

Musical intervention programs and wellbeing: A review from Positive Developmental Neuroscience

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INTRODUCTION

- Musical activity may enhance one's well-being, which could lead to a flourishing life (Croom, 2012)
- Emotional and reward brain circuitry can be activated through musical involvement demonstrating the ability of the environment to alter the brain (i.e., neuroplastic effects; Wilson, 2013)
- El Sistema is a worldwide musical intervention program that originated in Venezuela and targets socioeconomically disadvantaged children by providing ensemble orchestra opportunities
- Positive Developmental Neuroscience emphasizes strengths and human flourishing related to the brain and mind, instead of deficits and illness

OBJECTIVES

The purpose is to review the literature on El Sistema (and El Sistema-inspired programs), and frame it in the context of Positive Developmental Neuroscience

METHODS

- A systematic search of available literature in the PubMed and PsycINFO databases was performed
- Search terms included "music", "El Sistema", "neuroplasticity", and "neuroscience"
- Information was gathered to create the subfield of Positive Developmental Neuroscience by conducting a literature review and borrowing elements of Positive Psychology in a developmental context

RESULTS

- Music plays a role at multiple levels (Wilson, 2013)
 - 1) **Brain level:** structure and function
 - 2) **Mind level:** cognitive processing
 - 3) **Personal level:** influence on one's thoughts and emotions, and well-being regulation
 - 4) **Social level:** music enhances social cohesion

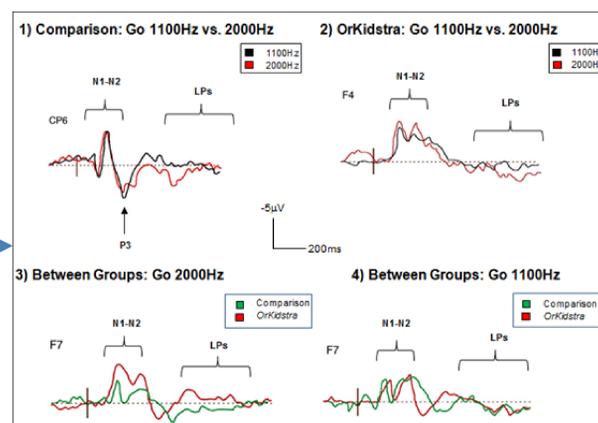


Figure 1. Examples of Event-Related Potentials (ERPs) in children with El Sistema-inspired (OrKidstra) training and without it. (1) Comparison group: Response for Central-parietal (CP) region with Go at 1100Hz vs. 2000Hz; (2) OrKidstra group: Response for Frontal (F) region with Go at 1100Hz vs. 2000Hz; (3) Between-Groups comparison: Response for F region with Go at 2000Hz; and (4) Between-Groups comparison: Response for F region at 1100Hz. Epochs: Pre-stimulus (-200ms) to post-stimulus (1000ms). Figure adapted from Schibbli & D'Angiulli (2014).

Table 1. Systems engaged through music making

Adapted from Wilson (2013).

Sensory processing	Auditory, visual, tactile, kinesthetic
Auditory perception	Auditory recognition, pitch perception
Learning fine motor skills	Coordination of both hands, control of digits and voice
Integration of sensory-motor modalities	Monitoring and correcting during performance
Visual and spatial processing	Visuospatial perception, mental rotation
Executive function and attention	Auditory and spatial working memory and imagery, selective and maintained attention
Processing of emotions	Emotional awareness and expression, anticipating and experiencing reward
Processing of memory	Procedural, semantic, and episodic memory
Social cognition	Empathy and imitation, theory of mind

RESULTS (continued)

Themes of El Sistema (Majno, 2012)

- 1) Accessibility
 - 2) Regularity and intensity of training
 - 3) Collective courses and ensemble practice
 - 4) Pursuit of artistic quality and reward of excellence
- Longitudinal studies have shown a causal link between music training and neuroplasticity (e.g., Hyde et al., 2009)
 - Music training enhances learning through neuroplasticity (e.g., Rosenkranz et al., 2009)

- Musicians' brains are different than nonmusicians' brains in terms of their shape, size, density, connectivity, and functional activity, with the most significant differences being found in the frontal, motor, and auditory regions (Merret & Wilson, 2011)

DISCUSSION / CONCLUSIONS

- El Sistema can have beneficial effects on children's well-being by influencing their brain circuitry and leading to positive outcomes

Limitations: A more exhaustive literature review could add additional details not mentioned in this review poster.

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