

Effects of musical training on verbal memory



**ASSIGN
BUSTER**

The "Mozart effect," was a study published in *Nature* in 1993. The researchers Rauscher, Shaw, and Ky (1993) reported that college students who spent 10 minutes listening to Mozart's Sonata for Two Pianos in D Major had improved their IQ scores 8-9 points higher on the Stanford-Binet subtest for spatial ability. This was compared with students who either listened to a relaxation tape or listened to nothing. While the IQ effects did not persist beyond the 10 to 15 minute testing session the "Mozart effect" and the testing was limited to college students the influence of the "Mozart effect" has been widespread. According to researchers this "Mozart effect" was reported significantly more frequently than other *Nature* articles of the time.

(Kravovsky, M, 2005) The popular understanding of the "Mozart effect" was so pervasive that the 1998 governor of Georgia, Zell Miller, proposed a bill to provide each newborn child with a cassette or CD of classical music.

In this study Jones and Zigler (2002) examine the literature relating to many varied attempts to find the "The Mozart Effect". Their research included Rauscher, Shaw, and Ky (1995) who attempted to replicate their findings. Interestingly in the 2005 study the effect of listening to Mozart was not immediate as it was in the 1993 study. However the effect was short lived in both experiments and did not continue.

Another study (Rauscher et al., 1997) involved 6 months of keyboard training. The study involved children between the ages of 3 and 5 each had a private piano keyboard lesson for 10 minutes a day for /day for 6 months. The piano group had higher post-test scores on the Object Assembly task (requiring spatial-temporal abilities) of the Weschler Preschool and Primary

School Test of Intelligence (WPPSI). There were no differences between the groups on spatial recognition tasks (Rauscher et al., 1997).

The research of Jones and Zigler outlines numerous researchers who have attempted to replicate the “Mozart effect” with limited success. Also noted is the fact that the Rauscher et al. Study of 1997 has not been replicated. Methodological criticisms are cited as being likely to account for the lack of replication.

For Jones and Zigler the popularity of the “Mozart effect” can be attributed to entrepreneurs seeking to make financial gain as well as the appeal of the quick-fix solution as opposed to substantive (and more expensive) programs that have been proven. Jones and Zigler commend the research of Hart and Risley (1995) who studied language development of children raised in different socio economic groups and the way that impacted the quality and quantity of utterances heard by children. The higher the socio- economic status the more utterances heard by the child.

Jones and Zigler see a tendency to embrace the easy solution to underachievement which is typical of the focus on environment as opposed to genetics. The Mozart effect is another example of naive environmentalism whereas intelligence is “a stable predominantly heritable characteristic”. They quote (Chabris: 1998) as an example of research substantiating their point of view. In Jones and Zigler we see a well researched paper (which would be expected of a researcher of the reputation of Zigler) but one that not only challenges the notion of music as a way to promote learning and intelligence but when you scratch below the surface you see researchers

reluctant to accept any environmental influence on intelligence. Ref:

Krakovsky, M, Discredited “ Mozart Effect” Remains Music to American Ears

February 2005 STANFORD GRADUATE SCHOOL OF BUSINESS

Michael S. Franklin, Katherine Sledge Moore, Chun-Yu Yip, John Jonides, Katie

Rattray and Jeff Moher - The effects of musical training on verbal memory

Psychology of Music 2008; 36; 353

This study researches the link between musical training and general cognitive ability. The results strengthen the claim that verbal memory skills are better for musicians than non musicians. Other researchers have concluded that musical training helps develop non-musical verbal abilities because musical training aids in the development of the auditory areas of the brain cortex. Some research has suggested that verbal memory processes including those involved in music makes use of left hemisphere structures and in the long term is the cause of structural differences in the brain. This is because these processes both long and short term make use of left-hemisphere structures.

This study was able find a advantage in in verbal memory for musicians and additionally a greater working memory capacity for musicians. These results may indicate new areas of potential research verifying the positive impact of music on verbal skills.

This study found a good match between musicians and non-musicians in gross measures of cognitive skill. These include areas such as aptitude and achievement measures, yet there were still verbal memory differences.

These results are similar to Schlaug et. al.(1995a and 1995b) which showed
<https://assignbuster.com/effects-of-musical-training-on-verbal-memory/>

that certain differences in brain structure are dependant on the age at which training begins. The suggestion is that musical training is responsible for altering brain morphology which in turn is likely to lead to subsequent behavioural correlates. The issue with this single study is that it is impossible to

infer a causal relationship between musical training and verbal memory advantage. However, there are a number of studies which when appraised jointly are starting provide evidence for this causal link.

One study by Norton et. Al (2005) is an early study as to whether the differences in brain structure that has been reported between musicians and non musicians were existent prior to that musical training or developed subsequently. In this study the authors compared beginning musicians in the age range of 5 to 7 to non musicians of the same age. In this study no pre-existing neural, cognitive or motor skill differences were found. Replications of this kind of study will be critical in establishing whether there is any causal link between musical training, cognitive and linguistic skills and brain morphology/function.

There is not only evidence supporting greater reliance and development on left hemisphere brain structures because of musical training but also an improvement in spatial skills as well. According to this study (Rauscher et. al. 1993) has shown that 10 minutes of listening to a Mozart sonata improves performance on spatial IQ tests. For Franklin the general consensus about this research is that improved performance does not result from listening to a particular type of music per se, but the enhancement of mood or arousal

improves performance of a cognitive task. Recognising the controversial nature of the “Mozart effect”, Franklin points to studies based on musical training rather than simply listening to music. Bihartz et. al. (1999) is cited as research where musical training shows significant improvements with cognitive performance especially verbal skills. Alternatively Costa-Giomi (1999) is cited where low income groups of children were studied as they learned keyboard skills. This study found an improvement in spatial reasoning but no difference in verbal or quantitative skills. I would question whether it was the difference in income and/or the specific keyboard skills that caused the difference in results.

For Franklin et. al. (2008) the way that adult studies are more consistent than child studies in finding a difference between verbal memory in musicians and non-musicians suggests that spatial skills are enhanced with musical training. Franklin et al. theorise that it is possible over time that musical training leads to shifts in brain organisation and function. The hope is that research will eventually clarify the relationship between musicianship and verbal/cognitive skills and show that “enhanced verbal rehearsal mechanisms are likely responsible for musicians verbal memory advantage.”

Amelee Racette and Isabelle Peretz

Learning Lyrics: to sing or not to sing?

Memory and Cognition -2007 35 (2) 247-253

Racette and Peretz recall a long history behind the notion that music serves as a mnemonic technique for learning verbal material. From the Minstrels of old stories are still transmitted through songs (Calvert & Tart, 1993; Rubin, <https://assignbuster.com/effects-of-musical-training-on-verbal-memory/>

1995). Additional examples are learning the laws of physics through karaoke (Dickson & Grant, 2003) and learning ESL via songs (Medina, 1993). This study seeks to add to the understanding of this phenomenon both empirically and theoretically.

For RP the notion of music facilitating word recall is counter-intuitive as there is more to learn in a song than a text. Typically song learning has been assessed through written recall (Kilgour, Jakobson, & Cuddy, 2000; McElhinney & Annett, 1996; Wallace, 1994). The format change between perception and performance also brings a bias in word recall over the spoken version, as extracting words from the sung version requires the music component to be filtered out.. Additionally written recall involves the performance a task that is not familiar to participants. Typically lyrics are learned to be sung, not written. Therefore there is an expected advantage of singing over reciting words. This procedure has been used only once previously (Jellison & Miller, 1982), and the results were negative. Music was found to interfere with recall of digits and had no effect on word recall. Although in this experiment the words were unrelated, so the music was likely to be an additional difficulty.

In many studies, an advantage of sung over spoken presentation has been shown (Calvert & Tart, 1993; Chazin & Neuschatz, 1990; Kilgour et al., 2000; McElhinney & Annett, 1996; Rainey & Larsen, 2002; Wallace, 1994; Wolfe & Hom, 1993). The advantage of sung text compared to spoken text at encoding has been attributed to speed (Kilgour et al., 2000) and also to melody simplicity (Wallace, 1994). The idea being that words are pronounced more slowly in a song than a speech. If the sung version of a

<https://assignbuster.com/effects-of-musical-training-on-verbal-memory/>

text is compressed to similar duration of its spoken version the recall difference disappears. This suggests the slower rate of singing compared with speaking is the key variable in song learning ability. (Kilgour et al., 2000).

Another consideration is whether the music and lyrics of a song are processed in such a way that they promote the binding of speech and music sounds at multiple levels of processing. This may explain enhanced memory for relatively distinct representations of both text and melody elements in the same song. (Peretz, Radeau, & Arguin, 2004). The alternative view is that the text and melody of songs are integrated in a singular representation, especially when singing is required. The central distinction between these two positions is a difference in recall. If the processing is integrated, then recollection of a part of the song will reinstate the whole. For example the melody will reinstate the text. Alternatively if the processing is separate, the recall of part of the melody may or may not connect with the text. The connection is dependant on the strength of the links.

The idea that melody and text may have a unitary memory trace has been relatively neglected in linguistics but has been studied in perception and memory. The prevailing paradigm in the field involves the recognition of unrelated song lines (Crowder, Serafine, & Repp, 1990; Morrongiello & Roes, 1990; Peretz, Radeau, & Arguin, 2004; and others have found that with song lines melody and text appear to be highly associated. This is even after a single hearing. The suggestion being that lyrics and melody representations are united in memory for songs.

However it is still too early to make clear conclusions as there is increasing evidence that the music and language components of songs maintain autonomy in both perception (Besson, Faïta, Peretz, Bonnel, & Requin, 1998; Bonnel, Faïta, Peretz, & Besson, 2001) and memory (Crowder et al., 1990, Experiment 3; Peretz, 1996). Recently, these conclusions have been extended by studying brain-damaged patients who suffered from a severe speech disorder without a concomitant musical disorder (Hébert, Racette, Gagnon, & Peretz, 2003; Peretz, Gagnon, Hébert, & Macoir, 2004; Racette, Bard, & Peretz, 2006). These results are indicating that verbal production, both sung and spoken, is mediated by the same (impaired) language output system and the speech route is distinct from the (spared) melodic route. These neuropsychological findings strongly suggest that singing taps into distinct codes for melody and text.

Musicians seem to have better verbal memory than non-musicians (Chan, Ho, & Cheung, 1998; Jellison & Miller, 1982; Kilgour et al., 2000), and this start early in childhood (Ho, Cheung, & Chan, 2003). Therefore it seems that musical training strengthens auditory temporal processing which in turn mediates verbal recall (Jakobson, Cuddy, & Kilgour, 2003; Jellison & Miller, 1982). These results suggest that music may assist in text recall, but only with individuals that regularly practise music.

This study found that the best strategy to learn song lyrics was to ignore the melody. The melody seems to interfere with rather than help word recall. These results applied to musicians and non musicians alike.

Music was found to be of little help either at the encoding or recall stages. It should be noted that this study was conducted in French and French is not a stress-based language. It is possible that musical meter (and rhythm in general) is not as efficient a memory aid for French lyrics as it is for English lyrics. This test raises the issue that because English is a rhythm based language it may mean music is especially suitable as a language aid to English.

IT should be remembered than vocal learning us a privileged role as it involves the most sophisticated of human-specific traits - music and speech.

What this study also raises is some kind of alternative verbal processing model. The fact that music and lyrics can prompt each other implies some kind of unitary processing, yet the way that melody interferes with the learning of lyrics points to some level of separation in the cognitive processing. It seems we are still far from a model that successfully explains the full range of observed phenomena..