

# PLAYING MUSIC *IMPROVES YOUR* HEARING

The "cocktail party effect"

How much practice makes a difference?

Participation is key

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Learning a musical instrument helps to improve your memory and hand-eye coordination. It teaches you self-discipline, perseverance, and boosts your social and teamwork skills, along with a host of other benefits.

Not only that, studies show that playing music can actually improve your hearing ability and prevent age-related hearing loss, even if you only learn for a relatively short amount of time in childhood.

We find out more about this research and how those who play an instrument as a child reduce their likelihood of suffering a decline in their hearing as they get older.



## The cocktail party effect

The cocktail party effect (also known as selective attention) is the phenomenon of being able to focus one's auditory attention on a particular stimulus while filtering out a range of other stimuli, much the same way that a partygoer can focus on a single conversation in a noisy room. People who have had some degree of musical training are likely to be better at this skill than non-musicians, as they will be well-practised in listening to, and analysing, the sound of their own instrument when it is played simultaneously with others, in an orchestral environment, for example:

*"Playing an instrument requires that you get practice disambiguating and pulling out individual sounds from a complex soundscape... There are so many aspects of sound when [it] is presented, and this is not unlike listening for a friend's voice in a noisy restaurant. One needs to pull out the relative signal from a complex background<sup>1</sup>."*

According to scientific studies, however, the benefits of learning a musical instrument extend further than simply being more proficient at picking out a particular sound against other noises, and may actually mean that those with musical experience are less likely to suffer age-related hearing loss<sup>2</sup>. Practising a particular skill over and over will obviously improve a person's ability to perform that skill, and therefore it makes sense that musicians, who are used to hearing and listening in detail to certain qualities of sound, pitch and timbre will be more developed in the areas of their brain which process that information:

*"Music training 'fine-tunes' the nervous system... Sound is the stock in trade of the musician in much the same way that a painter of portraits is keenly attuned to the visual attributes of the paint that will convey his or her subject. If the materials that you work with are sound, then it is reasonable to suppose that all of your faculties involved with taking it in, holding it in memory and relating physically to it should be sharpened. Music experience bolsters the elements that combat age-related communication problems<sup>3</sup>."*

Dr Nina Kraus, director of the Auditory Neuroscience Laboratory is co-author of a leading study in the online science journal PLoS One<sup>4</sup>. It is important to note that no physical difference was observed between the musicians and non-musicians' hearing while the research was being carried out; their ears weren't any more sensitive. However, a difference was clear when examining the way the subjects' brains processed the auditory information:

*"Tests show that certain sounds produce stronger electrical signals in a musician's brain stem, and these signals offer a more accurate representation of pitch, timing and tone quality—three things that help us pick out a single voice in a noisy room<sup>5</sup>."*

## How much practice makes a difference?

A surprising discovery of Dr Kraus's research into the hearing abilities of people with musical experience versus non-musicians is that the benefits of studying an instrument can continue, even after active participation in music-making has ended. Previous studies

had all focused on participants who, at the time of testing, were still active musicians, but "this is really the first time that it has been demonstrated that in the more typical scenario—where someone has played a musical instrument for a number of years in childhood but then stopped—that prior training has a long-lasting effect on how their nervous system responds to sound<sup>6</sup>."

In this instance, the adults tested were aged up to 31, and had played music as a child for between one and eleven years before giving up. There was no significant difference between those who had given up music after one to five years and those who had continued playing for up to eleven years, although the benefits from musical training were shown to dwindle slightly over time. Further studies have tested adults up to age 65, with similar results; even if the subject had stopped playing an instrument after only a few years, the neurological benefits were still evident.

## Participation is key

An important distinction to make here is the vital difference between simply listening to music and actually *making* music. Both activities have their benefits, obviously, however just listening to music, however attentively, does not demand the same high levels of concentration that playing music does—listening while playing seems to call for an altogether different *kind* of listening.

There is yet more research to be carried out on this subject, with questions such as whether the instrument studied can make a difference, and whether choral singers and orchestral players see more benefits than soloists or amateur musicians. Also it would be interesting to discover whether the same level of benefits are available to people who only start playing in adulthood, rather than having lessons as a child. Although Dr Kraus doesn't yet have data to back up her thoughts on that, she does have a hypothesis:

*"From everything I know about how the brain changes with experience and what I know about the effect of musical experience on the nervous system, my scientific gut feeling is that it can only help<sup>7</sup>."*

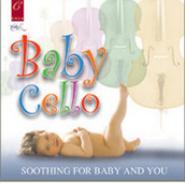
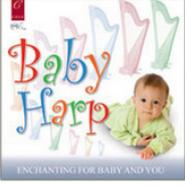
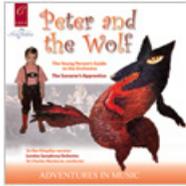
We would like to thank Dr Mary Jo Grote for bringing this interesting subject-matter to our attention. Mary Jo Grote earned her Bachelor of Arts degree from Indiana University in Early Childhood Education and a Master of Arts degree from the University of North Carolina at Greensboro in Communication Disorders & Sciences. She received her PhD in Communication Disorders & Sciences from Wichita State University, focusing on pediatrics, psychoacoustics and amplification. Dr Grote is a licensed Audiologist in private practice northern Virginia, USA. More information about her work can be found at the [Hearing Health Centre](http://hearinghealthcenter.com) and she welcomes questions by email to [hearwellagain@hearinghealthcarecenter.com](mailto:hearwellagain@hearinghealthcarecenter.com). Dr Grote is also an enthusiastic cellist in her spare time.

*"Music is a delightful way to enrich auditory training throughout life. In this fast paced world, we can all benefit from honing these skills from the beginning of life to enrich our acoustic and auditory experiences every day."*

## Our Recommendations

This scientific research will be music to the ears of parents hoping their child will benefit from their hours of practice and sometimes costly music lessons. Not only will they reap rewards physically, emotionally and intellectually, but they will have made a real difference to their chances of hearing well into late adulthood. Even if the child chooses not to continue with their musical studies, just a couple of years practising can affect the outcome.

At [babymusic.com](http://babymusic.com), we believe that listening to music and participating in music-making are both extremely worthwhile activities. Why not inspire your child to take up an instrument or renew their enthusiasm by listening together to some of our fabulous recordings:

 <p>Welcome to Baby Cello, the award-winning CD which calms you and your baby when you most need it, yet captivates listeners when in a receptive mood.</p>	 <p>Beloved lullabies and softly flowing music from our sixteen wonderful harp players will waft baby to calming sleep and sweet dreams.</p>	 <p>Coming soon: Sir Ben Kingsley narrates Peter and the Wolf and The Young Person's Guide to the Orchestra.</p>
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- [1. The Hearing Journal: Musical Training Offsets Audiological Decline](#)
- [2. Northwestern University](#)
- [3. Northwestern University](#)
- [4. PLoS One](#)
- [5. NPR Music](#)
- [6. The Telegraph](#)
- [7. ABC News](#)

## Further Reading

### Websites

#### [Auditory Neuroscience Laboratory](#)

The Auditory Neuroscience Laboratory investigates the neurobiology underlying speech and music perception and learning-associated brain plasticity. They study normal listeners throughout the lifespan, clinical populations (poor-readers; autism; hearing loss), auditory experts (musicians) and an animal model.

#### [American Speech-Language-Hearing Association](#)

The professional website for audiologists, speech, language and hearing specialist scientists worldwide. Contains a number of relevant articles on the benefits of playing and listening to music, and music therapy.

### Online Articles

#### [Can music experience improve older adults' hearing?](#)

An article from the Northwestern University explaining how older musicians excel in memory and hearing speech in noise compared to non-musicians.

#### [Childhood music lessons improve hearing in adults](#)

Short piece focusing on the fact that benefits of playing music are evident even after just a few years of practice.

#### [Say what?! Musicians hear better](#)

NPR Radio article describing better hearing all-round for musicians, and also how playing music can help language-learning in young children.

#### [Playing Music as a Child Leads to Better Listening as an Adult](#)

A very readable summary of several leading journal articles by Dr Nina Kraus.

#### [Why learning to play music at any age can improve your brain—even with some hearing loss](#)

A useful feature from AllVoices, with links to other articles and further research.

#### [Playing Music Protects Memory, Hearing, Brain Processing](#)

This is an accessible article on the subject, but a good overview of the research.

#### [The Mystery of "The Cocktail Party Effect" Solved](#)

Explanation of this auditory phenomenon and how the brain works to pull out a single voice among many.

### Periodicals

These are highly technical academic articles, but may be of interest to those wanting very in-depth information

Kraus, Nina et al., "[Musical experience and neural efficiency—effects of training on subcortical processing of vocal expressions of emotion](#)", *European Journal of Neuroscience*, Vol. 29, pp. 661–668, 2009

Kraus, Nina et al., "[Musical Experience Limits the Degradative Effects of Background Noise on the Neural Processing of Sound](#)", *The Journal of Neuroscience*, November 11, 2009. 29(45):14100–4107

Kraus, Nina and Strait, Dana, "[Can you hear me now? Musical training shapes functional brain networks for auditory attention and hearing speech in noise](#)", *Frontiers in Psychology*, 13th June 2011

Coleman, Matthew, "[Musical Training Offsets Audiological Decline](#)", *The Hearing Journal*; April 2012, Volume 65, Issue 4

Kraus, Nina et al., "[Musical Experience and the Aging Auditory System: Implications for Cognitive Abilities and Hearing Speech in Noise](#)", *PLoS One*, May 2011

"[A Little Goes a Long Way: How the Adult Brain Is Shaped by Musical Training in Childhood](#)", *The Journal of Neuroscience*, 22 August 2012, 32(34): 11507-11510

Kraus, Nina et al., "[Musical experience offsets age-related delays in neural timing](#)", *Elsevier, Neurobiology of Aging* 33 (2012) 1483.e1–1483.e4