A Neuroscience Model of Music Learning

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Introduction

Based on an extensive review of peer-reviewed neuromusical studies in the Musical Brain Imaging Research Database (MusicBIRD), the author proposes a Neuroscience Model of Music Learning (NMML) to identify the ways that humans learn to be musical. Drawing heavily upon research comparing musically and non-musically trained subjects, as well as a large body of consistent and independent evidence supporting each component of the model, the NMML offers a neuroscientific basis for the brain processes associated with music learning. At this time, the NMML consists of nine neural components forming the basis of music learning.

Potential Outcomes

The implications of this model may yield practical applications and insights for music teaching, and assist research directions in multiple fields, such as neuroscience, music education, music therapy, developmental psychology, and cognitive psychology. The NMML coincides with several pedagogical practices that are already promoted in many pre-service music teacher training programs (e.g., modeling, audiation, and music-movement relationships). Sharing the neuroscientific basis for music learning processes may expand the comprehension students and teachers have for the components of music learning experiences.

NMML

A comprehensive review of neuromusical research supports a model of human music learning based on:

1. Lifelong learning with optimal learning periods
2. Quantity and quality of musical experiences
   - Deliberate practice
   - Instant Plasticity
3. Audiation (mental music imagery)
4. Creativity
5. Interactions with other brain systems:
   - Kinesthetic (audiomotor networks)
   - Linguistic
   - Spatial Awareness
6. Resilient long-term memory
7. Social observation of musical models (mirror neurons)
8. Emotional responses
9. Ubiquitous and unique musical processes

Background

The Musical Brain Imaging Research Database (MusicBIRD) is a comprehensive resource of neuromusical research affiliated with the Music Research Institute (MRI) at UNC Greensboro and is maintained by Dr. Richard Edwards, Professor of Music Education at Ohio Wesleyan University. Its guiding principles are:

1. To compile and review all peer-reviewed neuromusical research,
2. To explore how neuromusical research may offer insights into the pedagogical and philosophical foundations of music education.

Currently, there are 532 qualifying studies in the MusicBIRD. To learn more, go to sites.google.com/a/owu.edu/musicbird

Sample MusicBIRD page