



## The Brain's Crescendo; How Music Training Impacts Child Development

Dr. Assal Habibi  
Associate Research Professor of Psychology  
Brain and Creativity Institute  
University of Southern California

Monday, April 24, 2023  
EEB 539

<https://usc.zoom.us/j/99532928626?pwd=QjlwM2JGejZLdzNPdWEwc3RSNk0wdz09>  
Meeting ID: 995 3292 8626      Passcode: 239086

**Abstract:** In a multi-year longitudinal study, we have been investigating the effects of a group-based music training program on the development of children, beginning at age 6, using behavioral, neuroimaging, and electrophysiological measures. The target group of children have been participating in the Youth Orchestra of Los Angeles (YOLA) program. This music program is based on the Venezuelan system of musical training known as El-Sistema and offers free music instruction 6–7 hours weekly to children from underprivileged and under-resourced areas of Los Angeles. The children in the music program have been compared with two groups of children, one involved in a community-based sports program, and another not enrolled in any systematic afterschool training. During this talk, I will share some of the behavioral and neuroimaging results from this study. Over the course of 5 years, we have observed that children in the music group had better performance than comparison groups in musically relevant auditory skills (pitch and rhythm discrimination) and showed an accelerated maturity of auditory processing as measured by cortical auditory evoked potentials. We also observed that children in the music group showed a different rate of cortical thickness maturation between the right and left posterior superior temporal gyrus and higher fractional anisotropy in the corpus callosum, specifically in the crossing pathways connecting superior frontal, sensory, and motor segments. For nonmusical skills, children with music training, compared with children without music training, showed stronger neural activation during a cognitive inhibition task in brain regions involved in response inhibition and decision-making (bilateral pre-SMA/SMA, ACC, IFG). Finally, we observed that parents of children involved in music training, after four years, rated their children higher on the emotional stability personality trait and lower on aggression and on hyperactivity compared to children not involved in music activities despite no differences in these measures before children's entry into the program. Considering a general reduction in art education specifically in the communities where there is limited access to art exposure in general, and specifically to music education, the findings from this study is providing compelling answers to the ongoing discussion about music's role in the education curriculum.

**Bio:** Assal Habibi is an Associate Research Professor of Psychology at the Brain and Creativity Institute at the University of Southern California. Her research takes a broad perspective on understanding the influence of arts and specifically music on health and development, focusing on how biological dispositions and learning experiences shape the brain and development of cognitive, emotional and social abilities during childhood and adolescence. She is an expert on the use of electrophysiologic and neuroimaging methods to investigate human brain function and has used longitudinal and cross-sectional designs to investigate how implementing music training programs within the school curricula impacts the learning and academic achievement of children from under-resourced communities. Her research program has been supported by federal agencies and private foundations including the NIH, NEA and the GRoW @ Annenberg Foundation and her findings have been published in peer reviewed journals including Cerebral Cortex, Music Perception, Neuroimage and PLoS ONE. Currently, she is the lead investigator of a multi-year study, in collaboration with the Los Angeles Philharmonic and their Youth Orchestra program (YOLA), investigating the effects of early childhood music education on the development of brain function and structure as well as learning skills, cognitive, emotional, and social abilities. Dr. Habibi is a classically trained pianist and has many years of musical teaching experience with children, a longstanding personal passion.

**Hosts:** Dr. Karim Jerbi, karim.jerbi.udem@gmail.com  
Dr. Richard M. Leahy, leahy@sipi.usc.edu