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It's a Jungle In There: The Evolutionary Necessity of Psychotherapy

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It's hard to deny that we humans have amazing brains. Despite our common origins with other animals, we have come to possess far greater abilities. Anatomically, modern humans evolved from our chimp-like ancestors around 100,000 years ago, but it took another 50,000 years for our brains and culture to evolve sufficient complexity to make us capable of language, planning, and creativity. But alas, this staggering complexity has its downsides. The most basic of which are the challenges involved in the development and integration of the brain's government of neural systems.

The neo-cortex, for example, the division of the brain that organizes our powers of conscious thought, imagination, and empathy, are interdependent with ancient neural networks conserved by natural selection through countless generations. Beneath our newer equipment, capable of composing sonnets and symphonies, are structures driven by primitive instincts, unconscious impulses, and primordial fears. Within the small area of our skulls, the reptilian, ancient mammalian and modern human brains attempt to coexist and cooperate, at least enough to get us through the day.

You are probably familiar with this idea as Paul MacLean's model of the Triune Brain. The basis of his theory is that the contemporary human brain embodies a living record of our deep evolutionary history. At the core is the reptilian brain, responsible for arousal, homeostasis, and reproduction. The paleomammalian (older-mammal) brain, involved with learning, memory and emotion wraps around the reptilian brain. The neomammalian (newer-mammal) brain, required for conscious thought and self-awareness, sits atop the other two. These three levels roughly conform to the more common distinction of brainstem, limbic system and cortex. While MacLean's theory has many significant limitations, it can serve as a valuable heuristic for understanding some of the challenges of human experience.

An important aspect of neural organization is the conservation of executive functions for many basic functions in lower, more primitive levels of the brain. In other words, there are many cooks in the kitchen who don't necessarily work well together

because of their differing agendas and ways of processing information. Furthermore, only a small region of the cortex is capable of conscious awareness and articulating its strategies. This is problematic because networks working in silence are capable of influencing our conscious thoughts, feelings and actions—an idea paralleling Freud's conception of the conscious and unconscious minds.

The fact that so much neural processing occurs outside of conscious awareness and that executive decisions at multiple levels can be in opposition, lays the groundwork for considerable inner conflict. And don't forget to add the complexities of lateral specialization, vertical neural networks, and the influences of age, gender, and culture on the structure and function of the brain. In the words of Charles Hampton-Turner, this anachronistic menagerie of the human brain confronts the psychotherapist with the challenge of treating a human, a horse, and a crocodile attempting to inhabit the same body. Given these neural complexities, it's easy to see why just being human can be a daunting task.

The Social Brain

The potential for miscommunication among the networks of our brains might not be so bad if we lived in isolation. But our brains are also social organs which require sustained connection with other brains. At birth we are totally dependent on our caretakers for our physical survival. In some circles, a fetus isn't even considered viable until it graduates from medical school. So, if your average reptile is born "knowing the ropes" of how to perform the basic tasks of survival—getting food, fighting, and mating—we are, so to speak, born *dumb.* That is of course with the exception of knowing how to stimulate our parents to attach to us. For a human baby, survival doesn't depend on how fast we can run, climb a tree, or tell the difference between edible and poisonous mushrooms. Rather, we survive based on our abilities to detect the needs and intentions of those around us. If we are successful in relationships, we will have food, shelter, protection, and eventually children of our own.

Our prolonged dependency allows for an increasing amount of brain development to occur after birth, making each human brain an experiment of nature; a unique blending of genetics and experience. The parents are a baby's first environment, and their unconscious minds link with the baby's primitive brain which is hungry for learning. The parents' non-verbal communication and patterns of responding to the infant's basic needs not only shape the baby's perceptions of itself and the world, but also the architecture of the brain. Because the first few years of life are a period of exuberant brain development, early experiences have a disproportionate impact on the shaping of neural systems.

Although we rely on relationships, they can certainly be a challenge. At times we may even feel that life would be easier without them or the conflict and heartaches that can ensue. While being embedded in a group results in many difficulties, it also comes with an

ability to interactively regulate each other's internal states and build each others' brains. This ability to link with, attune to and build new neural connections in the brains of our clients is at the heart of psychotherapy. In this way, we are in a position to counterbalance some of natural selection's less stellar choices.

The Power of Early Learning

What makes the combination of a complex brain and human interdependency such a problem? From birth, the primitive regions of our brains are deeply affected by our social and emotional experiences. As a result, a great deal of extremely important learning takes place while our primitive brains are in control. For most of us, these interactions remain forever inaccessible to conscious memory, consideration, or modification. We mature into self-awareness years later, having been programmed by early experience with assumptions that we accept as truth. These artifacts of evolution and neural development turn the accidents of birth into the causes for which we come to live and die.

The powerful influence that early experience exerts over our brains can be both good and bad news. The good news is that the individual brain is well-suited to survive in a particular social environment into which it is born. Parents, family and culture shape each of our brains for maximum adaptation to our social niche. In good times and with good-enough parents, this early brain building will serve us well in adulthood. The bad news comes when factors are not so favorable, such as in the case of parental psychopathology, where the brain may be sculpted in ways that optimize survival during childhood, but prove to be maladaptive later in life.

We see this in abused and neglected children who often enter adolescence and adulthood without a clear picture of their early experiences but with a variety of symptoms. Explosive anger, eating disorders, drug and alcohol problems, and other forms of acting out are common. They also have identity disturbances and a poor self-image exacerbated by their angry feelings and negative behaviors. Like a veteran with PTSD, the brains of these children become shaped to survive combat, but are ill equipped to negotiate peace.

It is obvious that our primordial dependency can influence us in perfectly terrible ways. The caretaking of an alcoholic parent by a child may allow them to make it through childhood, but can lead to problems later in life in the choice of mates and negotiating getting their own needs met in relationships. And, as the song from the musical *South Pacific* suggests about racism and ethnic bigotry, "you have to be taught to hate and fear; it has to be drummed in your dear little ear." Thus, the implications of the way our brains have evolved and how each one develops has ramifications far beyond our personal happiness.

In psychotherapy, we are offered the means to explore our early experiences with the possibility of coming to understand our symptoms as forms of sensory, motor and emotional memory. Once they can be consciously thought about and placed into a coherent narrative, we gain the ability to reintegrate dissociated neural networks of affect, cognition, abstract thinking and bodily awareness. This process opens the door to decreasing shame and increasing self-compassion while creating the possibility for healing.

The Speed of Unconscious Processing

In order to survive, animals have to be tough or fast. The tortoise and the hare are good examples of these different, but equally viable survival strategies. While our elaborate cortices separate us from both of their brains, further down, all three are pretty similar. Our expanded cortex does allow us vast response flexibility over our more primitive cousins. Of course, thinking through options takes time and in some circumstances, a speedy reflex is more adaptive. Because of this, we have retained many primitive reflexes and automatic subcortical processes in the service of survival.

It takes approximately 500-600 milliseconds for an experience to be processed by our cerebral cortex and for it to register in conscious awareness. The amygdala, the core of our fear and attachment circuitry located in the early mammal brain, can react to a potential threat in less than 100 milliseconds. This means that by the time we have become consciously aware of an experience, it has already been processed a number of times in more primitive brain regions, activating memories, and triggering neural patterns organized by past learning. When we finally become aware of the outcome of this process, we experience it as if we are making a conscious choice. That is, the brain somehow creates the illusion that we are in living in the present moment, and act with free will based on conscious deliberation. There is extensive evidence that this is not really the case.

Although we think we are experiencing what is around us, it turns out that our conscious awareness is primarily the result of what has already occurred within our brains. In fact, 90% of the input to the cerebral cortex comes from internal neural processing. This makes sense for rapid appraisal and reflexive action based on past learning but also results in distortions and ruts in our thinking that can keep us frightened, withdrawn and confused. Think of the veteran years after combat, who ducks when he hears a car backfire, or runs for cover as a news helicopter flies overhead.

Attachment schemas are another example of these kinds of implicit emotional memories which derive from the summation of our early experiences with caretakers. They become automatic predictions of outcomes which become activated in subsequent relationships. Schemas shape our conscious experience of others by activating fast systems of emotional evaluation and lead us to either seek or avoid proximity. A person who experienced early abandonment may, as an adult, be perfectly capable of starting new

relationships. At a certain point, however, intimacy may trigger an implicit attachment memory leading them to become frightened and flee from a potentially healthy relationship. The impulse to run, driven by primitive brain circuitry, is overpowering and inescapable. The true reasons, stored within implicit networks dedicated to fear regulation, remain as aspects of what Christopher Bollas so accurately described as the “unthought known.”

The illusions constructed by our brains of living in the present moment and being in control of our behaviors have obvious survival advantages. Foremost of which is the ability to be assertive and doubt free in the face of a complex and confusing world. The downside of this strategy comes when we become so confident in our personal perspectives and beliefs, that we are unable to consider alternatives to our own thoughts and beliefs. In the case just described, a fleeing partner may come up with a list of irrelevant reasons for fleeing because there is no access to the true source of their fear.

Openness to questioning one’s assumptions is a key aspect of psychological mindedness and a predictor of a positive outcome in psychotherapy. We certainly do our best as therapists to teach our clients to question their assumptions, especially when they are self-defeating and incorrect. We attempt to get them to “act in,” that is, to come to sessions and talk about their impulses with the hope of integrating inhibitory cortical input with regions organizing primitive urges. Psychotherapy encourages a skeptical perspective when it comes to the output of our brains. Given how our brains work, this is a sound strategy, one we share with well-trained research scientists and Buddhist monks.

The Bias towards Anxiety and Fear

Survival is based on rapid and accurate decisions to approach what is safe and avoid what is dangerous. Some anxieties appear to be hard wired and linked to ancient survival needs. Our fear of spiders, snakes, open spaces, and heights harkens back to the survival requirements of our tree-dwelling ancestors. Because vigilance and rapid approach-avoidance reactions are central mechanisms of survival, Aaron Beck postulated that evolution favors an anxious gene. In other words, natural selection probably weeded-out our past relations who were too “laid back.”

The core of the neural circuitry involved in fear and anxiety is the amygdala, a structure we share with our ancestors who had only to navigate their physical environments and basic social interactions. With the evolution of the cortex, humans now live in a matrix of diverse social connections and possess imaginations that can carry them into worlds of their own making. Unfortunately, these primitive fear circuits are unable to tell the difference between real and imagined danger. We now have the capacity to experience anxiety associated with just about anything from public speaking, to existential despair, to the thought of an asteroid striking the earth.

The amygdala is also central to fear memory. The reason why is it so easy to forget someone's name but so hard to forget a traumatic experience is due to the different neuroplastic properties of the hippocampus and amygdala. The hippocampus, central to explicit memory, varies in size depending on current learning requirements and is capable of reversing or replacing old learning. In contrast, the amygdala demonstrates persistent dendritic modeling subsequent to stressful situations. In other words, the amygdala is like an elephant who never forgets. The amygdala's role is to remember threats and apply them in future situations while generalizing fearful experiences to as many situations as possible. This is why a panic attack outside the home can lead to agoraphobia or getting scratched by a cat can spread to a fear of all furry animals.

In contrast, the hippocampus is constantly remodeled in response to new details and will easily differentiate one furry animal from another. Evolution has shaped our brains to err on the side of caution whenever it might be remotely useful. It now appears that therapists help people get over their fears, not by deleting traumatic memories, but by building new connections to inhibit these memories from triggering autonomic arousal. Beck’s anxious gene seems to be finding increasing support from neuroscience.

Another problem with fear is that it makes us cognitively and emotionally rigid. We become afraid of taking risks and learning new things, resulting in what Wilhelm Reich described as a tendency for those who become sick to remain sick. Once our brains have been shaped by fear to perceive, think and act in stereotyped ways, we tend to remain in cognitive and emotional ruts which are reinforced by the very fact of our survival. Our chance of changing in positive ways rests in getting input from trusted others. The problem is that fear makes us mistrustful.

Caring relationships are not easily entered into nor is it easy for us to benefit from them. Openness and trust are fragile creatures; even with the people we love most. The training of the therapist and the therapeutic context itself are designed to enhance support, trust and provide consistent emotional availability. Within the consulting room, therapists attempt to be amygdala whisperers and work to reactivate networks of new learning in the hippocampus and prefrontal cortex. Warmth, empathic caring and positive regard create a state of mind which enhances neuroplastic processes and increases the likelihood of positive change.

The Suppression of Language and Predictive Capacity under Stress

When animals hear a loud noise or a sound suggestive of danger, they freeze in their tracks, become silent and scan the environment for danger. We share both these startle and freeze responses with our more primitive cousins. The logic of these response are quite clear–-being still and silent make us less likely to be seen or heard and prepare us to respond to potential threat. Research suggests that during these states of high arousal, the

area of our brain responsible for the production of speech (Broca's area) becomes inhibited. Thus the conservation of the startle and freeze responses into the newer mammal brain may, in some cases, result in diminished capacity for language.

While this may serve no negative end in animals without language, it is a high price for a human to pay for being afraid. Putting feelings into words and constructing narratives of our experiences make an invaluable contribution to emotional regulation, the integration of neural networks of emotion and cognition, and the experience of a coherent sense of self. When people are traumatized, they can lose the ability to put their fear into words that can help regulate affect, make meaning of their experience and build descending inhibitory cortical networks to the amygdala. This artifact of evolution is especially problematic in situations where individuals are forced into silence by their abusers or after enduring the "unspeakable horrors" of torture, war, or the extermination of friends and family.

An additional problem connected to this phenomenon is that Broca's area also contributes to networks of prediction and anticipation. This may be one of the reasons why individuals who have been traumatized seem to experience more than their share of subsequent accidents, bad relationships, and misfortune. The compounded loss of words and predictive abilities enhance the long-term impact of the trauma by increasing the probability of dissociation and re-victimization. In therapy we simultaneously help our clients to regulate their emotions while constructing adaptive narratives for their experiences. In this way, we hope to disinhibit language, restore predictive abilities, and support neuroplastic processes which rely on moderate states of arousal to become activated.

The Primacy of Projection

Human brains possess complex social networks which become activated as we observe and interact with those around us. Neurons called mirror neurons in the pre-motor regions of our frontal lobes fire when we observe someone engaging in a specific behavior, such as saying a word or grasping an object. Some mirror neurons are so specific that they only fire when an object is grasped at certain angles by particular fingers. These same neurons fire again when we perform the action ourselves. Mirror neurons link observations and actions, allowing us to (a) learn from others by watching them, (b) anticipate and predict others' actions, and (c) activate emotional states supportive of emotional resonance and empathy. All three of these functions support group coordination, cohesion and the spread of culture.

We also possess neural circuits which analyze the actions and gestures of others allowing us to develop a theory of mind—what others know, what their motivations may be, and what they might do next. As with mirror neurons, having an automatic theory of what is on the mind of another serves the prediction of behavior while supporting group cohesion.

The existence of these sophisticated social neural systems reflects the fact that millions of years of natural selection have been refining our brain's ability to read the emotions, thoughts and intentions of others. Anthropomorphism (imputing human intentions into animals and inanimate objects) may have its roots in the power of these unconscious and automatic neural networks. Think about how easy it is for us to accept and grow fond of Herbie the Love Bug, E.T., and Mr. Ed.

We are quick to think we know others because mindreading is instantaneous and obligatory. In essence, it is a reflex of the social brain to attend to the mote in our brother's eye and not to the beam in our own. While Freud saw these projective processes as defensive, they may in part be a natural byproduct of how our brains have evolved to process information. Unfortunately, evolution has not seen fit to invest much neural circuitry into self awareness. Projection is automatic and lessens anxiety while self-awareness requires effort and generates anxiety—which do you think is going to be the norm?

At the same time, the strength of these systems provides us with multiple avenues of healing. In our training as therapist, we learn to question our judgment and assumptions in light of the biases and countertransference we explore in our own therapy. We also learn to use mirror and theory of mind systems to enhance our attunement with our clients and explore their inner worlds. Taking responsibility and learning to "take back" our projections, allows us to try them on for size as potential sources of information about ourselves. While in couples therapy, we encourage our clients to stop "mind-reading" and learn to ask their partners about what's on their minds.

Unconscious Self-Deception

Based on our neural architecture and everyday human behavior, self-awareness and personal insight do not appear to have exerted a strong pressure on natural selection. In fact, self-awareness may have been selected against because it can lead to hesitation, self-doubt, and demoralization. In fact, it has often been suggested that depression results from seeing reality too clearly. Defenses help us to regulate our internal state by decreasing anxiety and shame. At the same time this can enhance social coherence by putting a positive spin on the behavior of those closest to us (I remember hearing a judge once say that everyone he sends to prison has a mother with an innocent child). This may be why humans have so few networks dedicated to self-insight and so many ways of distorting reality in their favor. Freud's defense mechanisms and the attribution biases of social psychology document many of these distortions.

While self-deception decreases anxiety, it also increases the likelihood of our successfully deceiving others. If we believe our own confabulations, we are less likely to give away our real thoughts and intentions via nonverbal signs and behaviors. Reaction formation, or behaviors and feelings that are opposite of our true desires, are often quite

effective. The best "con-men," from grifters to televangelists, can be so convincing that their victims often refuse to believe they have been cheated despite a great deal of hard evidence. Due to all of these built-in information-processing biases, the most naive observer can see things about us that we may be blind to ourselves. In psychotherapy, we provide our clients not only with interpretations, clarifications, and reflections but also with an alternative perspective (our own) which they can utilize to help discover themselves. This is why our own personal therapy is so important to our clients.

Why Does Neuroscience Matter for Psychotherapy?

Findings from social neuroscience are making it increasingly clear that psychotherapists are indeed in the scientific mainstream. In contrast to many other scientific fields, we have accomplished this while simultaneously respecting the subjective experience of our clients. In the absence of a brain-based model of change, we have learned to trigger neuroplastic processes and change brains. But why does an explicit understanding of neurobiological processes make any difference to our work? Here are a few thoughts.

On a practical level, the heuristics and data of neuroscience create ways to communicate with our clients about the shortcomings of our brains in objective and non-shaming ways. The truth appears to be that many human struggles, from phobias to obesity, are consequences of brain evolution and not deficits of our upbringing or character. Adding a neuroscientific perspective to our clinical thinking allows us to talk with clients about the shortcomings of *our* brains instead of the problems with *theirs*. Identifying inherent problems and developing methods to circumvent or correct them is a solid foundation upon which to base a therapeutic alliance.

As we come to better understand the neural correlates of mental health and emotional well being, we may be able to use this knowledge to aid us in diagnosis and treatment. Neuroscience may also someday provide us with a rationale for an informed eclecticism and provide additional means of evaluating outcome. We will be able to see which combination of treatments impact targeted neural networks and how changes in the activation of these circuits correspond with changes in symptomatology. In addition, neuroscience can also provide a common language to communicate with physicians and pharmacologists who also treating our clients. Finally, if you are anything like me, you might find a neuroscientific perspective to be an exciting addition to case conceptualizations.

Some therapists bristle at the integration of neuroscience and psychotherapy, calling it irrelevant or reductionistic. I think I understand their perspective and concerns—if you have a model of therapy that works, why bother with the brain? Would Rogers or Kohut have been better therapists if they had been trained as neuroscientists? Probably not. On the other hand, it’s hard for me to grasp how the brain could be irrelevant to

changing the mind. And while I dislike reductionism as much as the next person, doesn't reductionism say more about the thinker than the nature of natural phenomena? Our knowledge of neuroscience highlights the fact that we are primates with complex and imperfect brains who should remain skeptical about what we *think* we know. In other words, smart primates would be wise to remain humble and open to new ideas.

In conclusion, our brains are inescapably social, their structures and functioning deeply embedded in the family, tribe and society. And while the brain has many shortcomings and vulnerabilities, our ability to link with, attune to, and regulate each other's brains provides us with a way of healing which goes right to the heart of psychotherapy. From my perspective, the value of neuroscience for psychotherapists is not to explain away the mind or generate new forms of therapy, but to help us to grasp the neurobiological substrates of the talking cure—a linear continuation of Freud's *Project for a Scientific Psychology.*

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