

February, 2020

Author: Gabriel Qi

For our February, 2020 ANA Listserv Research Digest, we will look at two articles in the recently published book *Clinical Cultural Neuroscience: An Integrative Approach to Cross-Cultural Neuropsychology*, edited by Otto Pedraza. Special thanks to Dr. Daryl Fujii for recommending the book to the research digest initiative.

The first article is about visual cognition and culture. Goh, Li, Tu and Dallaire-Théroutx (2019) proposed a framework to understand culture-related differences in visual processing, hypothesizing that “the brain is geared toward veridical representation of the environment and that the integration of physical and valuatative (reward and error) signals from the environment are paramount to this goal.” The authors reviewed several streams of evidence in differences of visual processing between Westerners and East Asians: a) the famous analytic-holistic dichotomy of visual perception and attention; b) differences in processing facial features and expression; and c) different speed, strategy and brain activations during number and mathematical processing. They then discussed how socio-environmental reinforcement learning may have aided the acquisition of cultural differences. These may include “social feedback which engages the dopaminergic reward system including the ventral tegmental area and its projection targets in the frontal, subcortical, and limbic regions (Schultz, 2013; Schultz, Dayan, & Montague, 1997; Schultz & Dickinson, 2000; also see Mu et al., 2015, for similar discussion on the neurobiological acquisition of culture)” (pp. 138). To me, this framework and these findings further suggest careful considerations for cross-cultural test adaptations even with non-verbal, visuospatial tasks, which intuitively might be deemed straight-forward and universal.

For the second article of the month, I want to introduce a review by Chou and Booth (2019) on neurocognitive development of semantics in Chinese- and English-speaking children with and without autism. They defined semantic organization as “how the actual representations themselves are organized in occipitotemporal cortex” and semantic processing as “how these representations are accessed and manipulated by frontoparietal cortex” (pp. 200). Essentially, they reviewed that the left middle temporal gyrus (MTG) and the left occipitotemporal cortex are heavily involved in the organization of semantic knowledge, and these findings were quite consistent between Chinese- and English-speaking children. Semantic processing, however, seems more culturally dependent. The processing of word pairs with strong associations produces greater activation in the left inferior parietal lobule in English or in the left angular gyrus in Chinese. The authors argued that it may be due to greater engagement of the mapping from orthography to semantics at word level in Chinese, and greater phonological processing involved in English reading. For children with autism speaking either language, both semantic organization and processing are altered.

Food for thought this month:

Is it surprising that visual processing may be impacted by culture? What have your experience been for cultural differences on visual processing in your clinical and/or research work?

Here are the links to access the articles this month:

1. Publisher website:

<https://global.oup.com/academic/product/clinical-cultural-neuroscience-9780190619305?cc=us&lang=en&>

2. Google Books:

https://books.google.com/books/about/Clinical_Cultural_Neuroscience.html?id=Wiy7DwAAQBAJ

References:

- Chou, T., & booth, J. (2019). Neurocognitive development of semantics in Chinese- and English-speaking children with and without autism. *Clinical Cultural Neuroscience: An Integrative Approach to Cross-Cultural Neuropsychology*, 200. UK: Oxford University Press
- Goh, J. O., Li, C. Y., Tu, Y. Z., & dallaire-th roux, C. (2019). Visual cognition and culture. *Clinical Cultural Neuroscience: An Integrative Approach to Cross-Cultural Neuropsychology*, 124. UK: Oxford University Press