Section 2 - Neuroscience, Psychoanalysis, and The Baby Core of the Personality: Plausible Connections

Disclaimer:
1 – While I am not a neuroscientist, this course represents my earnest attempt to synthesize and surmise based on what I have learned from my eight months of research. I do know a considerable amount about psychoanalysis and the baby core of the personality. This course represents my intuitive blending of my clinical experience with neuroscience to create "working models" that will hopefully advance the student's own thinking to someday see further than I can. It is worth trying to understand what I am proposing as possible links, but it is a work in progress, not a definitive set of factual conclusions.

Course Introduction:
1 – From my explorations, psychoanalysis and neuroscience have been largely operating in parallel universes, with little cross pollenization. Kleinian models of the baby core of the personality are even less available to neuroscientists, except for the work of Mauro Mancia and Italian psychoanalysts, as far as I could find in my research. Any reference to psychoanalysis at all, among neuroscientists, seemed limited to unsophisticated comments about Freud.

2 – For this course, a considerable amount of this material is drawn from a handful of books including: "Neuroscience for Dummies" by Frank Amthor; "Feeling the Words" by Mauro Mancia; "Psychoanalysis and Neuroscience" by Mauro Mancia (editor); "Connectome" by Sebastian Seung; "Self Comes to Mind" by Antonio Damasio: "How We Learn" by Benedict Carey, "The Believing Brain" by Michael Shermer; "Subliminal, How Your Unconscious Mind Rules Your Behavior" by Leonard Mlodinow; and "Waking Up" by Sam Harris.

In my attempt to synthesize a large amount of information, and distill it down to a useful line of thought, I owe a particular debt of gratitude to Dr. Lou Cozolino, a Professor of Psychology at Pepperdine University, who is an expert on the neurobiology of interpersonal experience. He has been of great help in orienting and clarifying my ideas.

4 – During this course I am going to minimize my references to the detailed underlying science (i.e. brain anatomy and physiology), as I suspect the average reader will have less interest in the science, and want the "take home lessons" from the science. I will include some of the science in greater detail at the end of this handout, more as a reference for someone who has the interest in studying it at a later date.
The course will have a considerable amount of repetition of ideas, so don't be bothered by initial confusion, it will hopefully all pull together as the ideas are approached from various perspectives.

5 – Those psychoanalytic models that stay close to human experience and behavior would now seem to have great support from the neuro-scientific findings. The basic neuroscientists, as researchers, seem not to have the experiences and models (that are available to psychoanalysts) to see the depth of these correlations.

6 – I have wondered how the ideas I have learned in this course preparation will affect my clinical work. I notice two things so far. I am paying even more focused attention on the most "elemental emotional states" (i.e. as potentially stored in the amygdala) recreated in the transference, and I am more aware of the possibility of a person using or failing to use (or even having failed to develop) various brain capacities or regions. This latter idea has me particularly thinking about left versus right hemisphere use, or frontal lobe development and use.

A Tiny Introduction to the Evolution of the Brain:

1 – The earth was probably formed about 4.5 billion years ago. It took something like another billion years to cool sufficiently for the first unicellular "life" to appear (in the form of single cells that did not have a nucleus). After another billion years the first cells with a nucleus appeared.
About 500 million years ago, multicellular organisms moved onto land and developed backbones to deal with gravity, thus becoming "vertebrates".

2 – Reptiles, amphibians, birds, fish, and mammals represent what we think of as "vertebrate" species. They have a lot of brain structure in common at the most evolutionarily basic level. We can probably include dinosaurs in this group. They all had to have brains that would do several basic things. These could be summarized as maintaining their bodily functions and surviving in the outside world. These broad categories could in turn be broken down into greater detail.

Bodily function could be framed at a cellular level, an individual organ system level, or the interaction of all of these in feedback loops of stimulation and inhibition. Similarly, survival could be looked at in terms of parts of the individual, the individual in the environment, or the whole species of that type of animal.

All of the above issues involve "homeostasis" within the individual, and with the environment, to preserve the conditions for the organism to go on living. It had to be able to eat, avoid predators, and procreate. These required a very "modest memory system" that could recall the location of food, hot chicks and dudes, and dangerous neighborhoods. Much of this could be done by a highly refined sense of smell, combined with some instinctive reactions. It really does not require "thought" in the way we humans think of "thought as a conscious activity".

3 – While there is some debate in the timing of evolution, "primates" diverged from other mammals about 85 million years ago. Orangutans diverged from other primates about 14 million years ago, and the first member of the genus "Homo" appeared about 2.3 million years ago (with brains about the size of a chimpanzee). Over the next million years the brain size doubled, the equivalent of every generation adding 125,000 neurons.

The forerunner of modern "man" evolved between 400,000 and 250,000 years ago. Anatomically modern humans appeared about 200,000 years ago. Many anthropologists date the transition to behavioral modernity (i.e. the development of symbolic culture, language, and specialized lithic (i.e. stone) technology) as occurring around 50,000 years ago.

3 – So from the evolution of the first man to modern man, the human brain doubled in size, all of the additional size being "neocortex" (neuroscientists seem to prefer use that name rather than "cerebral cortex"). Half of that neocortex was "frontal lobes". That is why we can do all of the things that no other species can do, like have complex languages and highly elaborated social interactions. [Note: For reference, the human brain is about twice the size of the brain of a chimpanzee.]

4 – The neocortex functions in phenomenally complex ways, from the cellular level of neurons to the gross anatomy level. At the most macroscopic level, the neocortex is like a large sheet of brain tissue, which if laid out flat, would comprise approximately 1.5 feet square. It functions as a right and left side with a large tract of neurons (the "corpus callosum") connecting the two halves. It has four "lobes" ("occipital", "parietal", "temporal", and "frontal"), each with ridges ("gyrus"/"gyri") and grooves ("sulcus"/"sulci") as a result of folding this sheet into our skulls.

The neocortex is the "controller of controllers" allowing a new level of advanced behavior, particularly in the realms of social interaction, language development, making and using of tools, and perhaps most importantly for us, high levels of "consciousness".

It is interesting to note that in humans about "half" of the neocortex is "frontal lobe", and nearly half of that is "prefrontal". You could analogize these advancements as being like taking the original automobile

engine, with its cylinders, pistons, carburation, etc., (representing the reptilian brain), and then adding numerous microcomputers to create a much more powerful, sophisticated, and nuanced control of that engine (by the neocortex and especially the frontal lobes).

5 – It is probable that "thought", as we humans think of it, is a very recent development. Even with the idea of thought, we are still not talking about "self-consciousness" as would be needed for "introspection". That is an even more recent development, perhaps somewhere in the development of the middle of the evolution of primate species.

6 – It is interesting to realize that if living organisms have taken billions of years to evolve from unicellular organisms, into vertebrate species, and ultimately man, mammals only became the dominant land animals after the extinction of the dinosaurs about 65 million years ago.

The Human Brain as a Complex Government of Systems:

1 – The complexity of the development and functioning of the human brain is, to put it bluntly, completely amazing and mind boggling. Take for example, any area of mental functioning that is beyond ordinary comprehension. Imagine being able to memorize a telephone book (e.g. autistic savant), or being able extrapolate the mathematical variable "pi" (for the circumference of a circle) out to 20,000 plus numbers because the numbers are seen as colors on a page. How is it that a handful of people, as seen on the TV show "60 Minutes", can remember what happened on any particular date of their life, where they were, what they were doing, and what was going on in world if it was noteworthy. These represent the extremes of what a human brain can do and it's pretty darn impressive.

2 – To begin to comprehend even ordinary human mental function, one needs to think of the brain as a very large number of systems that must interact with each other, at a cellular level, in order to make everything work. It turns out that the brain has many different areas, each performing a different function. A German anatomist, Korbinian Brodmann, mapped the entire human neocortex in the early 1900's, and assigned numbers to every area, totaling about 52 areas in all (43 for human brains, 9 reserved for animals) .

3 – "Brodmann's areas" can be found to have a correspondence with the many different "functions" the human brain is capable of performing. In a very gross sense, some areas are more devoted to physical activity, i.e. "motor" areas, some are more linked to the perceptual apparatus including sight, hearing, smell, etc., some specifically to facial recognition or language acquisition, and some are particularly linked to the integration of these areas.

4 – As humans elaborated more complicated language functions, more complex social networks, and began to use tools in more elaborate manners, the integration of these networks required even greater sophisticated mental capacity.

In a simplified way, one could say that the explosion of our frontal lobes, and in particular the very front of those lobes, the "prefrontal cortex", was required to integrate these very sophisticated and complex activities and functions. In effect, the "pre-frontal cortex" became the "supercomputer" controlling all of the other "microchips" in the various regions of the brain.

5 – It is useful to think of this as a "government of systems" because evolution was not merely a "layering" of one capacity on top of another. Paul MacLean had postulated such a layering in the 1960's, with the bottom rung of evolution having a "reptilian brain", on top which was added the "early mammalian" brain, and then the brain of the "primates" (with "homo sapiens" being the most advanced version of this third layer).

The primary difficulty with this point of view (referred to the "triune brain") is that it oversimplifies the evolution of the interactions of all of the brain systems and regions, potentially resulting in misleading and erroneous assumptions about evolution and brain function.

It is more accurate to say that with evolution, every area of the human brain increased its capacities, development, and interconnectedness with other areas. For example, the enlargement of our frontal lobes not only increased our capacities to think in considerably more complex ways, but simultaneously increased the capacity in all areas of our brains to operate in more complex ways. In other words, the frontal lobes weren't the only upgrade. It was as if every major area of the brain got a parallel and simultaneous upgrade.

In effect every one of the four lobes of the neocortex, along with our cerebellum (particularly linked to motor coordination), became greatly more sophisticated in their interactions within themselves and with other areas.
As an analogy, picture all of southern California in the early 1800's, with a hundred small villages connected by dirt roads. Imagine it blossoming into a metropolis with freeway systems, complex water and sewage systems, electrical grids, etc. Then add to that infrastructure complex city and county governments, coalescing into a state government. Every area is more sophisticated in its function and governance, and in one way or another, they are all interconnected. That happened to Southern California over a period of some 200 years, and to man over a period of 200,000 plus years.

6 – There are some logical assumptions that can be inferred from this complexity of the human brain:
– One key idea is that this multitude of brain systems can mature at different rates, with different final results, in different people. This has huge implications for the education of children and assumptions about an individual child's development (i.e. is there a wider variation of ordinary development).

– A second is that when all of these systems operate well, the human brain is an amazing force to behold.

– A third is that in the same individual, some systems can be "highly functional", while others are "highly dysfunctional".

7 – As different systems of the brain come online during childhood development and into adulthood, one is developing qualitative shifts in how experience is processed. In other words, "the brain at one age is not the same brain at another", and therefore the experience of life is different at every age. This is partly because there are many more interactions between brain systems as development proceeds.

– e.g. The experience of the "passage of time" changes greatly with aging.

– e.g. "Concrete thinking", of the "where there is smoke there is fire type", gives way to more nuanced understanding of cause and effect.

– e.g. The tendency to be "self-centered" tends to give way to being more thoughtful of others, as we develop.

– e.g. The sense of what is "morally right or wrong" evolves with age.

<u>Divisions of Labor – Differences in the Left and Right Hemispheres of the Brain</u>:
1 – The two sides of the brain develop at different paces and perform different functions. This will probably turn out to be "profoundly important" for mental health professionals to understand if they really want to see variations in how developmental processes took place within their patients during childhood. I will summarize some of the differences:

– The "right hemisphere": Tends to look at things in a "global" way, creating a "Gestalt" of the situation, being able to process "parallel data" at the same time, and having a more "internal" focus. It is better at "visual pattern recognition" and more "holistic" kinds of perception, the "big picture". These contribute to the image of the right hemisphere as the "artistic, creative" side of the brain.

– The “left hemisphere”: Tends to look at specifics in a “linear”, “concrete” manner, while being more “language based”, and generally having more of an “external” focus. The combination of “language specialization”, “rule based reasoning”, and “analytic skills” make this side seem more “rational and dispassionate”.

– It is important to know that the two sides of the brain are connected by the largest tract of neurons in the brain, the “corpus callosum”. It has about 100 million of the human brain’s approximately 100 billion neurons. This allows for a relatively seamless interaction of the two halves simultaneously.

2 – Of potential particular interest to the mental health professional is the capacity of the “left hemisphere” to “INHIBIT THE CONSCIOUS AWARENESS” of processing of the “right hemisphere”.

I could imagine that this may have a contributory role in “manic defenses” (e.g. avoiding psychic reality) and “obsessional mechanisms” (e.g. keeping thought separated from feeling) as a means of escaping the conscious awareness of “internal emotional states”.

3 – “Very early learning in infancy” tends to be processed and stored in the “right hemisphere”, via subcortical neural networks. This means that this early learning tends to be “automatic”, via “very fast neural connections”, and is both “unconscious” and “non-verbal” (i.e. not pre-verbal, but “non” as in “never” becoming verbal). Nevertheless, it tends to profoundly shape conscious experience.

In other words, the early neural circuits between the “amygdala” and the “right hemisphere” of the neocortex will dominate the emotional relationship to mother, color the basic patterns of emotional relating to others, and influence the success or failure of positive self-esteem development, to mention just a few consequences.

4 – The growth of each hemisphere shifts over the first dozen years of life as it tends to plateau and become relatively equal.

– Growth in the “right hemisphere” tends to dominate from birth through 15 months, as the infant bonds with its mother, and takes in a picture of the universe outside the womb.

– By about two years, the “left hemisphere” is developing more rapidly, perhaps corresponding in part to the explosion of language development.

– By four years the growth of the “right hemisphere” is more prominent again, perhaps corresponding to the expansion of the social sphere as children learn to play with each other, gradually requiring less parental prominence in their interactions.

– Growth of the “left hemisphere” becomes more prominent again around 6 years of age, perhaps contributing to the child being more ready to start formal schooling.

– Growth in the right hemisphere takes over again during latency up to puberty, but the differences between the growth of each hemisphere are finally leveling off.

5 – It is of interest to note that damage to the “right” side of the brain, (aside from corresponding motor paralysis on the left side of the body), results in someone who is not too good at solving spatial tasks, but otherwise appears relatively normal in cognitive function. By contrast, extensive damage to the “left” side of the brain leaves someone profoundly impaired in language and cognitive function (i.e. functionally quite retarded).

6 – To summarize: “Split brain studies” show that the “left side” is the “intellectual”, the “wordsmith”. The “right hemisphere” is the “artist” with the “visual spatial capacities”. For example, you could see a fork

with your right hemisphere and not be able say what it was, i.e. to name it, because the language to name it would be unavailable. However, the right hemisphere could direct the left hand to draw the fork.

7 – Interestingly, the "left hemisphere" takes whatever information it gets from the "right hemisphere" and "MAKES UP A STORY" to have the information make sense, thus "telling a tale" to conscious awareness. It acts as an "interpreter" to create a "narrative meaning" that has a cause and effect significance to the self. This judgment will be stored in the hippocampus. This results in the fact that our brain can "impute meaning to anything".

As an interesting aside, the more the neurotransmitter "dopamine" (sometimes called the "belief drug") is dominant in the brain of an individual at a given moment, the more likely that person is to "FIND SIGNIFICANCE IN COINCIDENSES" (i.e. "magical thinking", "superstition", "belief in the paranormal", etc.). Think baseball players.

<u>All Humans are Functionally Born Prematurely</u>:
1 – The human brain doubled in size from its primate ancestors. This poses a mechanical problem. How are you going to get that big skull through the birth canal if the skull keeps enlarging. The seemingly logical answer is that you continue to send it out birth canal at the same old nine month time frame. The problem is that the brain has more developing to do before all of its components are fully matured.

As the brain has enlarged, the complexity of its connections has also increased. It can do many more sophisticated things, but that takes more time to learn and wire correctly. In turn, this means that the infant is going to be more dependent on its caregivers for a longer period.

Plain and simple, it just takes longer to develop the complex functions of which our brains are capable. With the evolution of our brains, and frontal lobes, we functionally are now born prematurely.

2 – Most mammals can walk and follow their parents, on their own, within hours of birth. Human babies, by contrast, can't do squat for themselves for several years. This has the benefit of allowing them to learn a great deal at the hand (or breast) of their mother. But it also means that they are especially vulnerable to miscarriages of development, both physically and emotionally.

3 – This has huge implications for pediatrics, multiple pregnancies with in vitro fertilization, etc. The vulnerability of the human infant to "time sensitive" developmental periods is compounded if the infant is in fact born even a week before its "due date". A month or more before the due date is regularly a catastrophe because it throws the infant into a world for which it is literally ill equipped. Its lungs and other organs are likely to be too immature to operate on their own without great susceptibility to difficulties and illness.

From an emotional standpoint, the medical complications, hospitalizations, disruptions of normal bonding with mother, etc. all create additional difficulties that may have lifelong implications. And guess what part of the brain is storing all of this in memory, the "AMYGDALA".

<u>Memory Systems – The Amygdala, the Hippocampus, and the Rest of the Neocortex</u>:
1 – If it is fair to say that all human babies are functionally born prematurely, then it becomes very important to understand the function of the "amygdala" which is part of the phylogenetically very old "limbic system". Here are some important facts about the amygdala:

– It is operational in the last trimester of fetal life and will remain a key repository of "emotionally important experiences" throughout the lifespan.

– The most important fact for the mental health professional is that these "memories as feelings" are stored in a manner that is "NOT VERBAL, NOT RECOLLECTABLE, ONLY RE-LIVABLE"!

– The amygdala is the “first developing executive system” on board for the infant. It performs “appraisals”, assessing the risk/reward potential for any situation. This originally had important survival value in evolution.

– It is a very fast system, able to recognize danger, such as seeing a snake, and telling your muscles in your legs to jump out of the way, before the rest of your brain can process the situation. The jump response can take as little as 50 milliseconds and while the “conscious awareness of a snake” can take 500 or 600 milliseconds to register in the neocortex.

– These early “executive functions” will be taken over, later in development, by the “fronto-parietal cortex”, but the amygdala, as a primitive executive, will retain “VETO POWER” for life.

2 – By contrast, the “HIPPOCAMPUS” is not sufficiently mature to act as a manager of memory until the “END OF THE SECOND YEAR OF LIFE” after birth. Furthermore, the links that the hippocampus will have to the “frontal cortex” will be further delayed because the “FRONTAL CORTEX IS NOT FULLY MYELINATED AND FULLY OPERATIONAL” until late adolescence at the earliest. The more sophisticated activities of the frontal cortex involving ethical and moral issues, social sophistication, and the application of wisdom (learning from experience) will still be developing for decades after birth.

As a memory system, the “HIPPOCAMPUS” acts like a system for packaging memories that can ultimately be permanently “uploaded” to some other area of the neocortex. In this sense the “hippocampus” acts like a more “temporary memory system” (i.e. not chiseled in stone like those of the amygdala), until the memories are flagged as “keepers” to be more permanently uploaded to some area of the neocortex.

This type of memory is more like “working memory”, a place to form and hold information, while performing a task at hand. It is a form of memory that may erode rapidly over time, or more slowly, depending on its importance, degree of associations, and repetition.

3 – The psychoanalyst Mauro Mancia refers to these two memory systems as “implitict” and “explicit”.
Those memories connected to the “AMYGDALA” are referred to as “IMPLICIT MEMORIES” (i.e. non-verbal, non-recallable, only re-livable).
Those memories related to the “HIPPOCAMPUS” are referred to as “EXPLICIT MEMORIES” (i.e. verbal, potentially available to recollection with conscious effort, and capable of becoming inaccessible to consciousness by unconscious “defensive” maneuvers).

[Note: I do not know who started this nomenclature, “implicit memories” and “explicit memories”.]

4 – To Summarize: The “amygdala” and “hippocampus” are both part of the very old brain systems (e.g. both are part of the “limbic system”), in terms of evolution, that serve many functions including the storage of experience. While “both” have connections to the “neocortex”, the amygdala’s capacities are online “much earlier” than those of the hippocampus. As a consequence, the functions and “memories as feelings”, as relates to the amygdala, are much more important to our understanding of infancy.

It is likely, when one takes the characteristics of each memory system into consideration, that the “hippocampus” and “neocortex” are much more linked to the elaboration of “unconscious phantasies”. However, it is likely that the “memories as feelings” stored in the amygdala, are the “grain of sand” around which the “pearl” of “unconscious phantasy” is elaborated.

<u>The Amygdala and Stress in Infancy</u>:
1 – To repeat what I just said about the “amygdala”, it seems to be the “first organizer” of the infant’s relationship with the world. It can be thought of as an “appraisal system” that tries to assess the value of a relationship from the most elemental standpoint of “risk versus reward”. I do not mean some fancy system for evaluation of life’s possibilities, I have something more elemental in mind like a “knee jerk reaction” such as “this is going to hurt” or “this feels good”.

If the amygdala was meant to store both positive and negative emotional experience, it is unfortunate that negative emotions, which probably had greater importance for survival, tend to dominate over the positive ones. That is probably particularly true if negative, distressing experiences are at all consistently present in the earliest days and weeks after birth (and of course the final months of pregnancy).

2 – When things go fairly well in infancy, most appraisals are "positive" and self-reinforcing. Research has in fact shown that a happy, harmonious relationship between the infant and mother actually increases "endorphin receptors" in the amygdala, mirroring Eric Erikson's first life task of establishing "basic trust" between mother and infant or John Bowlby's "secure attachment". In Klein's terms, it would lead to the establishment of a "good breast" inside the infant's psyche.

3 – But when it goes poorly, i.e. painfully, the negative emotional states not only cloud perception, but they are likely to create self-fulfilling prophesies like "nothing is ever going to go well".

4 – It is useful to think of the bodily chemistry and the brain at this point. The "fight or flight" system's impact on the body was designed for the "rapid resolution of stress". So, for example, a herd of impalas is chased by a lion for 10 seconds until one is caught. The rest of the herd that escapes does not stay "stressed out and traumatized" by the experience. While the animals can retain the idea of when and how to escape, their body's "fight or flight" response of their amygdala is designed for a "rapid resolution" of the stress/hormonal system so that they do not remain "traumatized", and they can go back to looking for juicy grass to eat.

The problem for humans, with their big, fancy brains, is that they can "generate their own stress" just by thinking and worrying, which prevents the body from recovering rapidly. When the experience of stress is chronic, for external and/or internal reasons, the continuous release of stress hormones (e.g. cortisol, which is potentially "catabolic" – i.e. breaking down – if sustained), actually damages brain development, for example destroying neurons in the hippocampus and areas of the neocortex.

The result is that chronic stress can literally compromise all areas of brain development in infancy, reducing new learning, and increasing reliance on past learning.

5 – In summary: The amygdala is a very old system that has great survival value when rapid assessment of "risk/reward and response" is needed. But we humans have a combination of potential complications that we add to this old system.

Our brains are immature at birth, and we are utterly helpless and dependent as infants on caregivers for months and years after birth. Combine this with our vastly more complex capacity to have awareness of our emotions and relationships. It makes us much more susceptible to have difficulties if anything goes wrong in infancy.

We end up with the potential for problems in such areas as affect regulation, attachments in object relationships, and problems with self-esteem, etc. In effect, we are too smart for our own good. We can hold on to emotional trauma for a lifetime. We can talk ourselves into difficulties, but we need someone else to talk us out of them.

<u>Using the Amygdala to Conceptualize a Model of the "Baby Core" of the Personality</u>:
1 – Put succinctly, the enduring nature of the "memories stored as feelings" in the amygdala suggests that it is a primary contributor to the clinically observable fact that experiences in infancy retain a disproportionate influence in life experience. What happens in the first days or weeks after birth seems to have a profound influence on the rest of the life. This is both scary and very upsetting because so many things can go wrong and infants seem like such tragically innocent victims.

2 – I suspect that the reason why the recognition of the importance of infancy has been so denied by the human race, for so long in history, has to do with how upsetting it is to feel that life can be ruined, functionally in a permanent way, by a problematic infancy.

3 – The characteristics of the amygdala as a system for the storage of memory (operating so automatically), and only later using connections to the neocortex to enhance its functions of risk/reward assessment, suggest that the "emotional die is cast" before a more "realistic appraisal system" can become operational to modify the stored impressions.

4 – The fact that the amygdala's "memories as feelings" remain inaccessible to conscious recall or verbal thought, adds to the implication that it is the likely organ for the creation of the "baby core" of the personality. The rest of the brain will add to the picture in the form of more complex linkages and reactions, but the "emotional core" of the picture seems surely to be the domain of the amygdala.

Models for Thinking About the Unconscious and Unconscious Phantasy:

1 – I was somewhat disappointed, when I began reading neuroscience texts, to see that the most common discussion of the word "unconscious" was in "adjectival" form. That is to say that "unconscious" was used to refer to brain activities that were outside conscious awareness. Arguably, much if not most of brain activities are "outside conscious awareness". For example, we are not consciously aware of all of the bodily "autonomic" processes that keep us alive and functioning, nor are we aware of so many motor activities that we do without consciously "thinking" about them. But these are not what a mental health professional has in mind with the word "unconscious".

We want to use the word as a "noun" in the sense that it is a "place" where developmental and emotional events and processes are "stored" or are "taking place", outside our conscious awareness. The universe of "unconscious object relationships", the type of meaning we would like "unconscious" to have, seems to be missing from the lexicon and interest of the majority of neuroscientists. I read a very good book on neuroscience that dismissed Freud and psychoanalysis in a mere paragraph!

2 – I have developed an impression, over decades of clinical work, that the most useful "working model" for the unconscious inner world, as Kleinian psychoanalysts would think of it, requires an "object relationship", essentially between a "part of self" and "another person" not felt to be self. That relationship is "linked by some emotional state" in which the part of self and the other figure are "felt to be doing something to each other for some reason".

To summarize, an "unconscious phantasy" would include "self" and "object", linked by an "emotional state", with an elaborated "phantasy" of "what" they are doing to each other and "why" they are doing it. But it could all be said to start with the "emotional connection" between them, "positive or negative".

Now mind you, I have simplified this a bit because I also believe it is possible for "one part of self" to have an object relationship with "another part of self". This can be seen, for example, in narcissistic personality organization (i.e. the "bad self" in control of "good baby parts of self"), or as seen with the "adult part of self" having a relationship to "good baby parts of self". But "self", "object", and an "emotional state" would seem to represent the essential core elements of an "unconscious inner world", as far as I am concerned.

3 – What I was pleased to discover, in my research for this course, was the concept of "implicit memory" and the unique early place in infancy of the "amygdala". It seems very likely that the amygdala, as first place where memories can be stored as feelings, both positive and negative, must be central to the production of crucial "early emotional states" as seen in the "repetition compulsion", the "transference", and elemental background "character" states, like "optimism, pessimism, depression, chronic anxiety or guilt, etc." (i.e. as viewed by Klein's paranoid-schizoid and depressive positions).

4 – So how might we put all of this together to create “an unconscious inner world” populated by object relationships in which people (i.e. self and object) are imagined to be doing something to each other for some reason, with an emotional state being central to the imagined interaction, leading to a semi-permanent “unconscious phantasy”.

– We might start with the amygdala storing an important emotional experience as a feeling that cannot be thought about, but only “lived out” because it is one of the core “self-states” that predominate for that infant. If that “core emotional state” is “positive”, it poses no problem and can be embraced by the infant.

But if that core state is negative, the infant will likely try if possible, to ignore or get rid of that state, by focusing its “organ of attention” elsewhere. As its brain becomes progressively better organized over the first two years of life, it will rework that core emotional state and begin to elaborate an “explanation” (i.e. unconscious phantasy) of that emotional state, whenever it recurs. It can gradually store that “phantasy” in its hippocampus, ultimately to be uploaded to other areas of the neocortex including parts of its frontal lobes.

The fact that the left hemisphere of the brain is good at “making up explanations” for emotional states, that might be coming from the amygdala’s connections to the right side of the brain, may contribute to the early, “ego-centric”, and “often erroneous nature of unconscious phantasies”.

5 – The confusing part of this scenario is why these “unconscious phantasies” are not more accessible to conscious awareness. While I cannot definitively answer this question, I do suspect that the “inaccessible and unthinkable memories”, stored as “feelings” in the amygdala, are the crucial ingredient.

If the “memories as feelings”, stored in the amygdala, are being regularly evoked by object relationships, then we will have reactions to the external situations and relationships, imagining that we were having an appropriate and necessary reaction, with no awareness that it may be a “recreation of something deeply archaic” and unavailable to conscious awareness.

Take for example, someone who is always feeling criticized, or left out. We might summarize that character pattern by saying that they have an “unconscious phantasy about their infancy”. That does not have to mean that they “thought” that way as an infant, they may have only “felt” that way. I once had a patient whose infancy went poorly, and I tried to give her a compliment one day, worded very carefully, and she still couldn’t get past her “baby core” reaction that “everything in life was a potential attack”. The best she could do in response to my totally positive remark was to say “I am not sure if that is a compliment or a criticism”. The amygdala wins again!

6 – In summary, what we think of as the “unconscious inner world” of a patient may actually be composed of an “emotional state” left over from their infancy, about which the patient elaborated, after the age of two, a detailed, semi-permanent “explanation” of this entire emotional state, and the people imagined to be involved. The “raw emotion” was stored in the amygdala, the “phantasy about it” was generated in the hippocampus , and it was ultimately distributed rather permanently in various parts of the neocortex. The key ingredient remains the “very early hard wiring of emotional states in the amygdala”, suitable for being activated by any appropriate stimulus.

7 – A slightly different frame of reference could encompass hemispheric differences in processing experience.

– For example, it has been observed that the left side of the brain is constantly trying to “make up a verbal story” about external reality. It takes salient events, and the role of the person experiencing the events, and tries to connect his or her actions (or states of mind) to those events.

One can say that the “right side” of the brain would be capable of “mere awareness” of things in the world, but it is the “left side” that adds a memory of the “context of experiences” so that “consciousness” is not

just the “remembered present” but is the “present remembered in words”. This process may be an additional component of the creation of “unconscious phantasies”, which I suspect reach their final, relatively permanent configuration, after the age of about two years.

8 – I would like to add a highly speculative note to this discussion at this point. I feel fairly certain that these really early “memories as feelings” are somehow stored as “embedded in an object relationship” between a part of self and a version of mom or dad. This model fits with all of my decades of clinical experience.

I have explained this by assuming that some form of “preconception” of the existence of a “mother figure” and a “father figure” exists, ready to be applied to life experience. This “preconception would be part of our evolutionary inheritance as mammals.

This leads me to wonder if the amygdala is able to retain the “memories as feelings” as an object relationship between part of self and a version of mom or dad. If it can, then “unconscious phantasies” could originate in the amygdala. If the amygdala cannot do this embedding of a feeling with a primitive version of an object, then that embedding would have to be performed later, in another area of the brain. This may be the most important area for further understanding of how neuroscience and brain development relate to emotional experience in infancy.

<u>The Brains Systems for Early Bonding Between Infant and Mother, Especially Facial Recognition Equipment</u>:

1 – I wish to initiate this discussion from a slightly tangential position. It has become a more acceptable notion, in recent years, that if an infant is exposed to two languages simultaneously, it will learn to be fluent in both languages.

This is a surprising reality when compared to the simplistic logic that would suggest that the infant would become “confused” about language. Fortunately, it turns out that confusion is not the result. This is because babies come into the world with language acquisition capacities that are phenomenal, but which they will lose after the critical first year or two after birth.

2 – What infants also come into the world with is an array of special capacities (from specific brain modules) to recognize their mother, having lived for nine months inside her. These capacities center on such things as facial and voice recognition, in addition to many other more nuanced elements of that make mother “unique”. These capacities allow the infant to form very early emotional attachments.

I could imagine that these extraordinarily nuanced capacities were necessary for a baby seal or penguin to find its unique mother in a sea of similar looking mothers. It may well be linked to extremely refined senses, for example olfactory or auditory discriminations. There are many possibilities.

3 – In the human infant, it turns out that there are brain modules particularly devoted to scanning areas of the human face, probably serving the same functions as for lower animals. But with our much more complex and sophisticated brain capacities, we can not only find our mom, we can also register the state of mother’s emotional well-being.

These advanced recognition systems have many implications for development, but I would like to highlight one at this moment. These systems also allow the infant very aware when mother is not around. This has, for example, a lot to do with why “adoption”, even at birth, is a “loss” for every adopted infant. This is in spite of the fact that the adopting parents will soon “bond” with the child, and successfully become the infant’s new parents. [See Module Six, Minnick’s Klein Academy.com, for “Some Thoughts on Adoption.]

4 – In summary, the human infant has an early task of recognizing and bonding with mother. While smell and sound remain important elements in this process, the development of a number of neocortical areas has enhanced the sophistication of these systems. These include areas devoted to the use of visual systems to

augment the more primitive ones. Human infants come with very powerful capacities to scan faces and recognize a great deal even though they do not yet understand how to interpret it. We rely on these visual cues throughout our lifespans.

The Potential Link Between Social Recognition Capacities and Projective Processes:
1 – I would add an additional wrinkle to these facial recognition capacities as a segue into a discussion of projective processes. A very complex, but crucial component of this entire bonding process has to do with an expansion of sophistication of the use of old systems in the brain. No matter whether you were in the category of "predator", or in the category of "prey", you needed a system for evaluating any situation where you contacted another living creature. In other words, even though you had an amygdala, that could do rapid risk/reward assessment, you needed details to make that assessment.

For example, it would be very helpful to be able to decide if the predator you have just encountered looks "hungry", or "pissed-off" because you are in its territory, or if it looks "friendly", or "horny", or whatever. Body posture and facial recognition/evaluation systems could be really helpful.

2 – Fast forward to the evolution of mankind, and our complex social hierarchies, nuanced use of language, etc., all requiring vastly increased and refined capacities to perform these increasingly subtle discriminations. A key point here is that to evaluate the emotional state of another, using all of this hardware that our brains have developed, we still need a "baseline template" for what these feeling states look like. This template no doubt has its origin in genetically determined "Darwinian categories of emotion" such as happiness, sadness, fear, surprise, disgust, etc.

But it makes sense to me that the "ultimate template" for all humans to appraise the feelings of others is first based on an awareness of one's own feelings, and a resultant expectation that others feel or react the same way we do. This has great significance in the relationship between mother and infant, and broader implications for all social interactions.

3 – I have been flummoxed for years for an explanation of the capacity of a human being to "project" their own state of mind into another, and have absolutely "no awareness" that they were doing such a thing. The first time I became consciously aware of projection, that I can recall, was as a pubescent teenager. A classmate was teasing me about my blue jeans being too short and my father said to me, "Whenever someone is teasing you, and makes you feel bad, look to see if they feel the same way."

I went back to school the next day and to my amazement, the boy who was teasing me about my short pants had even shorter pants, with even more sock exposed! From then onward, I found this paradigm to be really useful. Sadly and often disgustingly, I see the same thing in politics today, where one party is accusing the other party of doing something that is "reprehensible". I often have the impression that the accusing party did that same thing last year or last week. Are they hypocrites and con-men, or are they truly oblivious to the fact that the "shoe fits" them as well?

4 – The idea that I got from my father has been the primary basis of the model that I have used as a mental health professional, when I am trying to understand the origin and operation of "projective processes" in someone. I have expanded it by using Freud's and Klein's models for the "motivation" of projective processes. The "motivations" could include: (1) evacuation of "unwanted accretions of stimuli", as Freud famously said, in effect unburdening oneself of something painful; (2) a desire to put oneself in the shoes of another for the purpose of "empathy", (3) a hostile attack to simultaneously rid oneself of an unwanted state while spoiling an "enviable" state of another, in effect and "envious reversal"; to name three of the most common motivations.
[Note: See Module Two, Part Two, of MKA for a more detailed elaboration of projective processes.]

What my model was lacking, that I think can now be added, is grounding it in brain structure and function. It does not change the clinical model outlined above, but it bolsters and augments it with additional ideas.

5 – So back to the question of why projections are so "outside conscious awareness". While I cannot definitively explain how people can project with so little awareness, I can point in two possible directions.

– The first has to do with our evolutionary orientation toward sensing what others are thinking, feeling, or planning (i.e. "social recognition" hardware of the brain), while using our own thoughts and feelings as a template (i.e. "ego-centric bias").

Small children are notorious for assuming that everything that goes on around them is somehow linked to them. This seems to be mostly the result of a poverty of imagination about how and why things come to pass, melded with a desire to see themselves at the center of everything, so that they don't feel left out and helpless (as result of birth separating them from mom and her activities).

– The second explanation may well be linked to such clever and amazing things as "mirror neurons" that allow us to copy or imitate what the other can do. For animals, this is a tremendously helpful capacity for learning to immediately do whatever mom does to avoid predators. For humans, it greatly increases the speed and sophistication of what we can learn, whether it be in the realm of speech or motor skills.

But these capacities to evaluate the state of another, and mirror what they do, also lend themselves to a "confusion of self and other". In turn, it makes it easier to attribute our own state to the other, especially if the shoe fits, with no awareness that we are responsible for a projection of our own state of mind.

4 – In summary, our capacity for projective processes may be rooted in our brains capacity to assess the emotional states of others. But this also lends itself to confusing our "own emotional state" with the emotional state of the other. When we combine this idea with the idea of the "evacuation" of unwanted states of mind, we have a start, I think of a more complete model of projective processes.

<u>How Are Memories Formed and How Reliable Are They</u>?

1 – Animals can learn by association and remember that something is good or bad, but they cannot remember the "context" in which they learned that lesson. In effect, they only have an "awareness" of a reward or a punishment. This is "operant conditioning", but it is not "memory" in the proper sense.

2 – Memory in a proper sense is a very "complicated subject". It can be defined from many different frames of reference (see the addendum to this lecture for a more detailed elaboration of memory). The key point about memory that I wish to highlight here is that it is "not a digital photograph", stored as a file in one's memory bank, and all one has to do is open the folder and click on the memory.

Memories are actually things that have to be "reassembled each time they are recalled". This re-assembly is almost like a painter's pallet, a dab or color, a dab of feeling, a dab of context, a dab of various other elements, etc.

For example, I was speaking with a friend recently and we were trying to remember the name of a mutual acquaintance. I said I thought his name was Enrique, but I knew that didn't sound right. That was all I could remember. A minute later, I remembered, even though the conversation had moved on, that the person's last name was Encinas. So the "E" as an association to the first name was erroneous. Almost instantly after I said his last name out loud to my friend, the first name came to my mind as Tony. That first name was stored in my brain linked to that specific last name. That is what memory looks like, a series of associated elements stored in different parts of the brain, ready to be reassembled, hopefully in a manner that resembles the original experience, thought, or thing. But it is hardly a dependable process since it has to be reassembled anew on every occasion of recall!

3 – It turns out that the hippocampus is a key component in memory formation after the age of two. But its function seems to be to organize the memory and then upload the "map" needed for re-assembly of the memory, to other areas of the neocortex. Every step of process, from initial assembly, to final storage, to retrieval, is susceptible to distortion, addition, omission, etc. It turns out that memories are not very

reliable! [Note: See the wonderful "Ted Talk" video, "The Fiction of Memory" by Elizabeth Loftus on the unreliability of "eye witness" accounts of events.]

A Plausible Model for the Creation of Dreams:
1 – A working model of dreaming would seem to need to blend brain anatomy and function, as it is currently understood, with the clinically observable phenomena that most analysts work with daily. This means that the model would need to encompass (1) "baby level emotions", (2) current day experience,(3) be highly oriented toward "visual processing", and (4)allow for some form of "thinking" or "problem solving".

2 – For me, the "amygdala" could provide the "baby level emotions", and the "Right hemisphere" of the brain (which is not the verbal side) could potentially do the rest. It would be capable of using multiple areas in "parallel" at the same time, all with an "internal focus", and with less need for linear logic. It might also explain how little a role "language" seems to play in dreams (since language is a function of the left hemisphere.

3 – Put in different words, it seems plausible that the "amygdala" provides the "emotional state" that requires "processing work" to decide how one is going to "cope" with that emotional state. Since the emotional states that the amygdala deals with are "non-verbal" and "unavailable to conscious awareness", this would go a long way toward explaining why humans can almost never predict what they will dream about.

Furthermore, dreams seem to always involve some form of "emotion processing" or "problem solving". If the amygdala is the storehouse of the most profound emotions resulting from infancy, then it would make sense that the daily experiences ("day residue"?) are often triggering some deeper emotion that has parallel significance to the current daytime experience. One would not be able to connect the day's experience to the amygdala's stored emotion unless the day's experience was particularly strong, from an emotional standpoint. In other words, unless the "day residue" is particularly powerful, people are usually unaware of that some experience may have triggered some primitive issue about which one will dream.
One could read something in the news, hear somebody talk about something at work, etc. with no recall of that event, but still have been "stirred up" by it unconsciously.

For example, hearing that comedian Robin Williams committed suicide could have a strong link to one's own "death instinct" feeling that life is more of a pain than it is worth enduring. It is likely that many people had dreams regarding that sort of issue after hearing of his death by hanging. That would be a sufficiently profound stimulus for the dream, and a fair number of people might be able to recognize that connection between the daytime experience and the nighttime one.

But what if the only thing you heard was someone at work making a joke about how some politician ought to kill himself because of his shameful behavior. That might still trigger an emotional state stored in your amygdala that night, but with no recall of the joke, and no awareness that it connected to your own ambivalence about life.

4 – In summary, the amygdala and the "Right side" of the brain have unique characteristics in their functioning that seems very likely to allow them to orchestrate dreams, with only a very limited compositional framework needed to create the dream. The dream has a "purpose" and a "meaning", and the associated elements are quite relevant, it just doesn't have the "Left hemisphere's" linear, logical qualities.

5 – As an aside, I would like to add a speculation about the animal kingdom. I could well imagine that dreaming has its unique, non-verbal, visual, problem solving qualities because we inherited those functions from our animal ancestors. There amygdala needed to connect its appraisal capacities of risk/reward with some way of processing events and problem solve. I do not know at what level of the animal kingdom this began, but I strongly suspect it can be demonstrated in domestic dogs, if my own dog's behavior while asleep is any indication.

Baby Level "Denial", as a Precursor to the "Organ of Attention", and Failed Neuronal Development:
1 – I do not have anything fancy to say about this issue. I simply want to note one of the most basic and elemental modes of operation that an infant has available to it is to "choose to look" at something, or "choose not to look" at something. If it chooses "not to look at" or "attend to" something, then it is not using the neurons in the brain structures that would be activated, if it directed its "attention" to that person, issue, or thing. Take this to the extreme of the research that Rene Spitz did on babies in orphanages, who were given no stimulation, and all tragically died of "marasmus" at about 18 months of age, literally "wasting away".

2 – The human brain has an extremely powerful and potentially sophisticated array of systems for perception. It can choose to "highlight" or "neglect" any of them. In turn, those neuronal pathways can be "grown to be robust", or "disused into oblivion" ("pruning" and "apoptosis" – i.e. cell death). This has scary implications for infants and children who are neglected or mistreated. Neuronal pathways may be too strongly developed in areas of emotional distress, and too underdeveloped in important perceptual areas, to form a solid foundation for future learning and development.

3 – The "underdevelopment" side is tragically obvious in highly neglected children, with their impoverished linguistic, emotional, and often stunted physical capacities. It can also be the same with children who are withdrawing socially from their caregivers, in infancy, and are destined to be on the "autistic" spectrum.

The loss of brain "growth" and "interconnectedness" in infancy is rarely recovered later in life. One can see how the parental "rescue" stories of a child headed in that direction (e.g. displaying early signs of autism), often involve a "full court press" of emotional and social stimulation, to win the toddler or child back around to the "sphere of human relationships".

4 – A child's unconscious, functional choice, to highlight or neglect certain areas of mental activity, probably adds to whatever genetic predisposition they had to develop various systems of their brains in very uneven fashion. [Note: See MKA, Module Five, "The Clinical Relevance of the Organ of Attention".

The Amygdala as a Plausible Repository for the Death Instinct:
1 – My working model of the "death instinct" is that it is the infant's simple assessment of whether life is a source of more pain than it is worth to go on living in the outside world. I "do not" conceptualize it as a "wish to die", but rather as a wish to return to the previous state of being "back inside the womb". In other words, life outside the womb is too unpleasant, so it would like to return to being an "unborn inside baby". [See MKA, Module Two, Part One, for an elaboration of the "Death Instinct"]

2 – Linking the above definition and clinical phenomena to the "amygdala" makes a lot of sense to me, even though I cannot prove its correctness with certainty. Think of what the amygdala does. It assesses the risk/reward of experience from before birth. When things go badly in the period before, during, and after birth, it has to be that the amygdala is the primary brain area recording and assessing the ongoing emotional component of these experiences.

If mom is all "stressed out" during the pregnancy, or depressed, and it continues after birth, I can well imagine an infant "feeling" (I am purposefully not saying "thinking") that life is more of a pain that it is a pleasure. Spitz's babies with marasmus all died at about 18 months of age. I imagine they all "gave up" on life, and their little bodies simply shut down and stopped working. If that isn't the death instinct then I don't know what else could fit more as an example.

3 – An additional element in support of the "amygdala" being a crucial link in the death instinct is how the "ambivalence about life being worth living in the outside world" seems to remain in the personality in some very "deeply rooted, vague cloud of pessimism", for the entire life in some people.

When such a person has a bit of bad luck, like the loss of a job, or a divorce, or a serious illness, the "death instinct" often resurfaces, to espouse its propaganda about the "worthlessness" or "meaninglessness" of life. This sounds to me straight out of "amygdala 101".

Why Adolescent's Are Idiots and Its Relationship to the Frontal Lobes' Developmental Timetable:
1 – I would like to start with a quote from Mark Twain: "When I was a boy of 14, my father was so ignorant I could hardly stand to have the old man around. But when I got to be 21, I was astonished at how much the old man had learned in seven years".

2 – The recognition and understanding of "moral" and "ethical" behavior is a function of the frontal lobes of the neocortex. But there is problem with that fact. The myelination of the axons in the frontal lobe is not complete until late adolescence, and even then is just beginning to learn about living in the world. The result is that one can see high raw intelligence in an adolescent, but poor judgment, typical of inadequate frontal lobe function.

– The "orbito-frontal cortex" (the anterior, medial part of the prefrontal cortex) is essential for "risk and reward assessment" (connected originally to the amygdala) and what we could refer to as "moral judgment". For example, should I steal that candy because it will taste good, or should I not do so because I may get caught, or I may feel guilty.

– Patients with damage to this area (orbital-frontal cortex) may have normal or superior intelligence, but lack even a rudimentary concept of "manners" or "appropriate actions" in social situations. They also "lose all risk aversion" even when they have clear knowledge of bad consequences.

3 – I do not wish to oversimplify adolescence, or give those inhabiting it a "hall pass" or a "get out of jail free card". But unfortunately, the plain truth is that their frontal lobes are so underdeveloped that they don't "know their a_ _ from a hole in the ground".

Raging hormones, uncontrolled growth spurts, confusions about identity, etc. are insufficient to encompass the extraordinary "lack of judgment" that they display in the heat of the moment. As smart as they are is so many ways, when the chips are down and a crisis is at hand, they often "cannot think" their way out of a wet paper bag.

Take for example the recent situation with a talented college football player, who in the heat of an argument with his girlfriend, jumped out of a three story window, severely spraining both ankles. Thinking he had broken them, and trying to imagine how to face his football coach regarding his inability to play for the rest of the season, he concocted a heroic story of jumping out a third floor window to save a young cousin from drowning. How he imagined this could stand up to scrutiny is beyond me but after all, his frontal lobes are underdeveloped. The school hastily put out a press release of his heroism, that was embarrassingly retracted a few days later, and the student was suspended from the team for essentially being an adolescent with bad judgment and then lying about it.

4 – Having made incredibly stupid choices in my thirties, I think I have gotten wiser with every decade of my life, so that I now only occasionally fail to live up to my own moral and ethical standards. And even when I stumble, it is rarely very badly. I attribute this in part to my gradually learning to listen to what my "internal harmony" is telling me about any potential action I am contemplating. So I suppose I have to be patient with my adolescent brethren.

Toddlers, Borderline Personalities, and Acting Out:
1 – I think it is worth speculating about "self-control" and its relationship to brain development. At this point in this course,we now have a working model of emotional development and behavior that we can use to think about toddlers and the "terrible two's", (which as I think of it, is about the middle of the second year after birth).

2 – Assume, for example, we have a toddler who has stored "emotional memories" in his or her "amygdala", but cannot recall them, although they can be "felt" or "experienced" at the drop of the hat, when "primed" by some external stimulus. The toddler has limited language, on the order of let's say 50 words plus or minus, by the middle of their second year, but no "hippocampus" to assemble learned ways to "think" consciously about what they "feel". Furthermore, their "orbitofrontal cortex", which is essential for the regulation of emotion, has only reached maturity in the middle of the second year (even though it is not yet well interconnected with the rest of the frontal lobe), so there has not yet been much learned "emotional regulation".

3 – What we have in a toddler is an inability to remember, but a continual experience of "emotional states" that are entirely unconscious, unavailable for any kind of conscious regulation, and are simply a "drive to action". One can see that in later life, what we will call this the "repetition compulsion" (a drive to action without thought and awareness), is visible in the toddler, who is so neurologically immature, because it is the "only game in town". They cannot be otherwise, which makes them so difficult when they are overtired, ill, upset, etc.

4 – This demonstrates why Klein's play therapy technique was a stroke of genius, because a child of two-and-a-half or three-and-a-half can only convey their emotional states through action. This is because their ability to use language is minimal, and the memories are not available for conscious recall.

The same facts make Freud's discovery of the use of "transference" so brilliant as well, since patients do not have conscious recall of their infantile emotional experiences, save perhaps in the most rudimentary and fragmentary way. But they can relive the experiences in the relationship with the therapist, if allowed. The therapist must see that these are remnants of the patient's earliest experiences, stored at the "unthinkable" level of the amygdala, but being "re-lived" in the outside world because it is the driving force of the "baby core" of the personality.

5 – This brings us to "borderline" patients whose wildly impulsive, uncontrolled, action oriented behavior led me to always think of them as using their brain like a "big muscle". By that I mean they seem always to go from "impulse to action without intervening thought".

These ideas about brain development add some foundational facts to their behavioral description. We could say that the average "borderline" patient has suffered an excessive storage of unthinkable emotional experiences in infancy. They were powerfully stored in the "amygdala" as "memories in feeling". These "memories as feelings" have become so disruptive to later development, that the impulsive, action oriented, "evacuative" approach to relationships and emotional experience has come to dominate them.

In turn, the stress and chaotic experiences disrupted the cortical development (e.g. especially frontal lobe) that might modulate and regulate emotional experience. There is no remembering, just re-living. Furthermore, there is probably no realistic possibility of remembering or modifying those feeling states in the amygdala, without the help of a therapeutic environment. They are essentially trapped forever, as a toddler, in an adult's body.

<u>How "Analytic" Types of Therapy Alter Brain Structure</u>:
1 – The problem, as I would now conceptualize it, is how can the "emotional states stored in the amygdala", that are pre-verbal, non-verbal, and unavailable to conscious awareness, be converted to consciously available states that can be thought about and talked about.

2 – It seems likely that Bion's "beta elements" are linked to these "emotional memories" stored in the "amygdala", and their conversion to "alpha elements" requires the use of all of the neocortex. The problem is that it has to be the "neocortex of someone else" to do the conversion, before the patient's "hippocampus" and "neocortex" can take over the job.

3 – This job would further include taking “Right hemisphere” states of mind, as one often sees in “artistic types” of individuals who are in therapy, and helping them make those states of mind available to the “language based processing” of the “Left hemisphere”.

4 – Since the most primitive experiences stored as “memories in feeling” must be “recreated” in the transference (i.e. “re-lived” in the therapy relationship), in order to become potentially “thinkable”, any therapy that does not address the “transference” is less likely to create the conversion of unthinkable states of mind into “thinkable, verbally expressible states of mind”. Without such insight, the “adult” part of self is considerably less able or likely to be able to constructively manage “baby states of mind” (and the “baby parts of self” having them) that will be activated during future periods of stress or conflict.

5 – “Memories as feelings”, when converted into “ideas” that the neocortex can use (both consciously and unconsciously) to modify ones behavior vis a vis the outside world of object relationships, does actually alter brain pathways, and grow new brain chemistry that feels better.

Speaking of myself as an example, I first went into analytic based psychotherapy as a young adult while in college. I had a history of terrible allergic rhinitis and in the several years of therapy it permanently disappeared for the rest of my life. Mind you I had an additional 16 years of analysis after college that no doubt cemented those changes. But it is clear that my body’s chemistry in terms of immune system responses to antigens (pollen, etc.) was permanently changed by my brain modifications learned in analysis.

Many of my patients have demonstrated similar modifications of their central nervous system’s relationship to their bodies, with permanently altered susceptibility to psychosomatic illness, physical illness, less depression, increased mood stability, greater happiness in life, etc. To me, these all represent changes in brain chemistry, neuronal connections, and growth in the function of various areas of the brain.

<u>Implications for the Practicing Therapist</u>:
1 – Because the “baby core of the personality” seems to be “written in stone in the amygdala”, it will be found embedded in life attitudes and general approaches. These will be in evidence in all emotionally “intimate” relationships, and will therefore be recreated in the transference, unless the therapist consciously or unconsciously “colludes” with the patient (to evade certain issues) or outright “rejects” ideas from the patient (e.g. not listening to the patient), in both cases resulting in a distortion of the relationship with the patient.

– A common example is seen with therapists who actively try to be a “good object” to the patient. This almost always requires subtly and tacitly, or even openly, making someone else the “bad object” (parent, spouse, sibling, etc.). Thus the “negative elements” that are invariably stored in the amygdala are not allowed into the therapeutic relationship.

– One of the most common reasons for patients leaving therapy is a result of the therapist refusing to take seriously the patient’s complaints and negative reactions to therapist. This failure to take the patient seriously in certain areas risks missing key elements in the amygdala, that can only be re-lived in the therapy, but cannot be “thought” about or rationally expressed using language. The therapist may dismiss them as irrational, and fail to see they they represent “deeply unconscious structures” in the patient (i.e. very early, even pre-birth, memories as feelings stored in the amygdala), that must be taken seriously, even though they represent irrational distortions from an adult point of view.

2 – The therapist needs to be cognizant of the potential for planting a “false memory” in a patient that may impact the rest of the patient’s life.

This is most commonly in evidence, as mentioned above, in situations in which the therapist colludes with the patient, to keep parents as “bad objects” (or spouses, friends, bosses, even a part of self, etc.). In extreme cases, this can lead to tragic accusations of such things as sexual molestation, emotional abuse, etc.

in which the patient's phantasies are augmented by a therapist who takes everything as a concrete, factual recollection of childhood. One really tragic example of this was seen in the Mc Martin Preschool case where well-meaning investigators literally planted false memories in the children about sexual molestations that never took place.

– Therefore, all reconstructions should be taken with a grain of salt unless there is strong corroborating data. On the other hand, it is perfectly helpful to think of the therapist/patient couple as creating a "working personal myth" that has value in organizing data, even if it might not actually be a "verifiable historical fact". This might be stated in the following fashion: "It is as if you felt that …. even though we cannot know for sure what happened."

3 – Humans are too smart for their own good. They can generate mental activity in response to mental pain (think amygdaloid "limbic leakage") that actually "perpetuates the pain". The therapist must recognize that the "frequency of sessions" is the foundation of overcoming this obstacle. [Note: See MKA, Module Five, "The Art of Engaging Patients in Treatment" for a discussion of the frequency of sessions in relation to mental pain experienced between sessions.]

4 – Many different therapeutic modalities can modify the emotional experience of one's amygdala and resultant states of mind. But all of them are augmented by an "uncovering, psychodynamic therapy" that makes some sense of the "early underpinnings" of those states of mind. The insights add a stability to the capacity to cope with future conflicts, distress, or trauma as they come along later in life. The take home lesson is that it behooves all therapists to learn about the "baby core" of the personality, and their expression outside and inside the therapeutic relationship.

5 – The brain of an adolescent is only "half-baked", so much of their behavior will reflect this.

– As a result of this fact, in more severe situations, the goal in treatment is "survival" of the deluge of early adolescence, not a cure of it. More structural change through insight can await the development of the frontal lobes and a stabilizing of the confusions and chaos of early adolescence.

– From my reading of the book "How We Learn" by Benedict Carey, I can see that the learning capacities and styles of adolescents should not be likened to those of adults. They may operate differently (listening to music while studying, taking regular breaks, etc.) and may require modifications to the learning environment that don't seem logical to the parent. Not all kids are ready to apply to Harvard at 14 years of age! [Note: See addendum to this outline for more ideas about study and learning methods.]

– My experience over the years of following children into later adulthood has demonstrated to me that the human brain is remarkably plastic and capable of later change. Don't despair or give up on the struggling adolescent.

6 – All humans are essentially born prematurely. Any added weeks to that shortened gestation should be thought of a seriously altering the developmental timetable from which that child should be judged. A week early might make a child delayed six months in milestones for years into childhood. A month premature might make the child one or two years behind for most of their life.

The point is not to "sit-in-judgment" of the child's "immaturity", but to modify expectations accordingly to maximize the child's ultimate growth and happiness. Childhood educators and pediatricians are often not the best judges of this for any number of reasons. The parents, with a therapist they trust, are often in the best position to be realistic and imaginative about a given child's unique capacities and needs.

7 – Therapy takes a long time, and when the start was severely distorted, it may take a lifetime.

A Summary of Key Take Home Lessons From This Course:

1 – All humans are functionally born prematurely.

2 – The brain represents a very complicated set of interactions among a multitude of brain areas that can be conceptualized as a "government of systems".

3 – The two hemispheres of the brain have unique capacities that are useful for the practicing therapist to keep in mind as patients seem to vary greatly in their use of each side of the brain. Some patients are more verbal, goal oriented, concrete and linear in their thinking, and external in their orientation (i.e. perhaps more dominated by the left side of their brain). Others are more internal, artistic, emotional, global in orientation and less interested in thinking through details, less interested in logic or expression with words, and more "feeling" as patients that they are thinkers in therapy. It is helpful to see these differences and alter expectations of how therapy will go over an extended period of time.

4 – Dopamine increases "magical thinking". Patients may have a number of ways to bolster this type of thinking with resultant impacts on their approach to life.

5 – The amygdala is the first memory system on board from late months in the womb through the second year of life. It will remain a key part of the brain, when important emotional issues are involved, throughout the lifespan. It stores "memories as feelings" which remain permanently "non-verbal", unavailable to conscious introspection, and only "re-livable" in relationships in life.

6 – The fronto-parietal cortex will take over the "executive functions" of lower, subcortical systems, as development proceeds, but the amygdala will retain veto power.

7 – The hippocampus will not be mature enough to manage memory until after the second year of life.

8 – Dreaming is probably a function of the right hemisphere, working in concert with the amygdala, which may provide the "baby core" emotional states that are being processed in the dream.

9 – The death instinct is probably a function of very primitive emotional reactions stored in the amygdala.

10 – Adolescents lack a capacity for good judgment and self-restraint. This is significantly due to their frontal lobes,
which are responsible for moral and ethical judgment, not being fully myelinated until the end of adolescence.