



Understanding Cultural Neuroscience and Ethnopsychopharmacology Can Enhance Cultural Competency in Psychiatric Nursing

Written by Nicola Parry

In a presentation focused on science-based interactions between culture and biology, Jason F. Earle, PhD, PMHNP-BC, Wheaton Franciscan Healthcare, Racine, Wisconsin, USA, discussed results from research in the fields of cultural neuroscience and ethnopsychopharmacology, demonstrating how cultural differences influence the neurobiological foundations of key issues in psychiatric nursing.

Due to the increasing cultural and ethnic diversity of clients, Dr Earle emphasized that psychiatric nurses must be culturally competent to be good clinical providers. He encouraged the audience to consider emerging data from studies in the fields of cultural neuroscience and ethnopsychopharmacology to help improve patient outcomes in psychiatric nursing.

CULTURAL NEUROSCIENCE

Historically, psychiatric research has centered on the influence of neurobiology, genetics, and brain functioning, on different aspects of human behavior (culture). Cultural neuroscience, by contrast, explores the influence of culture on neurobiology and the influence of neurobiology on culture. Cultural neuroscience studies have demonstrated differences in brain functioning between people from Western and East Asian cultures. Dr Earle focused on cultural neuroscience findings—psychopathology, the self, emotion, and cognition—that might be relevant to psychiatric nurses.

Psychopathology

Dr Earle discussed a large study that examined polymorphisms of the serotonin uptake transporter (5-HTTLPR) gene in people in 29 countries [Chiao JY, Blizinsky KD. *Proc Biol Sci.* 2010]. The short allele of this gene has been associated with an increased risk of mood and anxiety disorders. The study authors found a high frequency of the short allele in countries from East Asia but a low prevalence of mood and anxiety disorders. Conversely, people from Euro-American nations had a reduced frequency of this allele but a higher prevalence of mood and anxiety disorders. In explaining this discrepancy, the study authors also investigated the differences in dominant cultural values and their influence on mood and anxiety disorder prevalence. While

individualistic values (independence, uniqueness, self-expression, and individual goals) are more common in Western cultures, collectivist values (connection, other focusedness, duties and obligations to others, and group goals) dominate in East Asian cultures. A statistical procedure from this study called a *mediation analysis* suggested that the collectivist values in East Asian cultures helped to buffer these people from developing mood and anxiety disorders.

Dr Earle emphasized research that suggests an intriguing relationship among brain plasticity, culture, and psychopathology, mentioning a study that showed an increase in the prevalence of major depressive disorder in Chinese people who migrated from a collectivist culture in Taiwan into an individualistic culture such as the United States.

The Self

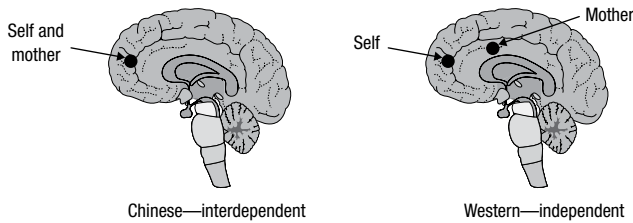
Past research in cultural psychology found 2 predominant kinds of self-construal: independent and interdependent. Western cultures tend to promote an independent self, which is autonomous, unique, the same across contexts, and driven by individual traits such as curiosity or strength. In East Asian cultures, the interdependent self is more common. It emphasizes connection, one's role within a social group, less differentiation from others, and the self's changing from one context to another.

Dr Earle discussed a study [Zhu Y et al. *Neuroimage.* 2007] that examined the neural activation patterns of Western and Chinese people when they were thinking about their own self, someone close to them (mother), and someone distant (a celebrity). The results appeared to support the idea that East Asian cultures have an interdependent self and Westerners have an independent self. Chinese subjects activated the same brain structure, the medial prefrontal cortex, for both the self and the mother. By contrast, Western subjects activated one structure for the self, the medial prefrontal cortex, and a separate brain structure for the mother, the anterior cingulate cortex (Figure 1).

Dr Earle presented research that suggests a relationship among brain plasticity, culture, and the self. A study found that the brain activation patterns related to the self can change in people who intentionally migrate from an



Figure 1. The Influence of Culture on Brain Activation Patterns



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interdependent East Asian culture to an independent Western culture such as the United States [Chen PHA et al. *Cult Brain*. 2013].

Emotion

Cultural neuroscience research has compared the neural processing of emotion in Westerners and East Asians. One study examined how Koreans and North Americans respond to scenes of emotional pain, finding that although both groups activated the same region of the emotional pain matrix, Koreans activated the region to a greater degree. The researchers demonstrated that this was related to the collectivist cultural values of the Korean subjects, which emphasizes other focusedness [Cheon BK et al. *Neuropsychologia*. 2013].

Cognition

Past cultural psychology research found that Western and East Asian cultures have different cognitive styles. Western cultures tend to be analytic, focusing on objects in the foreground and their features, whereas East Asian cultures are holistic. A holistic cognitive style focuses on background and its relationship with foreground objects. Cultural neuroscience research has consistently found different neural processing by East Asian and Western subjects that supports the idea that individuals from these cultures have different cognitive styles. For example, a study that employed eye-tracking technology [Goh JO et al. *PLoS One*. 2009] found that East Asians and Westerners had different visual attention patterns when observing pictures with changing foregrounds and backgrounds. East Asians shifted their gaze between the background and foreground, whereas Westerners’ eye patterns focused more on changes to foreground objects.

ETHNOPSYCHOPHARMACOLOGY

Ethnopsychopharmacology research has demonstrated that cultural and ethnic groups have varying responses

to psychiatric medication. Dr Earle highlighted this by discussing results from studies investigating polymorphisms of the serotonin uptake transporter gene and CYP450 enzymes.

In one study, for example, Caucasians with 2 long alleles of the serotonin uptake transporter gene responded better to escitalopram than did Koreans [Ng C et al. *Hum Psychopharmacol*. 2013]. Other studies have shown that Caucasians with the long allele responded better to antidepressants, whereas East Asians with the short allele responded better to antidepressants.

Research has identified cultural and ethnic differences with respect to specific polymorphisms in the cytochrome P450 enzymes, which are involved in metabolizing many psychiatric medications. One of these enzymes, CYP2D6, is involved in metabolizing antidepressants such as fluoxetine, paroxetine, duloxetine, trazodone, and mirtazapine and antipsychotics such as risperidone, aripiprazole, and olanzapine. Ethnopsychopharmacologic research has found 80 CYP2D6 polymorphisms. For example, CYP2D6*10 and CYP2D6*17 are more prevalent in East Asians and sub-Saharan Africans. These 2 polymorphisms are associated with lower enzyme activity and, consequently, lower doses of some antidepressants and antipsychotics to achieve a therapeutic response in these ethnic groups.

Some studies have shown that the diets of different cultural or ethnic groups can interact with CYP450 enzymes to influence metabolism. Dr Earle discussed a study in which individuals from Asia and Sudan who ate traditional ethnic foods in their home countries experienced slower metabolism of clomipramine. However, after immigrating to England and adopting new dietary habits, their metabolism of clomipramine increased to a level similar to that of English individuals.

HOW DO THESE DATA INFLUENCE PSYCHIATRIC NURSING?

In summarizing, Dr Earle noted that research in cultural neuroscience and ethnopsychopharmacology demonstrates how culture and ethnicity can shape the collective neurobiological functioning of large groups of individuals. This research also suggests more neurobiological variability than was previously imagined. A growing number of scholars have argued that this variability emerged from culture and genes jointly contributing to evolution, which is referred to as *culture-gene coevolution*. Ultimately, incorporating the findings from these disciplines into clinical practice can help psychiatric nurses be more culturally competent when working with diverse client populations.