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Playing an Instrument, Singing May Help Preserve Brain Health

Analysis by Dr. Joseph Mercola | March 09, 2024

STORY AT-A-GLANCE

- Practicing music is linked to healthier cognitive aging and increased brain volume in areas that play a role in memory, executive function, emotion and language
- Research shows people who played a musical instrument had significantly better performance in working memory and executive function
- Singing was also associated with executive function, while musical ability was linked to working memory
- The piano had the strongest links to improved cognitive health, followed by woodwinds and brass; no association was found for percussion, bowed instruments such as the violin, viola and double bass, or guitar
- Music also helps shape your memories by triggering changes in emotion that, in turn, make events more memorable

Engaging in activities that stimulate your brain is one of the simplest ways to keep your mind sharp as you age. Playing a musical instrument is one option, as taking part in musical activities may increase your cognitive reserve.[1] A higher cognitive reserve means your brain has a greater ability to withstand neurological damage or degeneration due to aging or diseases such as Alzheimer's.[2]

Not only is practicing music linked to healthier cognitive aging, but it's also associated with increased brain volume in areas that play a role in memory, executive function,

emotion and language.[3] Researchers with the University of Exeter in the United Kingdom even revealed which instruments — including your own voice — may be best in terms of protecting brain health.[4]

Playing an Instrument Is Good for Your Brain

To determine how playing musical instruments affects cognitive function in older adults, researchers from the University of Exeter used data from the PROTECT study, which is run in partnership with Kings College London. The PROTECT study is looking into how healthy brains age in people 40 and older.[5]

The featured study used a subset of people form the PROTECT cohort, who completed a questionnaire about their musical experience and exposure to music over their lifetime.[6] An association between musicality and cognition was revealed, with those who played a musical instrument having significantly better performance in working memory and executive function.

Singing was also associated with executive function, while musical ability was linked to working memory. "Our findings confirm previous literature, highlighting the potential value of education and engagement in musical activities throughout life as a means of harnessing cognitive reserve as part of a protective lifestyle for brain health," the researchers explained.[7]

Among the study participants, most had only played an instrument for five years or less, while 78% had received formal musical training, typically for two to five years. During the years they played a musical instrument, most reported practicing for two to three hours a week or less[8] — a manageable amount of time for most people.

Piano, Woodwinds and Brass Came Out on Top

The piano had the strongest links to improved cognitive health, followed by woodwinds and brass. No association was found for percussion, bowed instruments, such as the violin, viola and double bass, and guitar.

These results support the idea that learning to play a musical instrument can have long-lasting effects on various aspects of cognition, like problem-solving and memory. In this study, many of the musicians played the piano, which has been linked to better problem-solving skills and more brain activity in certain areas.

Surprisingly, though, playing the keyboard, and to a lesser extent, brass instruments, was strongly linked to better memory. On the other hand, woodwind players seemed to have better executive function.[9] Larry Sherman, author of "Every Brain Needs Music: The Neuroscience of Making and Listening to Music," told Medical News Today:[10]

> *"Practicing music can impact the brain in many ways, including increasing the speed of nerve impulses by inducing the formation of myelin, which wraps around nerve cell processes, and by increasing synapses — the connections between nerve cells. It may also actually drive the generation of new nerve cells."*

How Music Shapes Your Memories

Your brain can't — and doesn't need to — remember every event in your life, but those moments surrounded by music may be more likely to withstand the test of time. Over a lifetime, individuals encounter an abundance of information, necessitating the organization of memories due to their sheer volume and varying degrees of relevance.

Two processes seem to play a role in converting experiences into memories over time, according to UCLA scientists.[11] One process consolidates your memories by condensing and connecting them into personalized episodes, while the other process expands and isolates each memory as the experience fades into the past.

This ongoing interplay between memory integration and separation contributes to the formation of distinct memories and helps people comprehend and derive significance from their experiences while also retaining information.[12] In a study published in Nature Communications, researchers revealed the music triggers changes in emotion that, in turn, make events more memorable.[13]

"It's like putting items into boxes for long-term storage," study author David Clewett, an assistant professor of psychology at UCLA, said in a news release. "When we need to retrieve a piece of information, we open the box that holds it. What this research shows is that emotions seem to be an effective box for doing this sort of organization and for making memories more accessible."[14]

For the study, composers created music intended to evoke joy, anxiety, sadness or calm. Participants listened to the music while viewing neutral images and tracked moment-to-moment changes in their feelings using a computer mouse. After being purposefully distracted, they were then shown the images again in random order, revealing "the dynamics of people's emotions mold otherwise neutral experiences into memorable events."[15] According to UCLA:[16]

> *"Pairs of objects that participants had seen immediately before and after a change of emotional state — whether of high, low, or medium intensity — were remembered as having occurred farther apart in time compared to images that did not span an emotional change. Participants also had worse memory for the order of items that spanned emotional changes compared to items they had viewed while in a more stable emotional state.*
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> *These effects suggest that a change in emotion resulting from listening to music was pushing new memories apart.*
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> *… The direction of the change in emotion also mattered. Memory integration was best — that is, memories of sequential items felt closer together in time, and participants were better at recalling their order — when the shift was toward more positive emotions. On the other hand, a shift toward more negative emotions (from calmer to sadder, for example) tended to separate and expand the mental distance between new memories."*

Music for People With Dementia

The finding that playing a musical instrument is useful for memory and executive function in older adults has implications for diseases such as Alzheimer's. One systematic review and meta-analysis found playing a musical instrument is also protective against cognitive impairment and dementia.[17]

In fact, one of the studies in the review even reported musicians were 64% less likely to develop mild cognitive impairment or dementia.[18] In addition to enhancing cognitive reserve, a number of mechanisms have been suggested for why playing a musical instrument protects against dementia, including:[19]

- Enhancing executive functioning and working memory
- Stimulating brain plasticity to restore sensorimotor brain networks
- Reducing stress and depression
- Promoting social cohesion

The fact is, music predates language and speaks to humans on a primal level. Thinking back to your adolescence, you probably associate key memories with the soundtracks that played during these formative years. Before this, music likely began shaping your reality during infancy — there's even evidence that babies respond to music while still in the womb.[20]

At the other end of the spectrum, older adults, including those struggling with degenerative conditions, may come alive again when they hear their favorite tunes. In one study of 39 people in a long-term care facility in Iowa, for example, listening to individualized music led to a significant reduction in agitation (such as anxiety, shouting and irritability) both during and after the session — more so than occurred when residents listened to generic classical relaxation music.[21]

Other research has shown individualized music may calm agitated patients with dementia and lead to significantly lower anxiety scores.[22] It may also help Alzheimer's patients recall memories. When you listen to music, a broad range of neural networks become engaged, including those linked to autobiographical memories and emotions.[23]

The brain region behind your forehead, known as the medial prefrontal cortex, is one of the last to atrophy among Alzheimer's patients; it's also the hub that music activates. Petr Janata, with UC Davis' Center for Mind and Brain, conducted a study to map the brain activity of subjects as they listened to music. He said in a press release:[24]

> *"What seems to happen is that a piece of familiar music serves as a soundtrack for a mental movie that starts playing in our head. It calls back memories of a particular person or place, and you might all of a sudden see that person's face in your mind's eye … Now we can see the association between those two things — the music and the memories."*

The University of Exeter researchers believe the evidence is powerful enough to recommend playing an instrument or singing as a way to reduce the risk of dementia and promote brain health:[25]

> *"Public health interventions to promote healthy aging and dementia risk reduction should consider including advice for adults on engaging with music. In particular, adults may be encouraged to take part in community music or singing groups or to re-engage with an instrument they have played in former years.*
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> *There is considerable evidence for the benefit of music group activities for individuals with dementia, and this approach could be extended as part of a health aging package for healthy older adults to enable them to proactively reduce their risk and to promote brain health."*

Mastering New Skills Boosts Your Brain

If playing a musical instrument doesn't appeal to you, there are many other ways to boost your cognition and memory. The key is to choose an activity you're passionate about. Participating in "purposeful and meaningful activities" activates your neurological system, mitigates the impacts of stress-related ailments, diminishes the likelihood of dementia, and bolsters overall health and well-being.[26]

A crucial element for enhancing brain function or reversing functional decline hinges on the level of significance attached to the task at hand. Put simply, the task should hold personal importance, be meaningful or intriguing in some way, and captivate your focus.

For some, this may be playing an instrument, but for others it could be another hobby entirely. For example, a study uncovered that engaging in craft activities like quilting and knitting was linked to reduced chances of mild cognitive impairment.[27] Another study demonstrated that involvement in "cognitively demanding" pursuits such as learning quilting or digital photography bolstered memory function among older individuals.[28]

The key is to identify an activity that intellectually stimulates you. Ideally, it should demand your complete attention, provide immense satisfaction, and be something you eagerly anticipate, such as playing a musical instrument, gardening, constructing model ships, crafting or myriad other options.

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