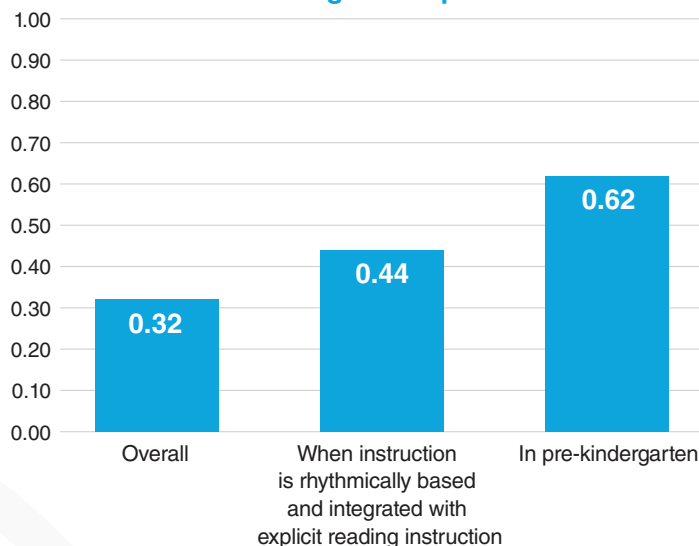


# The Relationship Between Musical Training and Early Reading Skills

Music is often called the “universal language” because of its ability to transcend cultural, linguistic, and geographic boundaries. It communicates directly to our emotions and senses and can create connections between humans at a fundamental, non-verbal level. But the act of making music—that is, producing beats and sounds organized in musical ways—may have significant benefits beyond emotional enjoyment. Indeed, a growing body of research has established a strong connection between making music and the development of foundational reading skills. This paper provides a summary of this research and highlights a new music instruction program for pre-kindergarten, called *A Song A Day*, that aligns with its key findings.

**Average Effect Sizes for Music Instruction on Reading Development**



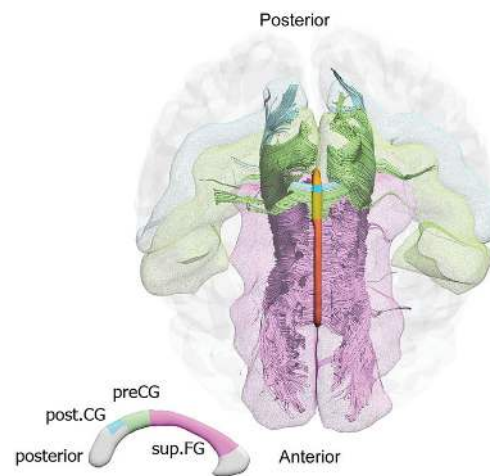
From Standley (2008)

Research into the connection between music and reading goes back many decades. In a meta-analysis, Standley (2008) analyzed 30 experimental studies, conducted from 1963 to 2004, to determine the impact of music instruction on reading development in children. The results revealed a statistically significant positive effect of music instruction on reading skills (effect size = .32), particularly in enhancing skills such as phonological awareness, word decoding, and reading fluency. The benefits are strongest when music activities are rhythmically based and integrated with explicit reading instruction (effect size = .44). They are also stronger in pre-kindergarten (effect size = .62) than in later grades.

What might explain the strong connection between music instruction and reading development? According to recent neuroscientific research, music-making appears to develop and engage regions of the brain that are also used for language and reading. Some of the strongest findings show a link between musical training and auditory memory, auditory processing, and phonological awareness—three skills closely associated with reading ability.

## Auditory Memory

Musical training involves listening carefully to sequences of tones, rhythms, and harmonies, which strengthens the brain's ability to retain and process auditory information over time. Engel et al. (2019) found that music instruction enhances auditory memory by improving attention, sequencing, and sound discrimination, all of which are critical for storing and recalling auditory stimuli. Habibi et al. (2018) conducted a longitudinal study examining the effects of music training on child development. Their findings showed that children involved in structured music programs displayed enhanced auditory working memory and neural efficiency when processing complex sound patterns compared to non-musicians. These differences were not just behavioral but also observable at the neural level, suggesting that music training physically strengthens the brain networks responsible for auditory memory.



Fractional anisotropy (FA), a measure of white matter integrity, was increased at time 2 in the music group, compared with two control groups, in the connections between superior frontal gyri (pink), precentral gyri (green), and the postcentral gyrus (light blue) of the corpus callosum. From Habibi et al., 2018.

Hyde et al. (2009) provided compelling neuroanatomical evidence for this connection, showing that children who received musical instruction had structural changes in brain regions related to auditory and memory processing. Specifically, increases in gray matter density were found in auditory cortices and areas involved in working memory and motor planning, indicating that musical training induces long-term adaptations that benefit memory-related functions.

These studies reveal a consistent and biologically plausible link: musical training enhances auditory memory through repeated exposure to structured auditory input, which engages and refines the neural pathways involved in storing, organizing, and retrieving sound-based information. This not only improves musical abilities but also supports key aspects of cognitive and linguistic development.

### Auditory Processing

Musical abilities and training are also closely related to the development of auditory processing, a fundamental cognitive skill that enables individuals to detect, discriminate, and interpret sounds in their environment. This capacity is essential not only for musical perception but also for speech and language comprehension. Carr et al. (2016) found that auditory neural stability—a key component of auditory processing—is associated with beat synchronization in preschoolers. Their study revealed that children with more stable auditory brainstem responses were better able to align with musical beats, suggesting a strong connection between rhythmic abilities and auditory system consistency. This synchronization is not just a musical skill; it reflects the brain's ability to process auditory information with precision, which is also critical for understanding spoken language, especially in noisy or complex environments.

Adding to the neurophysiological evidence, Dondena et al. (2021) explored how early rhythmic training influences auditory processing in infants. Their study found that exposure to structured rhythmic activities enhanced neural markers of auditory discrimination and prediction, demonstrating that even brief, early interventions can positively shape auditory processing pathways. The findings suggest that musical rhythm engages cortical mechanisms involved in tracking patterns and detecting deviations—skills that mirror the demands of language comprehension.

Taken together, these studies show that musical training fosters adaptive changes in the auditory system that support both music and language skills. By engaging with musical elements such as rhythm, pitch, and tempo,

children practice fine-grained auditory distinctions and temporal sequencing that directly enhance their auditory processing abilities.

### Phonological Awareness

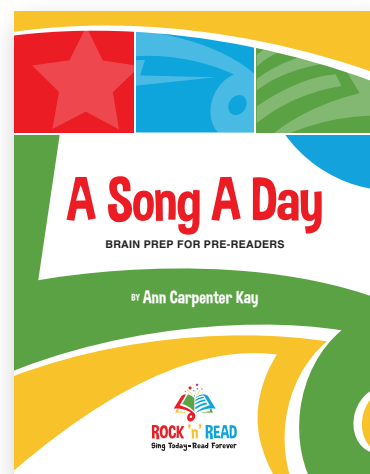
Engaging with music—particularly rhythm and pitch—uses cognitive and neural mechanisms that overlap with those used in language processing. For example, Bonacina et al. (2018) found that clapping in time with music uses neural networks that are involved in auditory-motor synchronization and phonological processing. This rhythmic activity strengthens the brain's timing and auditory precision, which are key components of phonological awareness. Degé et al. (2015) found that preschoolers who demonstrated stronger musical skills performed better on tasks that required them to identify and manipulate speech sounds, supporting the idea that musical aptitude lays a cognitive foundation for early literacy. They emphasized that rhythm-based training may be especially beneficial due to its alignment with the temporal dynamics of spoken language.

Gordon et al. (2015) conducted a meta-analysis in which they synthesized findings on the effects of music training on literacy skills. They examined thirteen studies that met key criteria, such as the inclusion of both experimental and control groups, the use of pre- and post-measures, and evidence that reading instruction was constant across groups. The results provided evidence for the relationship between music training and modest gains in phonological awareness skills (effect size = 0.20).

These studies support a converging view: music training can enhance phonological awareness by reinforcing temporal processing, auditory discrimination, and working memory—skills that are essential for segmenting, blending, and manipulating sounds in language.

### A Music Curriculum Based on Research: A Song A Day

Founded in 2014, the non-profit Rock 'n' Read Project organization has sought to bring the benefits of music instruction to schools throughout the U.S. through advocacy and the creation of curricular materials that put research

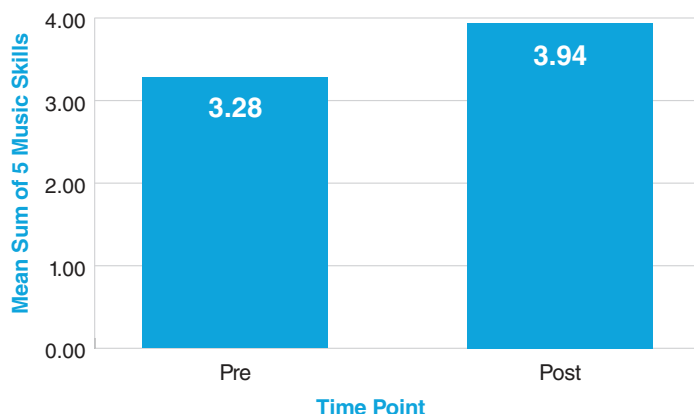


into practice. *A Song A Day* is one such effort. Targeted to children in pre-kindergarten and kindergarten, *A Song A Day* consists of 50 motivating, short, daily sequential lessons that use singing and basic music skills to practice foundational pre-reading skills that develop the brain for reading, with an emphasis on auditory processing, auditory memory, phonological awareness, and beat synchronization. Lessons include opportunities for children to actively practice rhythm and pitch through activities involving clapping, singing, listening, and speaking, all in the context of developing pre-reading skills.

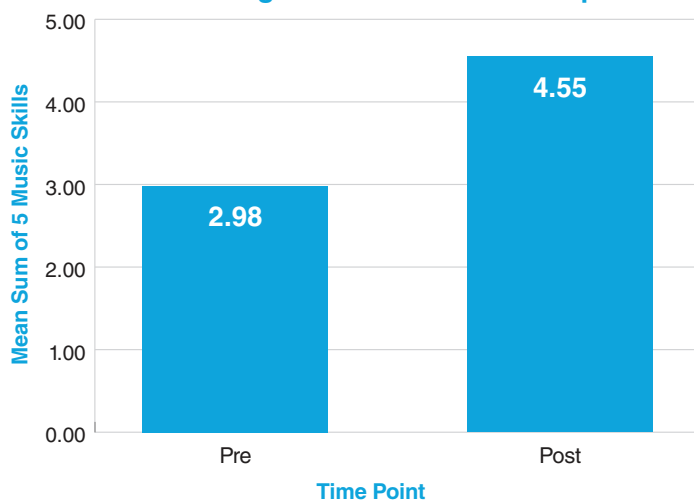
The *A Song A Day* program includes the Musical Fitness Assessment, a measure of basic musical skills that can be used to evaluate children's growth over time. The assessment measures five basic music skills: keeping a steady beat with a metronome, keeping a steady beat while singing a song, clapping the rhythm of a song, matching a pitch, and singing in tune.

In a pilot study conducted by the Wilder Foundation in 2023 (<https://www.rocknreadproject.org/evidence>), *A Song A Day* was implemented by two groups: 18 pre-kindergarten teachers and 10 kindergarten teachers. There were a total of 80 pre-kindergarten students (four- and five-year-olds) and 122 kindergarteners (five- and six-year-olds). Teachers taught one lesson each day, starting with the first lesson in Level 1 and ending with the last lesson in Level 10. It took 12–16 weeks for teachers to complete the 50 lessons. Students were pre- and post-tested using the Musical Fitness Assessment. Both groups of pre-kindergarten and kindergarten students improved their basic music skills. T-tests were used to determine whether there were significant differences in music scores from pre to post. The change from pre to post was significant for all groups assessed, indicating that the program was effective in improving musical skills that are strongly and positively correlated with auditory memory, auditory processing, and phonological awareness.

**Music Skills—  
All Pre-Kindergarten Intervention Groups**



**Music Skills—  
All Kindergarten Intervention Groups**



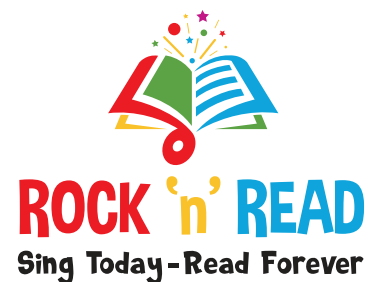
Future research efforts by The Rock 'n' Read Project will examine the direct impact of *A Song A Day* on the development of early reading skills.

## Conclusion

Experimental and neuroscientific research shows that music instruction, especially when it involves activities such as beat synchronization and singing, can enhance the brain areas essential for reading. Programs like *A Song A Day*, which align with this evidence, offer an engaging and effective path to support early literacy development. *A Song A Day* promotes both musical skill and reading development for all children. The inclusive instructional methods and activities provide an alternative and enjoyable approach to promoting foundational reading skills that lead to later reading success.

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