Culture-Brain Interactions

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One of the philosophical problems in neuroscience is seeing the trees before the forest. Indeed, it is essential to know how local events fit into the whole picture, but we must also look beyond correlations between stimuli and neural responses in one sensory nucleus. A lifelong dialogue between the environment and human brain begins at birth. Different environments enable different experiences; each experience is unique because culture gives it meaning. The eye tells the brain about each experience and the context in which it occurs. The brain records, transmits and recalls all events in their proper sequence and with attendant emotion. Culture gives behavior meaning. It helps us see beyond technique alone to better integrate diverse approaches to answering key questions about how the mind works.

Introduction

A dialogue between the environment and the human brain begins at birth. This lifelong relationship is integrated, multi-level, continuous, and changing (Anderson, 2002). Different environments enable different experiences; each experience is unique because culture gives it meaning (Corin, 1994).

Culture shapes our outward appearances; but less obvious and even of greater importance, our internal differences, such as our goals in life, our sense of justice, and our personal feelings. Culture is the myriad of influences that shape body and mind step by step throughout every stage of life (Wilson, 1998). Culture is not inherited through genes; it is acquired by learning from other human beings (Dobzhansky, 1963; Gazzaniga, 1985). Culture is analogous to an emotional package comprised of appraisals, subjective feelings, action tendencies, expressions, and patterned bodily processes. When an event creates an emotional response, all components are activated because of their interdependence (Fischer, Shaver & Carnochan, 1990; Laird & Bresler, 1991). Each event activates a cultural package of beliefs, values and norms which is recorded and recalled by the mind, giving form and meaning to our present and future behavior (Schacter, 2001).

The scope of culture is analogous to the role of the frontal lobes of the brain, often referred to as the “organ of civilization.” The frontal lobes enable us to construct inner representations of the outside world and to visualize threats before they materialize. They also take an aerial view of all of the functions of the brain and coordinate them. The frontal lobes are analogous to a symphony orchestra; they act as the brain’s conductor or leader, coordinating the instruments in the brain’s orchestra (Goldberg, 2001). Culture performs a function similar to the orchestra conductor, providing the mind with data from the broad external environment and the intricacies of individual’s interactions with it. The structure of a symphony orchestra is very hierarchical and somewhat autocratic with respect to musical authority. Similarly cultural information can be restrictive and event specific and requires...
appraisal and prioritization by the mind as it is sent along appropriate neural pathways. The precise neural pathways by which social information is provided to the mind and the intricate ways by which social data are stored, disseminated and retrieved have not been fully identified.

The analogy with the symphony orchestra and musical instruments is not new. Paracelsus (1891) first suggested the analogy of the brain's structure to a musical instrument such as a piano. While the piano provides the equipment to make music, its full potential for creative expression is dependent upon how it is activated by the player (Wolf, 1996). When the analogy of the brain to the piano is extended to include all of the instruments in an orchestra, it is the skill, creativity, and sensitivities of the instrumentalists along with the ability of the conductor to coordinate the nuances of sound that determine the outcome of the experience.

This essay elucidates and illustrates how culture shapes or influences the mind. The mind takes continuous photographs of our behavior and the context in which it occurs. Photographs capture actions, forms of communication, and provide the emotional texture to events. There is no way to define or label an event as positive or negative, harmful or helpful, without referring to the characteristics of the individuals or groups that make themselves vulnerable to the event. The ensuing discussion is based on the assumption that culture modifies or shapes events, circumstances and behavior irrespective of their origin. The author argues that culture and environment are often ignored or considered of low value in most mind-body research, resulting in incomplete and unidimensional assumptions and conclusions about the brain and its neural mechanisms.

Our approach to research has often been counter-intuitive. We have focused on the effects of an event or series of events on the mind of a single person. This situation approach has yielded data on how individuals process information, but it is not generalizable (Griffin & Gonzales, 2004). Ironically, we spend most of our time in interaction with other people and in groups, which greatly impacts how we perceive and appraise events (Singer, Wolpert & Frith, 2004; Miller & Birnbaum, 1988). Using the allostatic paradigm we need to broaden our perspective and protocols to emphasize the interaction between environmental situations and an individual's appraisal of the situation (Sterling & Eyer, 1988; McEwen, 1998, 2001). Understanding events requires being aware of the set points of the context in which they occur.

Understanding Events

Wegner (2002) noted that events seldom occur only once in real life; rather there is a sequence of events that create interaction and feedback. He saw real-life tasks and events as creating "a circle of influence" that sets off a chain of events. Observing people's reactions to related events over time yields some reliable insights about their behavior. For these reasons, information gathered either from real life or the laboratory alone greatly limits and distorts our learning about the processes that link the environment to the brain (Bruhn & Wolf, 2003). Furthermore, neural networks that underlie the processing of social information may be connected to those implicated in emotional reward circuits in the brain (Norris, Chen, Zhu, Small & Cacioppo, 2004). Researchers have studied either social or emotional processes, but not both, assuming that the networks of these processes are separate. Norris and his colleagues suggest that these processes are interactive and at least partially redundant. Redundancy and the fusion of variables, rather than being measurement problems, may mimic reality rather than distort it (Lazarus, Folkman & Gruen, 1985; Lazarus, 1994).