Problems on the Nature of Reality

Neuroscience and Evolutionary Biology Inform the Psychoanalytic Debate

David Pincus

Way Beyond Freud

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David Pincus, DMH

The Skin Horse had lived longer in the nursery than any of the others. He was so old that his brown coat was bald in patches and showed the seams underneath, and most of the hairs in his tail had been pulled out to string bead necklaces. He was wise, for he had seen a long succession of mechanical toys arrive to boast and swagger, and by and by break their mainsprings and pass away, and he knew that they were only toys, and would never turn into anything else. For nursery magic is very strange and wonderful, and only those playthings that are old and wise and experienced like the Skin Horse understand all about it.

"What is real?" asked the Rabbit one day, when they were lying side by side near the nursery fender, before Nana came to tidy the room. "Does it mean having things that buzz inside you and a stick-out handle?"

"Real isn't how you are made," said the Skin Horse. "It's a thing that happens to you. When a child loves you for a long, long time, not just to play with, but really loves you, then you become Real."

"Does it hurt?" asked the Rabbit.

"Sometimes," said the Skin Horse, for he was always truthful. When you are Real, you don't mind being hurt."

"Does it happen all at once, like being wound up," he asked, "or bit by bit?"

"It doesn't happen all at once," said the Skin Horse. "You become. It takes a

> long time. That is why it doesn't often happen to people who break easily, or have sharp edges, or have to be carefully kept. Generally, by the time you are Real, most of your hair has been loved off and your eyes drop out and you get loose in the joints and very shabby. But these things don't matter at all, because once you are Real you can't be ugly, except to people who don't understand."
>
> "I suppose you are Real?" said the Rabbit. And then he wished he had not said it, for he thought that the Skin Horse might be sensitive.
>
> But the Skin Horse only smiled.
>
> "The boy's uncle made me Real," he said. "That was a great many years ago; but once you are Real you can't become unreal again. It lasts for always."

(Williams, 1997, pp. 10-13)

Modern and postmodern debates always bring with them some statement on the nature of reality. For instance, is reality given or constructed? Further, what type of reality is under consideration: are we talking about reality at the ontological, epistemological, or metaphysical level? The Skin Horse[1] weighs in on these issues, and so does David, the robot boy in Steven Spielberg's (2001) movie *Artificial Intelligence* (AI), who is made "real" through a sequence of words that activate a program resulting in an immediate attachment to his human mother-to-be. In David's case, his attachment is pure and more enduring than time itself, humbling the ambivalence and fragility of human attachments. For the Skin Horse, physical form has nothing to do with making things real.

The issue of reality has taken many twists and turns through the centuries and has found itself in many philosophical and psychological discussions. In psychoanalysis the question of reality is a lively topic as our clinical and theoretical models are changing—the current uncertainty of our field upon us and our directions being forged for the future. In this chapter I studiously avoid these debates as they occur within psychoanalysis; instead, I look to the horizons of evolution and brain science to see how they might illuminate our perspective in the analytic trenches. I do so in the following manner:

1) I lay out some basic issues of mind versus the material surround, using the theme of the Skin Horse, and begin to lay the groundwork for my view that brains have been built to be mental-material melders-transformers. Later mammalian brains, in particular, may be viewed as digesting and constructivistic postmodern wonders, yet they are exquisitely attuned to and dependent upon the material surround. Furthermore—despite some brains' more recent postmodern leanings—brains are always utterly devoted to themes of regularity, predictability, repetition, redundancy.

2) I develop the notion of constructivism, as I view it, in the operations of brains. Constructivism in neuroscience has many connections to the modern-postmodern debate.

3) I take four examples from neuroscience that shed light upon the modern-postmodern discussion: (a) facial recognition, (b)

dendritic morphogenesis, (c) dreaming, and (d) modularism and modernism in evolutionary psychology.

4) In conclusion, I reconstruct these neuroscience observations in the context of the modern-postmodern debate, and inquire about implications for psychoanalysis.

BASIC ISSUES

Returning to the Skin Horse and the movie *AI,* the device of a Cartesian dualism raises the issue of emphasis or priority: Does the reality of feeling, of attachment, of loving, become more compelling than that of the material universe? This is a salient, compelling question, as Spielberg surely knows. And as psychotherapists who toil in the pained subjectivities of others, we are all too aware that the material comforts of our patients do little to improve their psychological lives. But do we conclude that affective reality is more important than the material surround? To do so is to grant precedence to *psyche,* to place the material world in something of a secondary, or, more extremely, epiphenomenal position. This position is tempting—if for no other reason than the fact that materialist traditions have dominated the Western scene for hundreds of years—but if we take it we deny the obvious truth that the organization of material substances of various sorts provides the conditions for our environments, our bodies, and our brains. Feeling minds must have bodies, floors, tabletops, a living biosphere. You can't have one .. .

without the .. . other(s).

Let us, then, while staying within the Cartesian bifurcation, modify our position. The material universe exists; the subjective universe exists (only for living creatures; for now at least, as there are no sentient machines in the production lines). Let us grant precedence to neither, nor contemplate how one emerges from the other (despite the very interesting possibilities to consider). Instead, let us ask which is more *important*—that is, which do we *pay attention to, care about more*? This is an arbitrary question, and its answer depends on the lens of analysis. In the past, psychoanalysts were inclined to agree that good mental organization has more going for it than good material organization—assuming that material reality is provided for *to a certain degree, that there is an average expectable environment, a base provision of the usual things*. Under normal circumstances, therefore, mind is more important. If, however, a usual brain suffers an unusual event (such as an infarct), or a usual liver suffers a cancer, or a usual home suffers a devastating fire, then a psychological emphasis fades and material concerns are more apparent.

And so this is the way it has been viewed: The figure of *psyche* could emerge into bold relief from the ground of its context, provided there were no eruptions from other factors in the offing. And this practical separation of mind from brain, internal psychology from the external surround, has yielded

plentiful fruit. This neo-Cartesian device has created a border around intrapsychic space that has allowed for meaningful study, theory-building, and clinical care. We now accept that this separation is a convention—simplistic and inaccurate—for many, many reasons, not least the fact that there is *no* average brain, nor a static, unchanging one. But the device has been a useful tool.

This neo-Cartesian device has had its equivalent in the temporal dimension: that which is given versus that which emerges. We know that nature (given)-nurture (emergent) bifurcations are naive, though they are sometimes helpful. I will exploit the nature-nurture (or nativism-constructivism) bifurcation in order to amplify certain points, keeping in mind that there are elaborate and compelling attempts to meaningfully dissolve these partitions, whether they be, for example, in terms of developmental psychology and psychoanalysis in general, cognitive development (Piaget, 1937/1954), phylogeny-ontogeny (e.g., Gould, 1997), selectionism-constructivism (Changeux & Danchin, 1973), Changeux, 1985,1997; Spoms & Tononi, 1994; Purves et al., 1996; Quartz & Sejnowski, 1997), neural network development (van Ooyen, 1994), emergence and neurodynamics (Arbib, et al., 1997; Freeman, 1995,2000), dynamic perspectives on cognitive and cortical modularization (Karmiloff-Smith, 1992), self organization in the nervous system (Szentagothai, 1993; Szentagothai & Erdi, 1989), and neurodynamics and systems theory (Erdi,

1993, 2000). With respect to evolution, one can parse between phylogenic time and ontogenetic time, and make the observation that mammalian brains have increasingly emphasized the importance of ontogenetic experience. This development is supported by newer brain organization, structure, and capacity. Have brains been evolving to become constructivistic-postmodern wonders? To what extent do they remain tethered to fixed realities and relatively fixed adaptations? In what follows, I look at brains through evolutionary time to see if they can weigh in meaningfully on this conversation. Brains may have been working toward a modern-postmodern synthesis long before humans began to consider such things. Understanding our brains' solutions may help us in resolving our debates.

BETTER MODELS

There are many opinions as to why the postmodern era has emerged with such vigor. Some argue that it is because we are disenchanted with the results that science and technology have brought to our lives; others say that adequate dynamic, context-dependent models and technologies were not available before now; still others attribute the cause to the periodic dismissal of that which is given (universal) in favor of that which is created (emergent) —that is, to an oedipal drama of generations.

While there are a multitude of reasons for the current zest in the

modern-postmodern debate, I am of the belief that the debate, through the ages and in its various forms, partially results from flaws in our explanatory models, whether these be scientific, cultural, or religiously informed. Ecological or context-oriented explanations are needed to understand biological phenomena; our science has only begun to tackle this area, and Western thought has vigorously avoided it. Crude parsings have beset the behavioral sciences since their inception: mind-body/brain, self-other, inside-outside/environment, structure-process, to name just a few. Because we have had limited models and limited technology to support our imaginations, it is understandable that *context* has not been easily amenable to description. The problem with nonecological models, however, is that separate boundaries lead to separate constructs, categories, and languages, with resultantly separate "pictures" of reality. These bounded categories are then employed in explanatory service—a sequence of causal chains may be offered, whereby, for example, a "drive" prevails upon a "defense." A clinically relevant postmodern view asks that all bounded categories be deconstructed-reconstructed in the context of the dyad. This dynamism is a welcome breath of air, freeing us from the constraint of our models, but it may cast us into a current of relativism that leads to the open sea, where there are no markers. In the biological universe, and in the world of neural networks and robots, the challenge has been to create models that provide anchors (the givens) and yet allow for complex, emergent, and novel phenomena (the emergents).

In Lawrence Friedman's (1999) fascinating paper "Why Is Reality a Troubling Concept" he framed the modern-postmodern debate in terms of an age-old philosophical argument between nominalism and realism. Friedman argued that there can exist a reality "in here" and one "out there" whose edges and contents are still porous, dynamically changing, and can become only relatively known. This balanced approach appeals to me, and it also finds voice in Cavell's (1998) position (though she argues it for different reasons). In my reply to Friedman's paper (Pincus, 2000), I focused upon the weakness of our explanatory models, how they have helped to create our problems and have fueled much of the debate between nominalism and realism. In a portion of my reply, I stated:

> I would add that the nominalist-realist discussion, at least in our field, gathers strength from impoverished models of capturing mind and behavior in the context of their environment. If, on a conceptual level, inside is severed too precipitously from outside, or person from person, models that flush context back into the fold will have their revenge.
>
> For very "primitive" creatures with reflex-like interactions with their environment, and virtually no capacity to transform or be transformed by it, either-or models of inside-outside, biology-environment, etc. are not that limiting. But for creatures capable of learning and sustaining more complex interactions with the environment beyond their bodies, simple parsings fall on hard times. This is especially true for humans, who have the capacity to transform the surround through technological innovation, creation of social realities, and the emergence of cultures. For the profoundly plastic and capable human creature, we should wonder if definitions of "biology" shouldn't be extended beyond our bodies to the complex organizations and cultures we create. (p. 596)

If we are to meaningfully understand the individual-in-the-world, the relationship between "individual" and "world" must be more fluid, the boundaries more porous, the causality and organizations more emergent.

In my reply to Friedman, I am attempting to soften what I had viewed as his too-harsh critique of the postmodern (nominalist) position, and that I find the current emphasis upon contextualism to be an understandable reaction to overly bounded models of psychic space. However, a radical contexualism that becomes a form of relativism that has its problems as well.

> In our field, the constructivist or radical postmodern thinker reactively floods context into the situation, to a degree that obliterates the realities of levels of separation, contrast, and organization. But context can be overstated precisely because explanatory models have parceled up the psychic field into naive reductionisms, parallelisms, and dualisms. Part of the overcontextualization by postmodern thinkers is in reaction to a too simplistic cleavage between the psyches of patient and analyst in the clinical situation. Endless contextualization is a process of never quite separating anything off, always enfolding causes, reasons, and things into one another.
>
> It is my belief that once the mind-brain sciences develop a language that adequately captures dynamic interaction, embeddedness, and context, explanatory hierarchies will settle out that allow relatively noncontextual factors a robust existence, side by side with the hopelessly drenched contextual ones. (p. 597)

The difficulty, of course, is to develop those models and language. The newer sciences of complexity, self-organizing systems, and general systems theory appear to be compelling efforts to respond to this very challenge.

A BRIEF FRAMING OF THE DEBATE

What is reality within the clinical situation? What is reality outside of it? Is reality defined by that which is given . . . by the material contours of the objects and participants . . . by what is felt or intended . . . or by what happens? Of course, the answer depends upon the lens of analysis and whether one is concerned with material reality, psychological reality, or the relationship of the two. In clinical psychoanalysis, the concept of context and the notions of emergent phenomena and field theories have stolen the show in recent years, leaving the "givens" a minimal role. To the extent that the "givens" assert their claim to the construction of reality, under the current lighting their assertion appears clutchy—desperate and overstated. But the enthusiasm of the "emergents" has brought a potentially relativist euphoria; with anchors tossed to the wind, postmodern ships drift off into the universe, having not even gravity, friction, or an atmosphere to provide resistance.

There is something wrong with this picture. Living systems depend upon regularity, redundancy, even repetition, therefore these features must not be cast to the wind. All biological creatures find some balance between stasis and emergence, and therefore the study of them may be able to help us with the above debate. In particular, the human brain seems to do a remarkable job in balancing the "givens" with the "emergents." Let us look to see how our postmodern value creating brain still finds itself tethered to

certain parameters, certain givens.

The Limits of Constructivism

> It is as if the Milky Way enters upon some cosmic dance. Swiftly the brain becomes an enchanted loom, where millions of flashing shuttles weave a dissolving pattern, always a meaningful pattern though never an abiding one, a shifting harmony of subpatterns ...
>
> —Sir Charles Sherrington (1940, p. 147)

To address how brains develop and change over time, models of neuronal selection, constructivism or some combination of the two are prominent in the literature. While the emphasis may vary, we may conclude that there are few credible hypotheses in neuroscience today that do not subscribe to some form of constructivism. Each moment in time changes the orientation and perspective of all others. The brain is viewed as a transforming and modifying entity, and the brain is simultaneously modified by experience. The human brain, more than any other, is profoundly unfinished at birth, with experience-dependent sculpting that defines future categories, perceptions, and shapings of the self. It is the plasticity of all brain tissue, but especially the organization of the human brain, that allows it to adapt to and form itself to ontogenetic experience, rather than being relatively dominated by phylogenic history (see section on modernism and modularism in evolutionary psychology, pp. 52-59, below). The principle of

experience-dependent shapings of concepts and constructs through the organization and modification of neural tissue would greatly appeal to the postmodern mind.

As a psychoanalytic clinician, I believe that our perceptions of the world around us are not simply copies of the data of external reality but must, in a profound way, incorporate and reflect our personal experience. The experience of our lives is woven through us (much like Sherrington's enchanted loom), altering the eyes through which we see the world. This personal perspective, in my mind, can never be removed from the theories we construct, the data we find to be most significant. One could rely upon the physicists to "harden" this position, one in which the impossibility of pure "objectivity" has been acknowledged and deference given to notions of indeterminacy, relativity, and quantum mechanics. But I base this conclusion on personal experience and clinical reality. What is important to us, and what we believe, sifts itself imperceptibly into what we see, what we experience.

Our construction of the world around us, while unique and meaningful to each of us, must bear some relationship to the shape and organization of things "out there," otherwise we would not be particularly well adjusted to our environment. Some would say that the way to solve this problem is to parse "meaning" from "objective reality" and say that our neuronal equipment makes relatively accurate copies of the physical world and we

each then add our individual hues of meaning to that copied world. This has been the mantra of representationalist and computationalist modelers of mind-brain. From where I view things, there are serious difficulties with this proposition. Space only allows me to mention them briefly. First, proposing that the brain copies the physical world and our "mind" interprets that world propagates a dualistic severing of mind from brain. Second, there is no evidence that these "copies" exist, and, as we know, the world around is infinite (Freeman, 1995,2000; Nagel, 1974) and is sampled from by the species and individual in question according to rules of relevance for that individual. The digestion of and assimilation to the world undergoes profound transformational and selective processes. Perception is a meaningful and active construction, reflecting the biases of our neuronal equipment and the biases of our particular individual experience. If the bias of the neuronal equipment can be thought of as reflecting the "memory" of species-wide adaptational victories, then no neuronal or psychological perception can be viewed as free from memory. Brown (1996) concurs, as he poetically captures the notion that perception apprehends objects through the past, when he states "the past reappears in the body of the present and dies in the final shape the present takes on. Every past moment is transformed as it propels an object into the present" (p. 43). We do not merely distort the pure, copied neural input according to our psychological needs and preferences. The neural image itself is constructed. Individual history and evolutionary

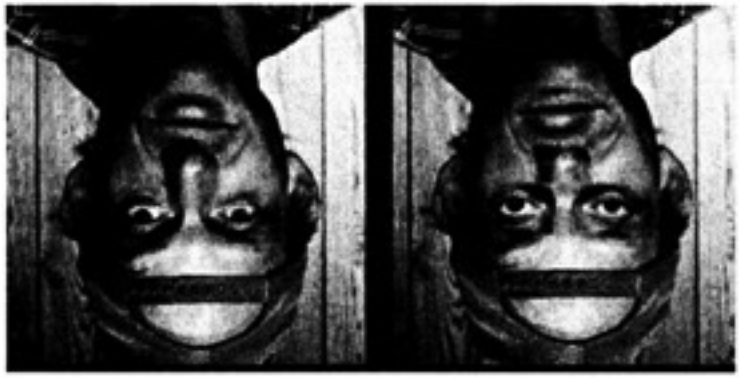
history bring their memories to bear on the perceptual processing—up and down—all along the way.

The postmodern theorist would heartily endorse this picture of things, as the picture would affirm, at the level of brain tissue, an experience-dependent orienting process, from which all perceptions are sifted through. Whatever givens, whatever universals are biased into our brains and nervous systems, these givens are taken up by the organizational processes of the constructing mind-brain and swept along into individual and culturally meaningful categories of experience. But before the postmodern can claim victory, let us hear from the modernist on these matters. The modernist might reply "well, of course, the brain is a constructing device par excellence . . . but universals can still be determined and are the basis for all subsequent organization The universals set the parameters; experience allows definition within those parameters

The debate between the modern and postmodern, in terms of the issue of constructivism, would take shape around matters of emphasis: just how much do the "universals" dominate subsequent organization? Or, more radically, does plasticity, especially human plasticity, virtually obliterate the usefulness of the notion of "universals"?

Let us take an example that calls into question the obliteration of

universals, an example I first observed in John Dowling's *Creating Mind* (1998). Certain types of experience are preferred by all people, and cannot be unlearned. Facial recognition is one of them. We all possess the neurological equipment to accomplish this task more or less well, but for some curious reason the face we are looking at must be properly oriented. Our equipment is biased to do the job with faces right-side up, but does a lousy job with faces in any other orientation, even with people we know very well. Furthermore, we will miss important cues from the upside-down face—cues that are profoundly meaningful beyond recognition of the face itself. Looking at an upside-down face, we may miss not only who the person is, but what their facial expression is telling us about their intent, how they feel, etc. Facial recognition is a right-side-up capacity, perhaps because in an evolutionary and experiential sense that is the way most faces are viewed in the real world. Below are two photographs of an inverted face. The one on the left has been altered slightly, though you will not be able to discern the significance of this alteration. This is because your neural equipment, your phylogenetic bias if you will, is geared to make significant distinctions of right-side up faces, not the reverse. But turn the image 180 degrees. The left picture with the minor modifications (his eyes and mouth have been cut out and inverted with respect to the rest of his face) produces an astonishing effect in the "normal" orientation that is entirely missed in the inverted orientation.



No matter how many times you train yourself to "see" the menacing features as you look at him in the upside-down mode, you will always be surprised when his head turns 180 degrees to the right-side-up viewpoint. I have tried to untrain myself to this bias, thinking that I might be able to overcome my predilection for interpreting faces in the right-side-up mode, but I cannot do it. Nor can you. We all do it the same way, see it the same way, and this is a universal. No matter how much wisdom can be found in the postmodern emphasis upon dynamic construction, anchors exist nonetheless. And we need those anchors.

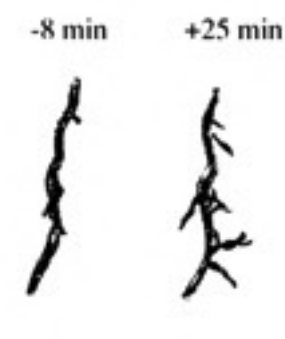
Dendritic Morphogenesis

The ancient Greek philosopher Heraclitus said: "As they step into the same rivers, other and still other waters flow upon them" (quoted in Kahn, 1979, p. 53). Thomas Wolfe wrote a novel called *You Can't Go Home Again.* It

has been known for some time that the brain is sculpted by experience, is never the same thing twice. This idea has been offered by many but can be described by Hebb's (1949) Rule, which emphasized that neurons that fire together wire together. The mechanisms of that sculpting have been identified by a variety of methods, but relatively little had been known about the role of synaptic activity in the development of dendritic morphology until Maletic-Savatic et al. (1999) observed structural changes in living dendrites as a result of synaptic activity. While it is true that this demonstration occurred in the nervous tissue of the lowly worm, its significance cannot be underestimated. We can “see” brain structure being altered by a learning event. Things are never the same. These changes were quite specific and astonishing—in some cases the structural changes “morphed" within three minutes of the onset of the stimulation. This is such a dramatic example of plasticity and the Hebbian Rule that it justifies going into a bit more detail. We now have direct observation of dendritic structural change in living brain tissue as a function of experience.

The researchers cultured living tissue from the hippocampus of rat brains and injected it with a virus that emits a green fluorescent protein. They then looked at the tissue through a two-photon laser-scanning microscope and were able to easily see all aspects of the associated axons and dendrites. They then placed a stimulating electrode very close (within about 10 microns) to the dendrite under observation. There were numerous new

growths and protrusions within 20 minutes of stimulation. Most significant were new structures (43%) and extensions of existing structures (57%) that the authors described as filopodia, which are hairlike protrusions. Below is my rendering of the stimulating electrode close to the dendrite and an actual picture of the dendrite 8 minutes before stimulation and 25 minutes after. The filopodia are thought to develop into mature dendritic spines, which are capable of forming new synapses



> If these structures generate synapses, they will have greater likelihood of connecting with presynaptic axons that were active during the synaptic stimulus, providing a mechanism for synaptic plasticity satisfying Hebbian rules. Such a mechanism could play a role in the establishment of functional neural circuits during development and memory storage, (p. 1926)

This dramatic evidence helps to delineate the proposition that experience (stimulation) leads to structural and organizational changes within the dendritic arbors. It helps us to see that the reality of the physical

structure of the brain can be modified within minutes. Extrapolating to humans, if we consider what we refer to as consciousness, emotion, and a self as being global state variables (that is, states that emerge in the context of massively interacting structures and dynamics), then each morphological change within the brain has the potential to alter the global states slightly, even if the tilt is infinitesimal. It is as if the enchanted loom is weaving a tapestry that is ever evolving, and each new thread has the remarkable ability to reconfigure the relationships of all threads before it. But before we conclude that the brain is making a case for an endless constructivism or relativism, we must remember that there surely are constraints on this process. A simple example is the registration of sensation. Humans may never respond to a particular odorant because it is "off the charts" of what our neural equipment deigns worthy. No amount of training can put it in the range of registration, and yet for another species the odorant is remarkably salient—readily recognized. There are some systems that are relatively impervious to experience, and these "universals" are relatively unresponsive to nudging. There are the boundaries that the skull imposes, and much is constrained by the genetic parameters of each person. These are just a few of the limitations imposed upon the evolving brain, but the capacity for new organization and dynamic interaction, which is reconfigured with each experience, is still immense.

Dreaming

The current scientific status of human dreaming provides us with a good opportunity to view the modern and postmodern perspectives at work. What is the reality of dreaming? Are dreams bottom-up neurological noise, arising from pontine volleys in the lower reaches of the brainstem, which we psychological creatures and especially psychotherapists like to organize and give meaning to? The thrust of brain science has been to show us that these volleys are responsible for REM sleep and that dreams occur within REM. If this picture is accurate, then the reality of a dream is two things: lower level nonmeaningful neuronal volleys and upper level narrative construction—the latter being something we do before waking or as we wake. Following this line of thought, conscious dream-remembering is completely constructing or "membering" a dismembered event. Depending on one's viewpoint then, the dream could be viewed as chatter or gossip (if one views the dismembered event as what is "real", the dream story is epiphenomenal garbage) or, more respectfully, a weaving together of a plot line that is emotionally and psychologically salient to the dreamer. In the latter instance, the dreamer's creation of a narrative might be viewed as anything from postmodern con-artistry to a sculpting.

We know that dreams are important. Whether their meaning is a sort of postmodern, constructed add-on or whether they are made according to meaningful design should not matter to psychotherapists, some would argue. Dreams are clinical facts and we interpret them as such. But the viewpoint

one has about the origins of dreams has an influence in the interpretive stance. If the recounting of a dream in a clinical hour is seen as profoundly shaped by the contours of the dynamic between the patient and analyst, then, whatever its sources, it takes up residence in the context of the transference-countertransference matrix and its enfolding-unfolding there will be highlighted in the interpretive approach. If a dream is viewed as having been pieced together from forbidden wishes (a process presumably occurring in the neocortex), then those disguised wishes will be looked for in the interpretation. If a dream is viewed as having been put together as a sort of tapestry of one's important emotional themes (via stimulation, presumably at the limbic level), then the interpretation of the dream will focus more on the surface of its content. And if a dream is viewed as a result of brain stem discharges and the theme is merely a composing and giving harmony to the neural cacophony of fingers randomly pounding a piano keyboard (which was the position offered by Wilhelm Wundt, the father of experimental psychology), then there is little at all to be said about the dream, except, perhaps, that it is a remarkable piece of music. Given the lack of definitive knowledge in the area and the great varieties of clinical presentation, most clinicians are probably pragmatists when it comes to dreams: some dreams seem to tell a surface level story of emotional significance, some reveal hidden wishes, and others we cannot make heads or tails of. However, despite the evolving knowledge base in dream research, it is unlikely that we would

assign each dream type to a particular place on the neuroaxis, for this would amount to a form of dream phrenology. We are more likely to retain an attitude of curiosity and flexibility, inclined to say that those dreams which we cannot understand we are not listening to properly, we have too few associations, or that the material is too deeply defended/layered.

Some reductionist oressentialist traditions in neuroscience would make all psychological experience of secondary importance, with dreaming no exception. The "real stuff' of brains and minds, it is thought, can be reduced to physical organization and chemical interactions. A more reasonable way of approaching the situation is to think about how the content and interaction of neural tissue leads to getting over the hump of the "hard problem" in neuroscience (Chalmers, 1995), that is, of how brains become minds. From this position, it is assumed that brains are necessary for minds but that there is something emergent from the remarkable interactive processes that cannot be reduced to the components themselves.

Neuroscience has been telling us that the reality of dreams are in the bottom reaches of the brain stem, where censors, selves, objects, and meanings do not readily reside. This argument has its origins in Moruzzi & Magoun's appreciation of the reticular activating system in 1949, the discovery of REM sleep by Aserinsky & Kleitman in 1953, and Dement & Kleitman's correlation of REM with dreaming in 1957. These three

discoveries provided the basis for belief in an activating system from down below, that this activation occurs during the REM phase of sleep, and that dreams occur during REM. McCarley & Hobson proposed their reciprocal interaction model in 1975, and Alan Hobson's work over the past 25 years has regularly attacked psychoanalytic idea that dreams are meaningfully constructed. Recently, Hobson has allowed that dreams can become meaningful, or that they are fashioned by some limbic level emotionally salient categories, but there can be no censor orchestrating all of this.

The hard truth, we have heard from neuroscience, is that dreams, at the level of psychological function and experience, are only epiphenomenal or secondary to more basic purposes and processes. Given that dreams correlate primarily with REM sleep, and given that REM is a volley of neurons firing from way down in the brainstem, then dreams, it is said, cannot be driven by complex psychological motivations. These complex motivations and processes are thought by many to reside much "higher up" and forward in the cortical regions. The nonpsychological purposes of REM (and, by implication, REM dreaming) are thought to be memory consolidation (the pruning of an overlapping distributive store), a fresh acetylcholine bath (something like hard drive maintenance and garbage disposal), and synthesis (norepinephrine and serotonin utilization are virtually shut down during REM, allowing for their replenishment).

The hard line, bottom-up camp gives very short shrift to the contributions of "higher" (and more forward) functions and structures. These thinkers and scientists are more drawn to an essentialist or fundamentalist spirit, and some have been stridently critical of top-down levels of explanation, especially the Freudian variety (see Hobson 1994, 1999). Recent evidence has begun to challenge the dominance of the bottom-up paradigm. First, a full 20% of dreams occur outside of REM and therefore without the benefit of the pontine bottom-up volley, though the experience of the dream is indistinguishable from that of REM dreams. Second, neuroimagers such as Braun (1997, 1999), Maquet (1996, 1997), and Nofzinger (1997) have found selective activation of paralimbic and neocortical areas during REM. Note Braun's (1999) comments in a recent issue of the journal *Neuro-Psychoanalysis*:

> Limbic activation in the absence of the rational prefrontal activity simply represents an unusual circumstance in which memory, emotion, and appetite may be expressed in the absence of the rational context provided by the prefrontal cortex. Limbic processes are unbridled, without being examined, categorized, rationalized, ordered. Rather than disinhibition, this could represent, in psychoanalytic jargon the suspension of the "reality principle" in favor of the "pleasure principle"— "regression" if you will. (p. 99)

Third, psychoanalyst Mark Solms (1997) has found that some patients with pontine lesions, who as a result no longer have REM, are still capable of dreaming. He also observed that others who had forebrain lesions were still

having REM sleep but no longer reported having any dreams. And fourth, many patients who have had lobotomies have also lost their capacity to dream along with some tissue in their frontal lobes, again suggesting a role for “higher up” areas in dream organization. This latter finding is particularly interesting, in that a lobotomy’s efficacy is thought to reside in a diminution of spirit or wishfulness. Why do dreams go away, post-lobotomy, along with a certain intensity of wanting? Perhaps there is something to Freud's dream theory after all. Together, these observations suggest that (a) dreaming is not synonymous with REM, although 80% of dreams are correlated with those pontine volleys; (b) scanning data supports the role of limbic activation and selected cortical regions in dreaming; and (c) certain forebrain areas may be crucial for dreaming to occur, and those areas may have something to do with regulating or expressing complex and/or intense “wishes” through the dream process.

Having briefly reviewed the complexity of the neuroscience debate on dreaming, we are left with the conclusion that the content of dreams is not merely epiphenomenal noise from the brainstem, and that limbic and neocortical levels of activation may have a great deal of influence in shaping the content of dreams. But does upper level activation during dreaming mean that a wish fulfillment censor is weaving the plot line? Or is a dream's plot determined by the limbic level emotional circuits that are stimulated, with these basic emotional experiences then elaborated into eloquent narrative?

Or is a dream merely a mental event that truly begins with awakening, whereby brain stimulation of whatever variety is placed in differing baskets and constructed afresh as the preconscious and conscious mind awaken to meet the sunrise? In my opinion, the jury remains out on these matters, but each type of question asks different things of the modern and postmodern debate.

Let us view this matter from three different vantage points.

(1) At the level of brain functioning, the issue of that which is "given" versus that which "emerges" can be parsed as following: Even if limbic and neocortical circuits are active in dreaming, the issue is a matter of dominance —that is, what is the overwhelming "given" in dream formation. Hobson's (1999) recent position is clear: Even if motivation and emotion centers are activated in dreaming, the forebrain is still "in the neuromodulatory thrall of the brainstem" (p. 218). A problem with this position is that it doesn't account for dreams that exist without brainstem activation. Ignoring this difficulty, Hobson clearly places brainstem activation in a dominant role, with limbic level activation secondary. Somewhere along the way a meaningful structure of a dream is created by the dreamer, but the plot line merely articulates the emotion centers activated. There is, then, no hidden meaning to dreams. Instead, there is an ability, through the dream, to articulate emotions in more affectively raw categories that are not so under the dominance of logical and

secondary process mentation. Meaning is on the surface of the dream, constructed into a narrative story that contains the affective themes, and when a dream is told to a therapist the narrative is again under influence of reconstruction according to the dynamics of the therapeutic relationship. The task of clinician and patient is to clarify the affective categories that are on the surface of the dream, for those are fixed and real (even though they are secondary to brainstem activation). Apart from the affective fixity of the dream's constituents, the postmodern perspective would hold sway here.

(2) Solms and others would emphasize the more top-down constituents of dreams, highlighting cortical and limbic activation. This picture would preserve certain elements of Freudian dream theory, for it allows the plot weaver to have complicated psychological-cognitive capacities. The dreamer does not merely create any narrative to organize pontine/limbic data, that narrative is motivated to express salient emotional themes and hidden wishes, often in a quite disguised manner. This picture takes neurophysiological data to support a complex psychological process, and it attributes motivation to that psychological process. And as we turn to the psychological dimension, in our consideration of the modern and postmodern world views, are there, then, fixed meanings and fixed hidden wishes that are to be discerned from the dream narrative? If so, then constructivism takes a back seat to finding the "truth," and the meaning must be found. This method of dream interpretation would take into consideration the constructivistic

aspects of the transference-countertransference matrix, and while the dream's meaning could not be found without this contextual consideration (though some Jungian and other schools say that it can), it can be ultimately "found." And even if the dream is multiply determined, with multiple interpretations over time, the idea remains that a meaning can be found, because dreams are built according to certain principles. Modernism survives in this model.

(3) The third vantage point is to emphasize the postmodern perspective of the dream and its interpretation. This picture would be as follows: regardless of what areas of the brain are involved or necessary for a dream to be produced, the narrative must be fashioned into a relatively coherent form so that the dreamer can "receive" it (though not necessarily make sense of it). A dreamer is a mind, and minds experience through a narrative space (which must include space-time sequencing) via the vehicles of subjects, objects, feelings and relationships. The ongoing creation of narrative space is what minds do throughout life, and that space is continually altered and transformed through each moment in time and in the context of each experience. Therefore, and this is a big therefore, while a dream may be composed according to certain rules which express certain motivations, the dream is a forever evolving act of mentation which is reconstructed and reconfigured with each remembering, and with each telling, whether to oneself or to one's analyst. The "givens" are swept up into the current context.

Each of the above three interpretations of the neurobiological data remains tenable and can be appropriated by those wishing to emphasize modern or postmodern sentiments. But the crucial issue remains: how to juxtapose and yet articulate that which is "given," that which is "emergent," that which is a "universal," that which is "constructed." The intercalation of neuroscientific and psychoanalytic pictures of dreaming provides us with another vehicle for considering the modern-postmodern debate.

Modularism and Modernism in Evolutionary Psychology

On a daily basis we are inundated with "newly discovered" evolutionary explanations for our behaviors. As a generic example for this sort of reasoning: We do this thing or have that desire because it had an x, y, or z adaptive value a very long time ago. What is "real" is not the meaning we assign to our behavior but, rather, its reason for surviving throughout evolutionary history. Truth can be found, and it is in the phylogenetic past. On first impression, we might be intrigued or shocked by yet another "hidden" meaning to our desires and behavior, an effect not unlike that of the psychoanalytic positing of unconscious meanings for our conscious thoughts, feelings, and behaviors. This can be a sexy and compelling assertion, and its unsettling effect can initially pass for a sense that "it must be true." However, I will attempt to show that this straight arrow from time-present to time-past is drawn by an argument fraught with assumptions that are often incorrect.

The postmodern in all of us will hail my argument as support for a relativist or context-dependent position and analogize the issue to the matter of veridical truth in the psychoanalytic situation. And there is something to be said for such a conclusion, but let us not get ahead of ourselves.

Because of space limitations, I focus on only three of the most glaring false assumptions:

Flaw 1: Everything that survives has been selected.

When a current feeling or behavior finds its raison d'etre in x, y, or z past adaptation, an unbroken arrow of time and causality are assumed that reaches from present to past. A great deal of evidence must be amassed to arrive at such a conclusion, and we know that if we are to assert such a claim to our patients at all it must be given tentatively and not without significant, multiple lines of support. We know that all behavior is multiply determined and context-dependent, and so we are at the very least cautious. Many thinkers in sociobiology and evolutionary psychology, by contrast, often do the equivalent of "wild analysis," as if they have a magic viewing portal that allows them to transpose the meaning of current behavior in terms of ancient history. Current behavior is understood to have been selected untold generations ago because it had adaptive value. It is a strange sense of enlightenment that supports the notion that the current truth can only be

seen in the absolute shadows of the past.

In this model, it is assumed that (a) the behaviors which survive today have been selected for many years ago and (b) selection is the sole and fundamental operative in evolution. There are many ways to challenge this model, but let me focus on a group of ideas that were first coherently captured by Stephen Jay Gould and Richard Lewontin (1979) in their groundbreaking paper "The Spandrels of San Marco and the Panglossian Paradigm: A Critique of the Adaptionist Programme." In that paper, Gould and Lewontin sought to challenge the dominant motif in evolutionary biology, which I would describe as an extremist or neo-Darwinian motif. The extreme selectionist model holds that natural selection is the only causal agent in behavior that emerges and survives: All things that we do now have been selected for with some adaptive benefit. This is a position that goes, in its singuarlity, far beyond anything that Darwin stated or intended. Darwin (1872/1965) himself suggested that there were many factors beyond adaptation and selection in the survivability of form and behavior, and even proposed a version of Lamarckian causality.

Instead of the singular causal explanatory model that lands solely in selection's hands, Gould and Lewontin proposed the idea that many traits, behaviors, and designs survive which are not adaptations, at least not in the biological sense. The color of bones or the sounds of hearts, for example,

provide no selective benefit but are tag-alongs that come with evolving organs and structures that work in a particular manner. Gould and Lewontin provide a term for the tag-alongs, calling them spandrels. A spandrel is an architectural term for a triangular space that is created when two arches are joined together. In the building of certain types of building with adjoining arches, spandrels emerge, so to speak, as a result of design. In churches they are often ornately decorated, otherwise there is the appearance of a barren space. The decoration is useful and aesthetically pleasing, indeed, these spaces become quite functional. But a spandrel in the biological sense is a feature that results from, emerges, or tags along with other features that truly have survived because of their adaptive benefit.

Spandrels may not remain spandrels, because, as we say, things change. This is a feature of living and many nonliving complex systems, and in the pursuit of a unifying principle or one clear explanation, some models restrict and hone, shoehoming a complex process into a restrictive explanation. Gould and Lewontin appreciate this complexity and even allow spandrels to become other things, because their context can change. In an upcoming review in *Psychoanalytic Psychology* (Pincus, 2002) I state:

> A spandrel can become selected for because of a change in the environment or because it acquires some new survival value (for which it was not selected originally). And so a spandrel can become an *exaptation* —which, by the way, is not an architectural term. A nonadaptation can become an adaptation, or an adaptation can be coopted to serve another

> adapted purpose, and both of these would qualify as exaptations—the "ex" referring to the fact that at a later time something has selected value that has been acquired, so to speak, because of changes in circumstances. Let me give you an example which is a favorite of Owen Flanagan's. Wing buds on insects and feathers on birds are thought to have originally been selected for as a means of thermoregulation. These buds did not help at all for flight, but it turned out that creatures who had these little thermoregulatory devices could jump around a bit better than others, because the buds gave them a little more lift under their bodies when hopping. As a result, budded creatures evaded prey a bit better. Buds were an adaptation with respect to the function of thermoregulation, but spandrels with respect to jumping. Longer buds became even better, leading to nearly Wright-Brothers-like capabilities. Flying (and wings) becomes, then, a biological adaptation, but is an exaptation with respect to the original adaptation of wing buds or feathers for thermoregulation. The beauty of Gould and Lewontin's position is that it removes evolutionary theory from the clutches of panadaptationism, or selectionist reductionism. The idea is that the process of evolution unfolds, stumbling along, environments change, that which is important shifts about. This type of thinking opens the door to a type of cultural dynamism within evolutionary biology without needing to be Lamarckian. (Pincus, 2002, p. 421)

And it leads to an evolutionary theory full of multiple causes and possibilities, a postmodern evolutionary theory of sorts. Evolutionary psychology, or at least some versions of it, often takes the ardent modernist and converts him or her into a fundamentalist.

There is one more compelling point to be made in this area, and it has implications for our modern-postmodern discussion. If selection—and therefore its result, adaptation—was the only driving force in evolution, we would expect incredible divergence for creatures which have evolved

independently, as they would have had different experiences in very different environments. Each environment would create its own selection pressures, and its creatures would evolve their own particular adaptations. But this is not how it has gone on our earth—there is a remarkable conservation of solutions across different environments. This conservative element counterbalances any premature euphoria in postmodernists who celebrate multiplicity of causes, continual change, and endless contextualization. Gould states:

> In the most stunning evolutionary discoveries of our decade, developmental biologists have documented an astonishing "conservation" or close similarity, of basic pathways of development among phyla that have been evolving independently for at least 500 million years, and that seem so different in basic anatomy (insects and vertebrates, for example). The famous homeotic genes of fruit flies—responsible for odd mutations that disturb the order of parts along the main body axis, placing legs, for example, where antennae or mouth parts should be—are also present (and repeated four times on four separate chromosomes) in vertebrates, where they function in effectively the same way. The major developmental pathway for eyes is conserved and mediated by the same gene in squids, flies, and vertebrates, though the end products differ substantially (our single-lens eye vs. the multiple facets of insects). The same genes regulate the formation of top and bottom surfaces of vertebrates, though with inverted order—as our back, with the spinal cord running above the gut, is anatomically equivalent to an insect's belly, where the main nerve cords run along the bottom surface, with the gut above. One could argue, I suppose, that these instances of conservation only record adaptation, unchanged through all of life's vicissitudes because their optimality can't be improved. But most biologists feel that such stability acts primarily as a constraint upon the range and potentiality of adaptation, for if organisms of such different function and ecology must build bodies along the same basic pathways, *then limitation of possibilities rather than adaptive honing*

> (my emphasis) to perfection becomes a dominant theme in evolution. (Gould, 1997, p. 35)

Conservation, the establishment of reasonable universals, and qualities of constraint are all aspects of the evolutionary process that must counterbalance the emergent half of the dialectic. Repetition, predictability, and reliability are especially important principles to engineer into brains that also tend to maximize limitless possibilities. We want to set sail, but we want to be able to find land, later. Humans may have the biggest sails, but all the more need for proper anchoring. And this anchoring may be more appropriately found in the astonishing conservation and homology in the subcortical structures of all mammals.

Flaw 2: Where have all the modules gone? Newer brains don't always work that way.

> Amongst the worst offenders are the psychologists Cosmides & Tooby (2001) who argue that human nature is universal and unchanging inasmuch as our genes are no different from those of our ancestors from the late Pleistocene period (25,000 years ago). As this time frame is too short to allow for genetic change, our genes must reflect the same environmental adaptation to the Pleistocene environment as those of our ancestors . . . genetic determinism is used to support a belief in a universal psyche that completely ignores the plasticity of the brain. (Modell, personal communication)

Even if the evolutionary psychologists have it right from an evolutionary biological viewpoint, there are other ways to question their assertions. In my

mind, these thinkers are too smitten with the modernist viewpoint, which has spawned a number of reductionist explanations for many phenomena in the biological universe that require more complex consideration. In keeping with my point in the earlier section Better Models (pp. 40-42), I think that our models must evolve toward an appropriate balance between the givens and the emergents, one capable of capturing the ideas of context, that is, capturing the capacity for both stability and change. Here, I suggest that evolutionary psychology falls out on the "given" side of the equation when it comes to its implied picture of the brain. In their enthusiasm and (perhaps) naivete, evolutionary psychologists propose modules in areas of the brain where such placement violates most of what we already know.

If a behavior survives the millennia because it has an adaptive purpose and has been selected for, there should be some instantiation at the physical level which both guarantees that behavior's future and simultaneously promotes its expression. Evolution has decided that all land mammals need kidneys, for example, and genes send the messages early in development so that a kidney that has remarkable specificity and reliability is built within each body. In the case of a kidney, structure, process, and function are pretty much pre-ordained, as it were. But where in the brain is the roll out that guarantees and supports the existence for a given behavior or attitude? Where is that "module"? Where is that place or process in the brain that "injects" itself into all futures for the species? Furthermore, isn't it true that

mammalian brains (and especially the human mammalian brain) have been evolving toward maximum adaptability in currently lived and changing environments? If so, aren't flexibility and plasticity the hallmarks of many newer brain processes, and doesn't the modular approach go against the grain of all we know about the most complex brains? If modularism has any place in the way we look at brain organization and funtion, the best candidates are the areas where the most conserved, nuclei-like organizations exist: the subcortical regions. But instead, many thinkers of modularist or modernist persuasion have a corticophilic bias, which, in my mind, is a clear misappropriation of brain space for their ideas. Jaak and Jules Panksepp (2000) have written a beautifully crafted critique of modularism in their paper "The Seven Sins of Evolutionary Psychology," and I refer interested readers to that paper for a more extensive critique than I offer here. At this point in our understanding of brains, there is no evidence in cortical regions for modules of the type that evolutionary psychology needs to anchor its claims. The groupings that do occur in the neocortex are in the structure of "columns" or "patches," but there is little to suggest that these functional units exist to express specific behaviors. The 3000-cell patches are very similar throughout our brains and many other species' brains, and seem more general-purpose groupings that await specialization according to individual experience. Furthermore, the modular approach denies matters of plasticity. "Put another way, the relatively homogeneous columnar organization of the

neocortex is not straightforwardly compatible with any highly resolved, genetically governed, modular point of view. Indeed, functional studies suggest a vast plasticity in many of the traditionally accepted cortical functions. For instance, the visual cortex can be destroyed in fetal mice, and visual ability will emerge in adjacent tissues" (see Deacon, 1997, p.116).

I have been making the point, through constructivism, the subtleties of facial recognition, dendritic morphogenesis, dreaming and now evolutionary theory, that our construction of reality is a delicate balance between the "givens" and the "emergents." I have described this debate in philosophy as being between realism and nominalism, or, in contemporary parlance, between modernism and postmodernism. Furthermore, I have argued that the history of brains through evolutionary time has optimized the building of bridges between both sides of this debate or, better, this dialectical process. Later brains have gone toward being larger and more capable of value-creating, and better responsive to emergent possibility. Emergence, construction, reconstruction and contextual learning have been highlighted in brains over the last 5(H) million years. An appreciation of plasticity helps us to recognize how the neocortex is oriented toward a massive, general, purpose flexible system and that there are few crystal-like modules able to capture light from the phylogenetic past and transmit that light into the day-to-day motivations and behaviors that guide our lives. Again, from Panksepp and Panksepp (2000):

> In our estimation, the type of psychological functions that evolutionary psychologists speak of, arise largely from the utilization of very old emotional capacities working in concert with newly evolved inductive abilities supported by the vast general purpose neocortical association areas. Although there are bound to be certain manifestations of emotional and motivational tendencies within these newly evolved regions of the human brain/mind, the massive modularity thesis entertained by evolutionary psychologists remains, except for certain well-accepted sensory-perceptual processes, far fetched and inconsistent with what we presently know about the higher reaches of the human brain/ mind.(p. 125)

Flaw 3: Genes do not proscribe behavior: The mapping of the genetic code is just the beginning.

The balance between the historical past and the experienced present is an issue that is crucial to how the psychoanalytic situation is viewed, the way that the brain is constructed, and, as I have tried to show, how one thinks about evolution in biological creatures. Modernist or postmodernist enthusiasms tend to polarize and collapse the forest for the trees, positing singular causes for complex processes and attributing capacities to inappropriate places. I would just like to mention a third area of concern: the tendency to envision the genetic code as a bible-like truth table that can illuminate our each and every behavior. We are all familiar with the seductiveness of universal explanations and single, linear causes, whether in the area of illuminating unconscious fantasies, finding solutions to certain heating or water pressure situations in our homes, or in the pleasurable directedness that a particular tasty dish will require of our attention. The last

half century has brought with it the attribution of a sense of veridical truth to "genetic" explanations when it comes to biological reasons for psychological behavior, following 50 years of causal-historical enthusiasm in psychoanalysis. While we might consider this tendency a counterbalance to the remarkable transformations that occur in our society and culture each and every day, I mark the last 50 years because of Crick and Watson's elucidation of the structure of DNA in 1953. The following five decades were punctuated with vigorous idealizations about the "truth" that can be ascertained by the genetic code, and, just as vigorously, renunciations and denials about whether anything at all can be learned. In keeping with the theme of this chapter, either-or and neither-nor causal models will not serve us well.

The explanatory distance from gene to phenotype can be vast, and now that the genetic code has been clarified, the hard work of comprehending the array of emergent and interactive factors, and their influence upon phenotypic expression, can begin. The new field of computational genomics is an attempt to model and predict these emergent/interactive effects, an effort to balance the "givens" of genes with the "emergents" of complex behavior and other forms of phenotypic expression. In our clinical work, at the level of psychological phenomena, we help our patients to understand the historical contexts of their current feelings and actions (and how their current behaviors, while historically organized, are never reducible to those past

meanings). In neuroscience, the parallel issue, as already mentioned, is the "hard" problem of comprehending how the function of mind emerges from the structure of brain. Fixed causes, locations, entities, and meanings are subject to an emerging whirlwind that enfolds, amplifies, and reconstitutes. We are witnessing an explosion in the study of complex adaptive systems and emergent phenomena, whether they are applied to weather patterns, economic systems, the distance from genes to behavior, or the workings of brains. It is in this context that a modernist wishfulness (as expressed through modularism and some evolutionary psychology models) must be better informed.

> All evolutionary psychological endeavors should recognize that genes do not directly control mind or behavior but only the proteins and developmental patterns that help construct specific types of brains. Equally important is the recognition that genes and brains can only operate within environmental constraints (Oyama, 1985/2000). These stipulations will help temper radically reductionistic agendas in evolutionary thinking that simply cannot work. They are also a potential saving "grace" for our apparent proclivity to misuse genetic knowledge. (p. 123)

It is not my intent, however, to suggest that genetics provides us with merely a mental tabula rasa, as that would lean too heavily toward a postmodern, nominalist naivete. There are profound parameters that are sculpted into our "human natures," as well as untold possibilities that arise from complex and fluid interactions.

DISCUSSION AND CONCLUSION

In this chapter I have turned to a few examples from neuroscience and evolutionary theory to shed a different kind of light on the modern-postmodern issue as it is encountered within psychoanalysis. We are used to approaching the issue from the facets of epistemology and models of mind. We inquire about the nature of what we know and what we can know and the reality of clinical facts. And we inquire about the nature of mind, the relevance of the structural metaphor, the representationalist picture, and the context-dependent constitution of mind. All of these things are regularly debated at psychoanalytic conferences and in journals, but usually without sufficient reference to neuroscience and evolutionary theory. I have tried to import examples from these areas as a means of enhancing our discussions.

I agree with Lawrence Friedman (1999) that "reality is such a troubling concept," and I think that is very much worth being troubled about, because it is implicit in all aspects of our clinical work and central to our theories about mind. But I do not think that it can be sorted out by creating a new philosophical and theoretical edifice that does not anchor itself adequately enough in neuroscience and evolution. If we are to add something truly new to a philosophical debate that has been raging for centuries (though disguised in different clothings) it will be through reference to biological processes, observed in brains and species over time. The examples presented here

provide a few footholds for that rich and compelling journey.

I have set in opposition two concepts—the “givens” and the “emergents”—as a means of elucidating some aspects of the modern-postmodern debate. In a sense, these categories are nothing more than the pouring of old wine into new bottles: taking the nature-nurture controversy and restating it with different words. Surely the philosophical and psychological discussion cannot be reduced to these categories, nor can it find much good taste if it is only a return to the older, re-poured stuff. But these categories can be useful devices, and a continual reference to them as one sifts through the philosophical, psychological, and biological data can help one organize one's findings and enrich their context. Perhaps the image of a continuum between “givens” and “emergents” would be a more accurate representation, though the device of emphasizing the end points helps to identify the very important task of finding a means to articulate the in between.

A line representing a continuum, two words representing supposedly separable categories . . . neither representation navigates the very tricky landscape I am trying to describe: the notion of context. Ardent postmodern theorists focus on the everchanging evolving process, their theoretical rivals emphasize the discrete, that which is knowable. Each perspective misses something when it loses sight of the other. A helix or an evolving spiral may

provide us with a better working model. And this is what we are looking for: a better representation, a better model, one that can capture the discrete as well as the evolving, emerging order. As our researchers and theorists scramble for new ways to conceptualize behavior, we hope, at the level of thinking about the quandary of how mind emerges from brain, that they will not arrive at limiting biochemical reductionisms or, conversely, naive holisms. We know better from the richness of our clinical work—my patient recalls, in the midst of a strong reaction to a transference interpretation, a detail, a memory, that has a synthetic, integrating quality that organizes much of what we are dealing with and explains much of what has been haunting her. The memory shapes and defines our psychic landscape, all at once providing greater clarity, discrimination, and a richer path into the past and toward the future. How can our models capture this complexity?

Supervenience, hierarchical organizations, dynamic systems theories, complexity theory, and various forms of chaos are now being put forward to capture this richness. I, for one, will look for evidence from neuroscience, genetics, and evolutionary theory for direction and confirmation, for I have little faith that debates between modernism and postmodernism, for example, will do much to point our way. It is not that the epistemological or philosophical questions are not relevant, since I think that they are crucial and must be explicit in the study of each neuroscientific "fact" that is discovered and each new model that is proposed. Instead, I will look to

findings such as the ones I've mentioned and to better models of mind-brain (Walter Freeman's work always comes to mind) that instantiate and elucidate the epistemological and philosophical questions. Tethering our conjectures to those findings, and then seeing how they fit with our clinical data, will provide us with a better opportunity to learn about that vexing problem of reality in all its varied manifestations and meanings. The Skin Horse has told me so.

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