant shapes development of emotional right brain; acts as a relational matrix for emergence of capacity to share a loving relationship at later stages of life.

• Schore & Marks-Tarlow (in press): “How love opens creativity, play, and the arts through the early right brain development.” Early origins of relational capacity to engage in mutual love as well as creativity are both generated in the early developing right brain.
• This right brain model is supported in hyperscanning research that simultaneously recorded near infrared spectroscopy activities during a cooperative, extremely pleasant interactive exchange in lovers (Pan et al., *Human Brain Mapping*, 2017).

• In lover (but not friend or stranger) dyads both partners show increased interpersonal brain synchronization in the right superior frontal cortex. This area has been implicated in the implicit understanding of others’ actions and self-awareness.

• What is needed are hyperscanning studies of right brain emotional transactions between lover dyads. (including mutual love in the therapeutic dyads).
Applications to psychopathogenesis:

Schore (Frontiers in Psychology, 2014) Early interpersonal neurobiological assessment of attachment and autistic spectrum disorders.

Research documents significant alterations of early developing right brain in autistic infants and toddlers, as well profound attachment failures and intersubjective deficits in autistic infant-mother dyads.

Apply model to assessment of early stages of autism. Interpersonal neurobiological functions of right brain may not only bridge attachment and autism worlds, but facilitate more effective models of early intervention.
• Implications for family law, cultural, political systems, and human capital formation.


• Critique of US culture: early day care. In US most women return to work at 6 weeks, critical period of early right brain development.
“Based on the developmental neurobiological data, I would suggest that this country should legislate and implement the strategies now operating in other industrialized nations: maternal leave of 6 months and paternal leave of 2 months.”


Schore (Children Australia, 2015): I cite Silver and Singer’s (Science, 2014) description of the wider economic implications of early brain research for not only the individual but the culture:

“Recent advances in neuroscience indicate the importance of healthy brain development in the early years to human capital formation . . . Investing in child development is the foundation for improved health, economic, and social outcomes. Not getting the early years ‘right’ is linked to violent behavior, depression, higher rates of noncommunicable disease, and lower wages, and it negatively affects a nation’s gross domestic product.”
• Application of regulation theory to ongoing changes in the physical environment:

• Schore, All our sons: The developmental neurobiology and neuroendocrinology of boys at risk. *Infant Mental Health Journal*, 2017:

• Why are boys at risk? Cites large body of research documenting significant gender differences between male and female social and emotional functions in the earliest stages of development. These result from not only differences in sex hormones and social experiences but also in rates of male and female brain maturation, specifically in early developing right brain.
The stress-regulating circuits of the male brain mature more slowly than those of the female in the prenatal, perinatal, and postnatal critical periods. This differential structural maturation is reflected in normal gender differences in right-brain attachment functions.

Due to this maturational delay, developing males also are more vulnerable over a longer period of time to stressors in the social environment (attachment trauma) and man-made toxins in the physical environment (endocrine disruptors) that negatively impact right-brain development.
• Differences in gender-related psychopathology: describe early developmental neuroendocrinological and neurobiological mechanisms that are involved in the increased vulnerability of males to autism, early onset schizophrenia, attention deficit hyperactivity disorder, and conduct disorders as well as the epigenetic mechanisms that can account for the recent widespread increase of these disorders in U.S. culture.

• 2018 conference in Washington DC on “The Early-in-Life Origins of Violent Behavior in Males.”

• Neurobiologically informed psychoanalysis may offer practical models of deeper origins of human violence.
• Anthropogenic climate change: ubiquitous neurotoxins alter fetal and postnatal right brain development.


• “Exposure to toxic environmental chemicals during pregnancy and breastfeeding is ubiquitous and is a threat to healthy human reproduction . . . Exposure to toxic environmental chemicals and related health outcomes are inequitably distributed within and between countries; universally, the consequences of exposure are disproportionately borne by people with low incomes.”
• **Applications to ecology**: Schore (*IMHJ*, 2001) builds on Freud to offer model of enduring effects of attachment trauma, i.e., right brain dissociation.

• Bradshaw, Schore, Poole, Moss, & Brown. (*Nature*, 2005). Elephant breakdown. Application of human attachment trauma to **animal PTSD**.


• “Bradshaw calls for not only a deeper understanding of the minds of carnivores and wildlife in general, but also a new paradigm that “demands a change in how the world is perceived and . . . a change in how we ourselves are viewed. Ultimately, this change entails more than coming to a deeper understanding of the consciousness of carnivores: it requires investigating various states of consciousness of humans, the apex carnivore of the planet and the disrupter of free-ranging populations of carnivores.”
“This kind of expanded self-inquiry must include both the reflected objective awareness of the human conscious mind located in the left brain, and the reflective social-emotional awareness of the unconscious mind located in the right brain.”

But what if political leadership does not have access to such awareness? Indeed the existence of this form of anthropogenic climate change in biosphere (as well as anthropogenic environmental toxins) denied by those at the apex of power. Such personalities devalue UCS mind; driven by hyper-masculine LH narcissistic power dynamics; poor RH awareness.
• Hecht (2014): LH power dynamics expressed in sense of being socially powerful, dominance, control of others, hostility, Machiavellianism, gloating, moral judgments based on outcome. RH affiliation: empathy, trust, gratitude, fairness, social intelligence, moral reasoning based on agent’s intentions.

• McGilchrist (2009) LH taking precedence over RH in modern world; potentially disastrous consequences.

• Current leadership reflects imbalance, LH power motivation at expense of or disregard for RH communal welfare. RH UCS mind of a leader at apex of power deeply influences culture’s collective unconscious. Source of current political, cultural, and psychological insecurity.
• “The times they are a changin…How about us?”
• Accompanying recent rapid political changes has been explosion over last 3 decades of knowledge across disciplines and expansion of an integrative perspective within and across fields. All disciplines must move beyond their intrinsic isolation and forge deeper clinical theoretical and research connections into disciplines with which they intersect.
• Psychoanalysis, needs to make an active commitment to integration and connection. Especially in current political environment that is anti-mental health, anti-science, anti-psychotherapy, and pro-big pharma.
Returning to the beginning of this talk, in my 1997 article on Freud’s *Project* I asked is the time right for a “psychology which shall be a natural science?” At the time I speculated, 

“[The] response of psychoanalysis will have to involve a reintegration of its own internal theoretical divisions, a reassessment of its educational priorities, a reevaluation of its current predominant emphasis on cognition, especially verbal mechanisms, as well as a reworking of its Cartesian mind-body dichotomies.”
“This redefinition involves the identity of psychoanalysis itself, in terms of both its self-reference and its relations with the other sciences. In principle, whether or not a rapprochement takes place between two parties depends not only on the information they share in common, but on their individual willingness to enter into a communicative system.”

Exactly 20 years on – field has moved towards these goals. But psychoanalysis “the science of unconscious processes” needs to significantly increase its efforts to continue to incorporate advances in science to fuel its growth and relevance.
• Ernest Jones (1953) called the *Project* "something vital in Freud that was soon to become his **scientific imagination**." We need a return of scientific imagination in 21st century psychoanalysis.

• Unique knowledge psychoanalysis contributes to science and humanities: century of studies of fundamental role of UCS in human experience, deeper realms of human psyche. Field must update its self-definition from static image of Freud’s 1920’s couch; increase its standing/status in eyes of other fields.

• Psychoanalysis needs to shift from narrow focus on cognitive UCS to UCS right brain/mind/body system.
• Annual meetings like this need more inclusion of science from within and outside the field, and more commitment to heuristic psychoanalytic research on therapy process and underlying mechanisms.

• Division 39 needs to make deeper connections into fields beyond psychology. As opposed to denial of UCS in last century, many disciplines now studying “implicit” processes beneath levels of awareness. Yet many fields still centered in model of a LH CS mind.

• Connections into science, also medicine/psychiatry; more complex models of psychosomatic disorders.

• Authors need to publish in journals outside of the field.
• **Changes in education and training.** Urgent need for a critical re-evaluation of Freud’s theoretical and clinical models, of what to retain, what to leave behind. Courses in developmental and affective neuroscience and interpersonal neurobiology need to be included in curriculum. Example *Core Competencies of Relational Psychoanalysis* (ed. Roy Barsness), Routledge.

• Need to deliver this information into internship training programs, expanding to and forming alliances with much larger population of psychodynamic psychotherapists.

• More writings needed on reducing infant, child, adolescent, adult affect dysregulating symptomatology and re-establishing interpersonal functioning of broad range of disorders; depression and anxiety disorders, personality disorders, bipolar disorders, schizophrenia, autistic spectrum disorders.
• Growing body of data on efficacy of psychodynamic psychotherapy: compared to CBT and DBT effects are longer lasting and increase with time (Shedler, 2010).

• Neurobiologically informed psychodynamic treatment uniquely focuses on patient’s dysregulated UCS emotional functions.

• Yang et al. (PLoS One, 2011): “Emotion processing operates on a conscious level as well as an unconscious (e.g., implicit and automatic) mode, with both being associated with different neurobiological pathways.”
“A large body of literature has focused on the conscious aspect of emotion processing as for instance in studies on emotional-cognitive regulation and its abnormalities. In contrast, the unconscious aspect has been considered as the perception and the earlier processing of the emotion that precedes their cognitive regulation.”

Show disturbed negative emotional unconscious processing in depressed patients. Expressed in a deficit in automatically and unconsciously orienting attention to negative social information (sad faces).
“Our result may also be clinically relevant in that unconscious negative emotional processing may provide a novel and more viable target for future psychotherapeutic...intervention than conscious emotion regulation strategies. More specifically, it means that we have to target unconscious processing rather than conscious processing as targeted in Cognitive Behavioral Therapy.”

In all disorders psychoanalysis brings expertise on UCS implicit right brain relational communication and affect regulating systems within therapeutic alliance. Focus on bodily-based internal world of the patient.
• **Change:** Call for commitment to early intervention for larger impact on not only the individual, but cultural emotional and physical health, improvement of human condition. Though first forged in maternal-fetal and attachment interactions, right brain evolutionary mechanism continues to evolve over life span.

• This trajectory of right brain development can be altered by attachment trauma. Neurobiologically informed psychodynamic models of early intervention during critical periods of right brain growth spurt (“the first thousand days”) can alter intergenerational transmission and prevention of psychopathologies.
• Change in theoretical psychoanalysis: variations in organization of right brain circuits implicitly processing emotion and stress regulation relevant to individual, personality, gender, ethnic group, socioeconomic differences.

• Yet invariant properties of right lateralized limbic autonomic circuits, including right subcortical areas, represent common expressions of humanness, of fundamentally, what it means to be human.

• As discussed, advances in knowledge of right brain may act as an integrative and energizing force that can catalyze movement of field out of consulting room into the larger social and political culture.
Field needs to replace metapsychological abstractions of psychoanalysis with right brain neurobiological data. Neuropsychoanalysis needs to be integrated into central constructs of its theory of **UCS**, foundation of psychoanalysis.

In light of uncertainties of current social/political context, sense of urgency to this change - Dylan’s lyric “you better start swimming or you’ll sink like a stone.”

Another Dylan lyric applies here, “Forever Young:”

- May your hands always be busy
- May your feet always be swift
- **May you have a strong foundation**
- When the winds of changes shift