

Recent Discoveries of Music Education and the Brain

- Musicians have been found to possess **advanced skills in both long and short-term memory and memory storage and retrieval**
- Musicians have been found to **acquire language and understand the rules of language and its syntax more effectively** than nonmusicians
- Music education **may develop the mirror neuron system** in the brain which enables the brain to **complete two processes at once** - making the brain work twice as effectively in the same amount of time. However, **significant debate remains** over whether music education is **solely responsible**
 - The mirror neuron system allows simultaneous processing of different types of information, for example, analyzing a sound for both its perceptual and hierarchical qualities. This area of brain development connects with a **group of skills known collectively as Executive Function.**
 - **Musicians have been found to have higher levels of Executive Function** - a group of interlinked tasks that include planning, strategizing, setting goals, and paying attention to detail. High levels of Executive Function are evident in a person who can successfully resolve internal and external conflict, or **solve problems effectively.**
- **Music rehearsal helps improve the memory pathways** in the brain - musicians use pictures and narrative to link memories.
 - Music rehearsal assists with the development of attention skills, which is a significant factor in Executive Function.
- **Musicians also appear to have higher levels of brain plasticity.** Brain plasticity refers to the capacity of the brain to change, remain flexible, and continues to learn throughout one's life.
 - This challenges earlier thinking that the human brain became "set" or unable to change or learn once we reached adulthood, summed up by the adage "you can't teach an old dog new tricks." Music education has been found to encourage high levels of plasticity in the auditory cortex (where we process sound information) and frontal cortex
 - This plasticity allows for **higher levels of creativity and divergent thinking as well as improved brain health into later life.** Although the above review of neuroscience research is not exhaustive, it does highlight the benefits of the type of music education that involves making, rehearsing, performing, and understanding music on brain development.
- The argument may now be made, using findings based in the scientific rather than artistic fields, that the **learning process** is far more important than the performance for **the overall neurological development of a child.**

- **The earlier** the students began practicing a musical instrument **the more significant the changes in the brain.**
- In essence, **positive changes in brain structure and function have been observed in musicians** who have learned a **musical instrument in a weekly one-to-one lesson** for more than 2 years and have commenced learning as early as is appropriate for their instrument.
- **Music education must occur through the medium of music making.** In an even narrower sense, it is music making that occurs through performance, rather than composition.
- The age at which music education begins has been widely researched and findings in this area are similar; **the earlier a child begins** to be exposed and understand music **the more they benefit.**
- The findings from this review could be applied in a broad range of circumstances, including: Supporting research in the education of parents, community bodies, and school administrators on the benefits of instrumental music education
- **Recognition of the collection of research, both scientific and aesthetic based, continues to suggest the importance of a music education for learners of all ages.**
- “For the vast majority of students, **music** can be every bit **as important educationally as reading and writing.**”
- **Beat synchronization** might provide a useful window into millisecond-level neural precision for encoding sound in early childhood, when speech processing is **especially important for language acquisition and development.**
- **Music training alters the course of adolescent auditory development**

[Anita Collins](#)
[Nina Kraus](#)