



# Music Training and Cognitive Function



Madilyn Waters

Department of Psychology, Sociology, and Public Health, Lindenwood University



## Research Question

How is music training associated with various cognitive functions?

## The Brain



Brains of musicians are structurally and functionally different in areas involved in auditory processing (Olszewska et al., 2021)

After only six months of music training, Moreno et al. (2019) discovered evidence of brain plasticity

## Executive Functions

Balbag et al. (2014) conducted a twin study that revealed that dementia and other cognitive impairments were less likely to appear in those who participated in musical training (Balbag et al., 2014).



## Attention

Musically trained individuals develop the ability to focus on one aspect of a sound (Levitin, 2006)

## Working Memory

A positive association exists between musical training and working memory are positively related (Criscuolo et al., 2021)

## Linguistic Abilities



### Reading Skills

Children who participated in music training displayed enhanced reading skills and pitch discrimination skills, as well as an improvement in behavior (Moreno et al., 2019)

In a study from Moreno et al. (2019), 32 non-musician children were tested on several different cognitive functions before being administered painting or music training.

Anvari et al. (2002) determined that music skills predict one's reading skills because they involve similar processes

### Speech

Individuals with nonfluent aphasia often experience the most progress through music therapy because it allows them to recall words and do so in a rhythmic matter (Sacks, 2008)

Most of the time, individuals with a stutter can sing a song just fine without stuttering, so when they speak as if they are singing, they tend to lose the stutter (Sacks, 2008)

## Intelligence



The more years of training one has, the higher one will score on an IQ test (Criscuolo et al., 2021)

Schellenberg (2009), claims that musical training is associated with higher IQ scores, but it does not show the same correlation with emotional intelligence

In contrast, Criscuolo et al. (2021) found that intelligence, including verbal intelligence, was higher among musicians in comparison to non-musicians

## References



- Anvari, S. H., Trainor, L. J., Woodside, J., & Levy, B. A. (2002). Relations among musical skills, phonological processing, and early reading ability in preschool children. *Journal of Experimental Child Psychology*, 83, 111-130. [10.1016/s0022-0965\(02\)00124-8](https://doi.org/10.1016/s0022-0965(02)00124-8)
- Balbag, M. A., Pedersen, N. L., & Gatz, M. (2014). Playing a musical instrument as a protective factor against dementia and cognitive impairment: A population-based twin study. *International Journal of Alzheimers Disease*, 2014. <https://doi.org/10.1155/2014/836748>
- Criscuolo, A., Bonetti, L., Sarkamo, T., Kliuchko, M., & Brattico, E. (2019). On the association between musical training, intelligence, and executive functions in adulthood. *Frontiers in Psychology*, 10. <https://doi.org/10.3389/fpsyg.2019.01704>
- Moreno, S., Marques, C., Santos, A., Santos, M., Castro, S. L., & Besson, M. (2019). Musical training influences linguistic abilities in 8-year-old children: More evidence for brain plasticity. *Cerebral Cortex*, 19(3), 712-723. <https://doi.org/10.1093/cercor/bhn120>
- Olszewska, A. M., Gaca, M., Herman, A. M., Jednoróg, K., & Marchewka, A. (2021). How musical training shapes the adult brain: Predispositions and neuroplasticity. *Frontiers in Neuroscience*, <https://doi.org/10.3389/fnins.2021.630829>
- Sacks, O. (2008). *Musicophilia: The tales of music and the brain*. Vintage Books.
- Schellenberg, E. G. (2009). Musical training and nonmusical abilities: Commentary on Stoesz, Jakobson, Kilgour, and Lewycky (2007) and Jakobson, Lewycky, Kilgour, and Stoesz (2008). *Music Perception*, 27(2), 139-143. <https://doi.org/10.1525/mp.2009.27.2.139>