**Chapter 3**

**An Introduction to the Clinical Biopsychological Model**

Within this book, I hope to convince psychotherapists and neuroscientists alike that a theoretical model currently exists that has the potential to explain how cortical processing and memory occur, as well as how this leads to a unified theory of psychotherapy. At its core is the proposition that a group of several thousand neurons that comprise a *cortical column* is the fundamental binary unit (i.e., bit) involved in all cerebral cortical processing and memory storage. A summary statement of the Clinical Biopsychological approach is as follows:

*We each have a brain. We each have two minds, as does everyone with whom we have a relationship. We verbally think and form verbal memories. We emotionally think and form emotional memories. Verbal and emotional processing occurs independently, but each can influence the other internally, and by controlling the external world perceived by the brain. It is possible to use a brain model to guide assessment, conceptualization, and treatment with patients.*

All nervous system activities (i.e., barring more generalized circulatory system hormonal influences) work by connections. If there are no connections, then two areas cannot communicate directly. This is critical in an understanding of “conscious” versus “unconscious” processing and responses. Sensory information that arrives at the cerebral cortex is as an accurate reflection of those stimuli, followed by the processing of the information which allows meaningful action. The same cortical areas involved in the original processing of information are the same areas reactivated when the memory is recalled. This means that all the sensory memories, including those emotional in nature, involve direct connections at the cortical, and not the subcortical, level.

The two cortices are considered to be semi-independent functioning minds. Within the suggested parallel processing design, the side that can best respond to an ongoing situation is the one that assumes control of the ensuing response. Both hemispheres receive similar sensory input. The posterior lobes (i.e., parietal, temporal, and occipital) are involved with processing and memory storage tied to incoming sensory information, while the frontal lobes are involved with analysis, planning, and response initiation, as well as associated memories of such activities. The left cortex processes sensory information in a detailed manner, resulting in its being slower than the right. The right cortex processes the information much faster (in milliseconds), but in a global, less-detailed manner. There is exchange of information between the sides, although this exchange can be both excitatory and inhibitory. From a developmental perspective, there is initially only very limited information exchange between lobes within each side, and between the hemispheres. This logically allows each cortical area to develop fully its memories and associated processing prior to influence from other areas. Additionally, left hemisphere functions (e.g., receptive and expressive speech) will develop slower than those of the right hemisphere (e.g., non-verbal emotional analyses and responses) because there are a greater number of information units (i.e., cortical columns) and interconnections in the circuits associated with left hemisphere processing. A final point is that the right hemisphere’s global processing allows for faster responses if confronted with outside danger; suggesting this side is best designed biologically (i.e., for survival) to respond and assume behavioral control while in a negative emotional state.

The left cortex primarily handles language functions because of its capacity to do highly detailed processing. Thinking verbally is a left cortical process involving the ventral lateral frontal lobe and is called the “verbal interpreter.” A point that will be discussed in Chapter 5 is that the DSM indicates there is a corresponding right ventral frontal area that handles sequential action processing, corresponding to the “emotional interpreter” which allows expression of the emotional aspects of speech and allows an internal emotional dialogue (e.g., imagining or hearing the inflections and volume of what is said, likely activating visualization of the actions). Other circuits in the emotional interpreter area are expected to control melodic aspects in singing and internal recall of melodies. The right posterior areas are involved in comprehending non-detailed emotional behaviors shown by others, as well as storage of external (e.g., sight, sound) and internal (e.g., visceral responses) sensory memories tied to emotions.

Thus, the hemispheres are viewed as capable of independent stimulus processing and behavioral responses which means both may be considered equally “conscious,” though not equally verbal. However, the faster, less detailed processing of the right hemisphere means this side is the best in analyzing non-detailed indices of emotional expression by others, such as facial expressions and voice intonations. It is also the quickest in analyzing and responding to potentially dangerous or threatening external and internal stimuli. Both positive and negative emotional memories involve the same columns that were used in original processing. The right cortex is expected to have only very limited verbal ability, being mainly related to words associated with the strong expression of emotion (e.g., profanity) and some lyrics housed within music. This restricts the right side to a limited repertoire of independent verbal responses to emotionally related stimuli.

The left cortex also has the ability to activate its own connected subcortical structures involved in both positive and negative emotions. This means it has equal ability to activate subcortically-based autonomic responding, as well as the mesolimbic dopamine pathway. However, it processes more detailed aspects and can make responses involving greater complexity, particularly in the verbal realm via the left lateral ventral frontal cortex. In summary of this brief introduction, each cortical hemisphere has the ability to process incoming sensory information and initiate its own response, including externally-directed behaviors and internal physiological responses. In this regard, there may be a lack of verbal awareness when the cortical circuits involved in a response do not directly connect to the left lateral ventral frontal verbal interpreter.