

Culture, brain, and health: introduction to the special issue

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Researchers in cultural neuroscience have largely focused on understanding the reciprocal relationships between brain function and sociocultural experiences (Losin et al. 2010). In exploring these relationships, researchers have revealed neural mechanisms underlying cultural differences in cognition and behavior, and shown how brain structure and function can facilitate the acquisition of cultural beliefs and practices. For example, cultural neuroscience research has demonstrated cultural variation in the brain mechanisms underlying many basic cognitive, affective, and social processes, including mental calculation, music perception, semantic relationship processing, mental state reasoning, and the perception of one's own face and body and the faces and bodies of others [for reviews see (Han et al. 2013; Han 2015)]. Cultural neuroscience research has also identified brain mechanisms related to cognitive and behavioral components of cultural acquisition, including imitative learning biases (e.g., Liew et al. 2011; Losin et al. 2015) and mentalizing (e.g., Adams et al. 2009; Kobayashi et al. 2006). While such studies of culture-brain relationships move the fields of psychology and neuroscience toward a more global perspective, many cultural neuroscience findings remain far removed from real-world applications.

Meanwhile, a rich literature on culture-health interactions in behavioral medicine, medical anthropology, and cross-cultural psychiatry and psychology suggests that cultural norms and practices influence the perception and maintenance of health, as well as the incidence, presentation, diagnosis, and treatment of illness (Helman 2007). For example, in the domain of mental health, the presentation of anxiety and depression varies among cultures, particularly in the prevalence and meaning of somatic and dissociative symptoms (Kirmayer 2001; Kleinman 2004).

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In the domain of socioemotional health, there is evidence that cross-cultural variations in the emotional states that are most highly valued (“ideal affect”), and the extent to which these ideal affective states are achieved, influence rates of depression (Tsai et al. 2006). Finally, an example in the domain of physical health is the putative “Hispanic paradox” in the United States: Hispanics have a lower risk of mortality than non-Hispanic Whites and Blacks, despite relatively lower socio-economic status (Ruiz et al. 2013).

A sociocultural neuroscience approach to real-world health applications has the potential to provide new insights into the neurobiological mechanisms underlying culture-health interactions, thereby bringing cultural neuroscience closer to direct societal impacts. Neuroimaging can provide objective measures of neurobiological processes closely tied to health and disease, which can in turn give rise to new discoveries. These discoveries include 1) confirming or refuting apparent mechanistic similarities and differences between health and disease processes previously identified at the behavioral level; 2) identifying specific neurobiological systems involved in health or healthcare processes, thereby indicating possible therapeutic interventions; 3) providing replicable neuromarkers of health and disease processes that may ultimately aid in diagnosis and treatment; and 4) providing measures of implicit processes related to disease and healthcare that are inaccessible to self-report. Thus, a sociocultural neuroscience approach to health has the potential to leverage the latest neuroimaging methodology to elucidate culture-health interactions, which can inform efforts to tailor therapies to different cultural contexts.

The articles in this special *Culture and Brain* issue on Culture, Brain, and Health provide a sample of emerging work applying a sociocultural neuroscience approach to understanding mechanisms underlying health and disease. In the domain of mental health, Chiao and colleagues discuss the role that cultural neuroscience can play in addressing research priorities for the next decade, as identified in the National Institute of Mental Health’s Grand Challenges in Global Mental Health Initiative. In the domain of socioemotional health, Casico and colleagues find that a key sociocultural variable—socioeconomic status—moderates the relationship between brain responses during social exclusion and susceptibility to peer influence during risky decision-making. Also in the domain of socioemotional health, Yang and colleagues demonstrate independent effects of cultural background and cardiac vagal tone (CVT) on emotional expressiveness. In the domain of physical health, Anderson and Losin propose a neurocultural model of pain that outlines the specific aspects of culture that affect each stage of the pain experience and the potential neurobiological mechanisms underlying these pain-culture connections. Finally, Levine and colleagues demonstrate that the known physiological benefits of interracial contact can even extend to a second generation, finding improved pulmonary function in children with asthma whose parents have more diverse social networks.

Even within the small sampling of articles in this special issue, the broad potential impacts of a sociocultural neuroscience approach to health and health care is evident. Across these studies, culture is operationalized in a number of different ways, including nationality, race, ethnicity, socioeconomic status, and interracial contact. Neurobiological outcome measures are also varied, including fMRI

activation and CVT, an index of sympathetic nervous system function. Among the many potentially fruitful areas of research connecting culture, brain, and health not covered in this special issue are the brain mechanisms involved in the healthcare process itself: those underlying how patients perceive states of disease and health, their experiences during medical care and mechanisms of treatment, and those underlying how clinicians perceive their patients. Future applications of cultural neuroscience to health can add significantly to our understanding of the mechanisms underlying these healthcare processes as well.

In summary, cultural neuroscience methods have the potential to increase our understanding of neurobiological mechanisms related to health and healthcare by instigating new basic science discoveries and new clinical advancements. Federal funding priorities in the United States and abroad are increasingly focused on applied research, and the world's societies are becoming ever more diverse. Thus, there is a growing need to understand similarities and differences in sociocultural and neurobiological mechanisms related to health across national, racial, and cultural groups. Cultural neuroscience is a discipline perfectly poised to fill this need.

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