A Musical Mind: Impact of Music on the Mind

By Gloria Chu

Music training has many effects on the mind. Building from our pedagogical understanding in music training and memory this discussion will further explore the difference between musicians and non-musicians in memory and the effect of age on music memory. The power of a melody is validated in an experiment where participants were asked to recall text after hearing it in a melody and in speech. Participants heard three verses of text sung with the same melody and were able to recall the text superior to just hearing the same text spoken. Yet when words were heard with different melodies, participants recalled better when heard in speech. Hence the conclusion is melody contributes more than just rhythmical information, music can chunk words and phrases identifying stress patterns and adds emphasis. Sung verses can be recalled stronger than spoken verses (Wallace, 1994).

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Musicians vs non musicians in memory

The ability for musicians to memorize long works is a mutual skill for musically trained individuals. A two-to-three-hour solo program occurs frequently across the globe. Yet does this ability to memorize music transfer into other disciplines? Jakobsen and colleagues studied 36 college students with 15 whom have received musical training averaging 11 years of piano instructions while other participants had less than one year of music training. The two groups listened to 16 words presented five times, presented with another list of words for distraction, and then asked to recall the initial 16 words. An additional 20 minutes later the 16 words were asked to be recalled again. Results indicated musicians performed better than non-musicians in remembering the words. When analyzed, musicians chunked the words into groups and categories in order to remember, much like understanding the music in phrases and sections rather than individual notes (Jakobsen et al., 2008). Hence musicians' skills and tactics for memorizing music can be transferred to other disciplines such as memorizing words.

Similarly, Park found similar results in a test with musicians. Using electroencephalography (EEG) electrical activity of the neurons in the brains were measured for 14 musicians and 15 non-musicians. In testing working memory participants were asked to select pictorial and visual items they have just seen. Musicians outperformed non-musicians in EEG measured working memory. Park explained musicians' neural responses in the brain are 300-500 milliseconds faster than non-musicians and responses in the parietal lobe are 400-800 milliseconds faster for musicians. Hence, when given the same amount of time to memorize, musicians have a better advantage as the neural responses are faster (Park et al., 2014). Chan and colleagues comment the stronger memory in musicians is due to a stronger magnetic resonance imaging in the left temporal region of the brain. Hence the reasoning for a superior verbal memory in musicians since the left region is responsible for such memory. Upon studying 60 female college students from the University of Hong Kong with half of the participants over six years of musical training, a list of 16-word lists were presented to the subjects orally three times. After each presentation the participants would recall as many words as they could. They concluded musicians could recall more words than non-musicians and music training have a long-term effect on the improvement of verbal memory (Chan et al., 1998).

As seen in the above studies, musicians show a positive result in memory, specifically in verbal memory. The skill a musician acquires through memorizing pieces is transferable to other disciplines including remembering text of words. This ability is important for one to be aware of to assist in learning and memorizing items

outside of the music domain. Musically trained students can refer to auditory means to learn content, regardless of the topic.

Age impact on memory and music

Upon understanding infants as young as five months of age can remember music passages, the question of whether music can assist with memory deterioration due to age arose. A study by Simmons-Stern and colleagues showed patients with Alzheimers performed superior on a task of recognition memory for the lyrics of a song when it was sung rather than spoken. The same test was conducted with adults without Alzheimers and the group showed no difference between sung or spoken lyrics. The authors suggest singing the music heightens the arousal in patients with Alzheimers allowed improved memory (Simmons-Stern et al., 2010). Hence from the study we understand music may help one's improvement of memory with Alzheimers. However, how does the process of deterioration of memory in music work for those with Alzheimers? Cuddy and Duffin conducted a case study on an 84-year-old woman with severe Alzheimers. The patient scored low on understanding and recalling standard instructions; yet, when tested on musical abilities she showed positive results. The participant was presented with familiar melodies and she responded by singing along with the words and often continued singing after the stimuli. She did not respond to unfamiliar melodies and showed facial dissatisfaction when she heard wrong notes. Hence she was able to detect distortions of music. Results indicate sparing of musical memory may be a feature of some forms of dementia (Cuddy & Duffin, 2005). The contrast of the patient's response to music versus daily life tasks were significant. It is interesting to note one's memory and recall of music may not deteriorate to the same level as other daily life skills.

With the finding of the resilient nature of music in our mind, further research was explored to determine how music can assist memory in Alzheimer's disease. Prickett and Moore examined ten patients diagnosed with Alzheimers on their ability to recall material after it is sung and spoken. This test mirrors the above test with non-musicians and musicians. Participants were presented words sung and then spoken. The test was videotaped to allow researchers to examine the patient's face and verbal response. Similar to the above results, patients responded to recalling words stronger when it was sung. An even more positive result was seen when the songs were of familiar tune, participants recalled with an improved 30% accuracy. Researchers also noted the participants attempted to sing the words back, whether it was of a familiar or unfamiliar tune; indicating patients can be stimulated to responsive participation with the use of familiar songs. With practice, patients were even able to learn new songs (Prickett & Moore, 1991). This study witness's music as a powerful tool in facilitating the mind, regardless of age and assessed condition of the mind. Even with Alzheimers, music facilitates with memory and can be used to help one to learn.

Conclusion

Music and memory have a massively strong link. With many studies deeply rooted in neuroscientific research, we see music impacting the memory of all ages. As one progresses into an elderly age, although there are signs of deterioration of memories, the ability of the older brain continues to adapt and retains its musical abilities (Prickett & Moore, 1991). Whether one is an infant or elder there is the programmed ability for music to enhance our memory. Although there are variations between musicians and non-musicians and age differences, studies have demonstrated the ability for the brain to use music to help us memorize. The human brain is truly remarkable, allowing us to use music as a means to remember thousands of frequencies and sounds. ■

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