The Mozart Effect

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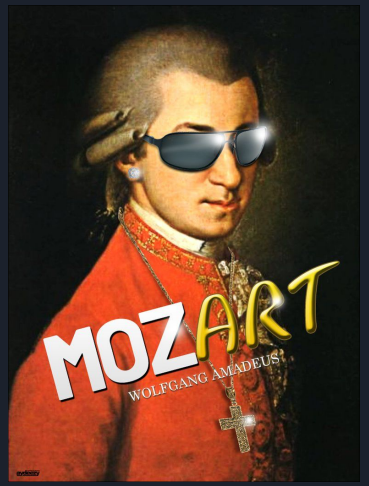
Mozart Effect (Abstract)



Do you listen to music while you study or do school work?

What kind of music do you listen to while doing this work?

-Before this presentation is over you should at least consider trying music while you study as there is a plethora of data to suggest that it would be beneficial

-Specifically you could give music composed by Wolfgang Amadeus Mozart a try!

-The theory of the “Mozart Effect” reported by Rauscher, Shaw, and Ky is that your spatial-temporal abilities are significantly enhanced while listening to music composed by Mozart. In this study Kristin Nantais and Glenn Schellenberg put that theory to the test.

Background

-The idea of using classical music to improve mental capacity has been around for several years. Many people believe its basis began with associative priming effects and spreading activation (Collins & Loftus, 1975).

-Many have tried to explain the phenomenon, one being the *trion model* (Leng & Shaw, 1991). This basically saying that complex musical composition excites cortical firing patterns.

-In terms of this experiment Kristin Nantais and Glenn Schellenberg decided to go off the work of Rauscher (1993) as many other researchers had failed to recreate his findings until the experiment in question conducted their own research. This new found success coming from the realization that the effect focused on **spatial-temporal** tasks which require mental transformation of the stimuli. They also wanted to understand if it was just Mozart or if preference was important.

Methods- Experiment One

- **Participants:** There are 56 participates in experiment 1
- **Apparatus and stimuli:** The first 10 minutes of Mozart's Sonata for Two pianos in D major, and K448 are record.
    - Likewise, the first 10 minutes of Schubert's Fantasia for piano, Four hands, in F minor is record
    - Each song came from the same compact disc and was performed by same two pianists.
    - During testing, listeners received a stereo signal over lightweight headphones (Sony CD550) in a sound-attenuating booth.

Methods- Experiment One

- **Testing Design:** Participants used a mouse connected to the computer to initiate a 10 minute listening and to record their responses on subsequent PF&C task which included 34 items (20 from the Stanford-binet intel-lingence scale, 14 created for experiment) that were scanned into the computer.

- Each item had an upper panel that showed a rectangular piece of paper and a series of folding and cutting manipulations, plus a lower panel with five possible outcomes.

- The relative difficulty of the items was determined in a pilot study in which 20 university students completed the entire set of items presented in random order. Following the pilot study, two 17-item subsets of equal difficulty were formed.

Methods- Experiment One

- **Procedure:** Each student participated in two conditions (music and control) on separate days within a maximum of 2 weeks.
    - In both conditions, the task was administered after a 10-min listening period.
    - In the music condition, participants listened to the Mozart or Schubert piece.
        - Half of the 56 participants listened to the Mozart piece in the music condition; the other half listened to Schubert.
    - The control condition consisted of sitting in silence for 10 minutes. Also the control condition were identical to the music conditions except that during the listening period, participants sat in silence wearing headphones.
    - Immediately afterward, each of 17 PF&C items was displayed on the computer monitor for a maximum of 1 min, and participants selected one of the five unfolded displays as the appropriate outcome. The 17 items were ordered from least difficult to most difficult. No feedback was provided. Sessions took approximately 25 min to complete

Methods- Experiment Two

Purpose: To test the influence of preference (test condition) on performance.

Control: Short story VERSUS

Silence/ relaxation tape (Rauscher's 1993)

Silence/minimalistic music/ a short story/ repetitive dance music (Rauscher's 1995)

Silence/relaxation tape/ repetitive music (Rauscher and Shaw 1998)

Participants: 28 Undergraduate students

Apparatus: Each student completed an online test consisting of "approved tasks under each condition (music and control) on separate days within a maximum of two weeks"

Procedure: Ten minutes of listening followed by spatial temporal task- music condition (Mozart or Schubert)/ control condition (ten minutes of the short story "The Last Rung on The Ladder"- asked which condition is prefered

Results

Experiment 1: 56 participants in total. Half of the participants listened to Mozart and the other half listened to Schubert. Control conditions were the same as the music conditions except that instead of listening to music, participants sat in silence instead.

-Scores on the spatial-temporal task were higher after listening to Mozart/ Schubert than after sitting in silence.

-Testing order showed that performance improved from the first to the second session

-The Mozart effect that was reported by Rauscher et. al. (1993,1995) was replicated with effects of resulting in the same magnitude. (results of substituting Schubert for Mozart in the music controlled condition)

(K. M. Nantais and E. G. Schellenberg 1999)

Results

Experiment 2: 28 participants in total. All of the participants listened to listened to Mozart. Control conditions included a short story instead of sitting in silence.

In the second experiment the Mozart effect disappeared when the control condition included listening to a story rather than sitting in silence.

Participants responses were based on their preference for the Mozart piece or listening to a short story. (13 preferred Mozart and 15 preferred a short story)

Participants who preferred the short story showed better performance in the story than in the Mozart condition. Participants who preferred Mozart scored higher than other participants across conditions.

(K. M. Nantais and E. G. Schellenberg 1999)

Explanation of Results

Experiment 1: Performance was better when participants listened to Mozart or Schubert rather than sitting in silence.

-the experiment shows that the Mozart effect does not particularly just pertain to Mozart, but other “easy listening” compositions as well (like Schubert).

Experiment 2: Listeners performed better in the condition that they preferred.

Participants’ preferences for a condition over another might have been accompanied by mood or level of arousal.

Music (like Mozart/ Schubert) can contribute to improved performance, but our results do not provide evidence that the improvement differs from that of another equally pleasing and engaging auditory stimuli.

(K. M. Nantais and E. G. Schellenberg 1999)

Visualizing The Results

Table 1. *Mean number of items correct in Experiments 1 and 2*

		Condition			
Experiment	*N*	Music		Control	
1	28	Mozart	12.75 (3.38)	Silence	11.89 (3.59)
	28	Schubert	12.36 (4.05)	Silence	11.04 (4.61)
2	28	Mozart	13.00 (3.80)	Story	12.93 (2.91)

Note. Standard deviations are given in parentheses.

Visualizing The Results: Experiment 2

Table 2. *Mean number of items correct in Experiment 2 as a function of listeners' preference*

		Condition	
Preference	*n*	Mozart	Story
Mozart	13	14.62 (2.40)	13.23 (2.35)
Story	15	11.60 (4.29)	12.67 (3.37)

Note. Standard deviations are given in parentheses.

Closing Questions

What kind of music / sound is optimal?

- “Fast music tempo increases the speed at which one completes a specific task. However, a fast music tempo also increases the number of mistakes during that task.”

When is the best time to use music / sound to study?

- “Acute and continuous noise adversely affects vigilance and comprehension.”
- “Music is distracting towards peripheral stimuli during frustrating situations, thus, music can reduce stress and mild aggression.”
- “Noise disturbs a well-rested nights sleep and impairs human performance on vigilance tasks the following day.”

Dalton et al, (2007)

Closing Questions

What is the best volume for learning / performance?

- “A moderate level of music is optimal for activities requiring careful attention and concentration. However, the determination of a moderate level is subjective to the listener.“
- “irrespective of sound type, loud volume intensities impair human performance during simple vigilance and simulated driving tasks.”

  Dalton et al, (2007).

Take away

- Low intensity, repetitive, music or sound is best for intense concentration. However some data suggest that complex music structure activates cortical patterns in the brain.

- When studying in a noisy environment, music or white noise at low volume through headphones will help eliminate environmental distractions.

- High intensity music or sound will accelerate working speed but also increase mistakes made.

Citations

Dalton, B. H. (2007). Effects of noise and music on human and task performance: A systematic review. Retrieved August, 2018, from https://pdfs.semanticscholar.org/abec/3497f58b65c00f4af213b289ce01d4ea61d2.pdf