

Editorial

Neurobiological Approach to Psychotherapy

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INTRODUCTION

The mind can be defined as a process that regulates the flow of energy and information. Regulation is at the heart of mental life. The brain has self regulatory circuits that may enhance directly how the mind regulates the flow of its two elements, energy and information.

Energy and information can flow within one brain or between brains. Naturally, other features of our world, nature and technological environments can affect how the mind emerges. Within psychotherapy we can see that relationship with another person profoundly shape the flow of energy and information both between two people and within each person.

Objectives:

1. Describe an interdisciplinary view of the mind and mental health.
2. Identify eight forms of integration and how they pertain to the cultivation of well being within psychotherapy.
3. Discuss the interplay of mind, brain and interpersonal relationships in the development of mental well being.

Brain development:

The mind develops across the life span as genetically programmed maturation of the

nervous system, being shaped by ongoing experience. About one third of our genome, directly shapes the connections within our brain. Although genes are extremely important in development, experience shapes our neural connections as well.

When neurons become active, they have the potential to stimulate the growth of new connections among each others. With 100 billion neurons and an average of 10,000 synaptic connections linking one neuron to others we have trillions of connections within our brain.

These synaptic linkages are created by both gene and experience. Nature needs nurture. Experience shapes new connections among neurons by the way genes are activated; proteins produced, and enter connections established within our web like neural system.

Mental well being:

The mind achieves states of self organization, by balancing the two opposing processes of differentiation and linkage. When separated areas of the brain are allowed to specialize in their function, and then become linked together, the system is integrated. Integration brings with it a special state of functioning of the

whole, flexible, adaptive, coherent, energized, and stable.

The coherent flow is bounded on one side by chaos and on the other by rigidity. In this manner we can envision a flow or river of well being, with the two banks being chaos on one side, rigidity on the other. This flow of well being can be seen to reveal the correlation among an empathic relationship, a coherent mind, and an integrated brain, as three points on a triangle of well being.

Promoting well being:

Therapeutic experience that move a person toward well being, promote integration. Deviations from this integrated flow, are revealed as rigidity, chaos or both, and result in symptomatic conditions that may be experienced as inflexible, maladaptive, incoherent, deflated and unstable. To achieve the goal of promoting integration, it has been helpful to delineate the domains of integration that can remain in the therapist's mind within the process of psychotherapy.

Domains of Integration include: integration of consciousness, vertical integration, bilateral integration, integration of memory, narrative integration, state integration, transpirational integration, interpersonal integration and the mirror-neuron system.

Integration of consciousness:

The mind flows as energy and information through attention, *Exogenous*, *Endogenous* & *Executive*.

The integration of consciousness involves the development of executive forms of attention that are associated with the larger capacities for self-regulation, such as the balancing of emotion, improved stress response, and enhanced social skills.

Self awareness (mindful awareness) is defined as paying attention, in the present

moment, on purpose, without grasping into judgment.

Recent studies of mindful awareness practices reveal that it can result in profound improvements in a range of physiological, mental and interpersonal domains.

Cardiac, endocrine and immune functions are improved with mindful practices.

People who develop this capacity also develop a deeper sense of well being and what can be considered a form of mental coherence.

Neural plasticity:

Within psychotherapy, the focus of attention on various domains of mental, somatic, and interpersonal life can create neural firing patterns in the brain that enable new synaptic connections to be established.

Neural plasticity (the change in neural connectivity induced by experience) might be the fundamental way in which psychotherapy alters the brain.

Vertical integration:

Taking the perspective of the vertical plan of our somatic architecture we can envision the anatomically and functionally differentiated elements of our body to extend from our head to our toes. The posterior region involves perception of physical world, frontal lobe involves motor and premotor planning (behavior), DLPF involves working memory (here and now) , and orbitofrontal cortex, medial prefrontal, anterior cingulate insular cortex involve linking body, affective state and thoughts.

There are nine middle prefrontal processes

- Body regulation: *autonomic*.

- Tuned communication: *links the mind together.*
- Emotional balance: *life has meaning but not too aroused.*
- Response flexibility: *pause before acting (inhibit impulses).*
- Empathy: *considering mental perspective of others.*
- Insight: *self knowing awareness.*
- Fear extinction *GABA → amygdala → calm fear.*
- Intuition: *gut feeling, heart feeling → open to the wisdom of non-conceptual selves.*
- Morality: *capacity to think in larger good, to act on pro-social ideas.*

Bilateral integration:

The nervous system of vertebrates is asymmetric with left being different from right. The right and left cortices perceive and create reality in quite distinctive ways. These differences illustrate the importance of bilateral integration. The right hemisphere develops first after birth, its activity and synaptogenesis more robust during the first 2 or 3 years of life. After that period there are a series of cyclical waves of left then right than left dominance in growth and activity. The right and left sides of the brain have distinct differences that have been supported by a range of scientific and clinical investigations.

Integration of memory:

Memory can be defined as the way in which a past experience alters the probability of how the mind functions in the future. Memory shapes how we experience the present and how we anticipate the future.

Throughout our lives we embed experiences into memory via a first layer of processing called implicit or non

declarative memory (subconscious, reflexive). Before age 18 months this is the only form viable to the growing infant.

Implicit memory involves the perceptual, emotional and behavioral neural responses activated during an experience; our bodily sensations are also a form of implicit memory. The brain readies itself to respond in a fashion called priming in which past experiences shape the way we prepare for the future (intuition).

The second layer of processing is called explicit or declarative memory, of two forms: a) Symantec: general knowledge and general information and b) episodic: sense of self and of time, both of them require focal attention for their encoding.

Hippocampus serve an important role in memory integration, it functions as implicit memory puzzle piece assembler that clusters the basic building blocks of the various elements of implicit memory together into frame pictures of Symantec and episodic memory. With massive stress-hormone secretion or amygdala discharge the hippocampus maybe shutdown temporarily resulting in active implicit memory e.g. flashbacks of PTSD.

Narrative integration:

As we continue to grow during the first 5 years of life, explicit autobiographical recollection becomes integrated into narrative memory. The brain appears to have a narrative function that can detect themes of our life-story and draw heavily on prefrontal functions as they integrate neural maps that form the underlying architecture of our episodic and autobiographical memory system. With narrative reflection one can choose to detect and then possibly change maladaptive pattern.

State integration:

As the brain becomes activated in the moment it coalesces its firing patterns into clusters of activation, we can call it “state of mind”. These repeated enduring states of activation of the brain can help to define what we see as our personality (the pattern of perception, emotional and behavioral responses that help us to denote who we are). We can embrace the differentiated state of mind and their drive to satisfy different needs for familiarity and comfort, novelty and challenge, connection and love, mastery and exploration.

Interpersonal integration and the mirror neuron system (MNS):

Our brains are profoundly social. The structure of our neural architecture reveals that we need connections to other people to feel in balance and to develop well. Through the middle prefrontal region the brain integrates input from other people with the process of regulating the body, balancing emotional states and creating self awareness. This visceral, social, and self-integration suggests that our minds are woven from the integration of aspects of

reality that on the surface appear to be quite desperate. How could bodily, interpersonal and mental go together?

MNS reveals how the brain is capable of integrating perceptual learning with motor action to create internal representations of intentional states in others (if a monkey sees someone pickup an object, his own motor system will become primed to initiate that same action). In humans the picture is more complex, e.g. MNS is thought to be an essential aspect for neural basis of empathy. By perceiving the expressions of another person the brain is able to create an internal state that is thought to resonate with that of the other person. Resonance involves a change in physiologic, affective and intentional states within the observer that are determined by the perception of the perceptive states of activation within the person being observed.

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