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The Effect of Music on Reading Comprehension

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Abstract

This study was designed to examine the effects of music on reading comprehension. Participants ($N= 22$, 59% female) completed three reading comprehension tests while listening to no music, classical music, and lyrical music. Reading comprehension in the no music condition was slightly better than in the classical music and lyrical music conditions, however this difference was not significant ($p = .94$). For future study, researchers should equalize test difficulty before conducting a similar experiment.

The Effect of Music on Reading Comprehension

Walking around campus, one might see many students with head phones on while reading a book or writing a paper. The tunes that are playing in their ears can range from slow, instrumental music to loud, dance music or heavy metal. There is much debate over the benefits and disadvantages of studying while listening to music, however, nobody has been able to come up with a concrete answer; Is music a distraction? Is one type of music more distracting than another?

There have been numerous studies conducted to test whether different types of music have an effect on cognitive performance, such as reading comprehension, memory, and arithmetic. Research by Furnham and Stephenson (2007) showed that soft, "lullaby-like" music can in fact improve cognitive ability and that more upbeat music can decrease cognitive ability. One hundred & eighteen elementary students were given four tasks to complete entailing reading comprehension, free recall, mental arithmetic, and verbal reasoning. Students performed better while listening to the soft music rather than the more upbeat music, therefore suggesting that students perform better on tasks while listening to calm, relaxing music, like classical music with more of a slow tempo. A possible explanation for these findings is that calming music relaxed the participants and helped to calm their nerves. The calm, relaxing music was not as much of a distracter as the upbeat music nor did it necessarily interfere. Instead, the music helped keep the participants focused and blocked any other common distracters such as the tapping of a pencil. In another study conducted by Furnham, it was found that music with fewer beats per minute, rather than upbeat, fast music, played a positive role in the performance of participants on reading comprehension tasks, prose recall tasks, and mental arithmetic (Furnham & Strbac, 2002). In a similar study by Cassidy and MacDonald (2007), it

was found that aggressive, fast tempo (high arousal) music has a more negative effect on performance of cognitive ability than relaxing, slower (low arousal) music. In this study, undergraduate students were randomly assigned into four conditions: fast tempo music, slow tempo music, background noise, and silence. The participants were then asked to complete five tasks mostly related to recalling information. The study found significant differences in recall ability between the silent condition and the noise conditions, with the participants in the silent condition performing significantly better. In all of the tasks, the fast tempo music appeared to be detrimental to the recall ability of the participants. With all of these studies, slow music, or no music at all, had a positive effect on participants while performing cognitive related tasks ranging from reading comprehension tasks to mental arithmetic. These suggest that music has an effect on cognition and these effects were positive.

Beaman (2005) found similar results in his study on irrelevant noise and short term memory. The phrase 'irrelevant noise' by his definition is noise that has no relevance to the task at hand and was made to be a distracter. Unlike the previously mentioned studies, Beaman tested noise intensity instead of types of music as a distracter. This study suggested that noise intensity does not have a significant effect on adults' cognitive ability, but a change in noise does act as a distracter. Children, on the other hand, are more easily distracted by the irrelevant noise than adults and the intensity has an effect. Many other studies have been done regarding noise. Furnham, Gunter, and Peterson (1994) conducted a study using reading comprehension tests and television noise as a distracter. In this experiment, participants performed significantly better in a silent condition than with the noise of the television. These studies suggest that irrelevant noise has a negative effect on cognitive abilities.

A study conducted by Zimmer and Brachulis-Raymond (1978) found that there was no significance for music conditions. Students were placed within four music conditions and given information tasks entailing arithmetic, memory, and verbal memory. The four conditions were a control condition, connected speech (conversation style), popular music and industrial noise. Zimmer and Brachulis-Raymond found no significant effects of music on cognitive tasks. It was not obvious as to why Zimmer and Brachulis-Raymond did not find an effect other than the fact that students were familiar with the noise distractions because they were used to hearing them while in an academic setting and were able to block them out. It is evident that there are conflicting findings among the aforementioned studies, which guided our current study of whether music has an effect on performance on reading comprehension tests in three conditions.

We expected that music will play a role in performance on reading comprehension tests. Since music can be distracting, as suggested by the studies previously mentioned, we expect that participants' test scores will be highest in a no music condition and that the tests scores will be the lowest in a popular music with lyrics condition.

To test this hypothesis we conducted an experiment involving a convenience sample of college students and tested them on their performance of reading comprehension tests in three separate conditions. The participants were given three different tests while either listening to no music, classical music, or lyrical music and answered seven questions after each test pertaining to the reading.

Method

Participants

Twenty-two Hanover College students volunteered to participate (41% male). The participants' ages ranged between 18 and 21. The participants were mainly Caucasian, with

one African American student. The participants' GPA ranged from 2.47 to 3.70, with a mean of 2.93. The participants were gathered from a convenience sample. The participants received extra credit for a psychology course, if given the option by their professor.

Materials

One laptop computer with speakers was used to play music in one classroom. Within this room, there were three conditions of music stimuli; lyrical music, classical music, and no music (control). For the lyrical condition the researchers selected three songs currently popular on campus and frequently played on pop music radio stations. The three songs chosen were "I Kissed a Girl" (Perry, 2008), "Our Song" (Swift, 2006) and "Paper Planes" (M.I.A., 2007). These songs are all generally upbeat and catchy, and approximately three and a half minutes each. For the classical condition, the researchers chose "Piano Concerto No. 24: II. Larghetto" (Mozart, 2007, track 2) and "Piano Sonata: II. Aria" (Schumann, 2007, track 5). The first piece is approximately seven minutes long, while the second song is three minutes long. These pieces were chosen because they are slow and lullaby-like. Three separate reading comprehension tests were administered. These reading comprehension tests were gathered from www.majortests.com, a S.A.T. preparation website. Each test was estimated to take 10 minutes and contained seven multiple-choice questions. Questions on the reading comprehension test pertained to the author's views, definitions of words through context clues, and the actions of the characters within the passage. The researchers also administered a brief questionnaire to all the participants inquiring about the participants' age, gender, GPA, and ethnicity.

Procedure

The participants were given an informed consent form and filled out a demographics questionnaire before the study was conducted. The participants were told that the study was

being conducted to measure concentration given different circumstances. The researchers told the participants that their test score and information sheets would only be seen by the researchers.

The participants selected a number from a bag and these numbers were used as a way for the researchers to match participants' tests with their information sheets. The participants were randomly assigned into three groups. These groups experienced the music conditions in the same order (silent, classical, lyrical), however, the order of the tests changed in order to equalize differences in test difficulty. The order of the music conditions remained the same for each experimental session to minimize carry-over effects; the lyrics or beat of the lyrical condition could stay in a participant's head. After the completion of one reading comprehension test, the music was stopped and the tests were collected. The participants were given a new test, and began to work on it when the new music condition started. At the end of the study, the participants were given a written debriefing, thanked for their participation, and were dismissed.

Results

We had expected that participants would have had higher test scores while taking a reading comprehension test in the control condition than in the classical and lyrical condition and also had expected that participants would have had higher test scores while taking a reading comprehension test in the classical condition than the lyrical condition. To determine whether there was a difference in the mean scores of tests taken in different sound conditions, we conducted a within-subjects one-way analysis of variance (ANOVA) on the effects of music on test-taking ability. This showed that music had no significant effect on participants' performance on a reading comprehension test, $F(2, 42) = .058, p = .94$, and that participants' mean scores across sound conditions were within .1 of each other (See Figure 1). However, when performing

a within-subjects one way analysis of variance (ANOVA), we did find a significant effect for test difficulty $F(2, 42) = 4.73, p = .01$. The test labeled “Harding” ($M = 2.6$) was more difficult than the tests labeled “Stout” ($M = 3.5$) and “Pioneer” ($M = 3.64$). The significance of test difficulty could be a possible factor as to why we did not find a significant effect of music on test-taking ability

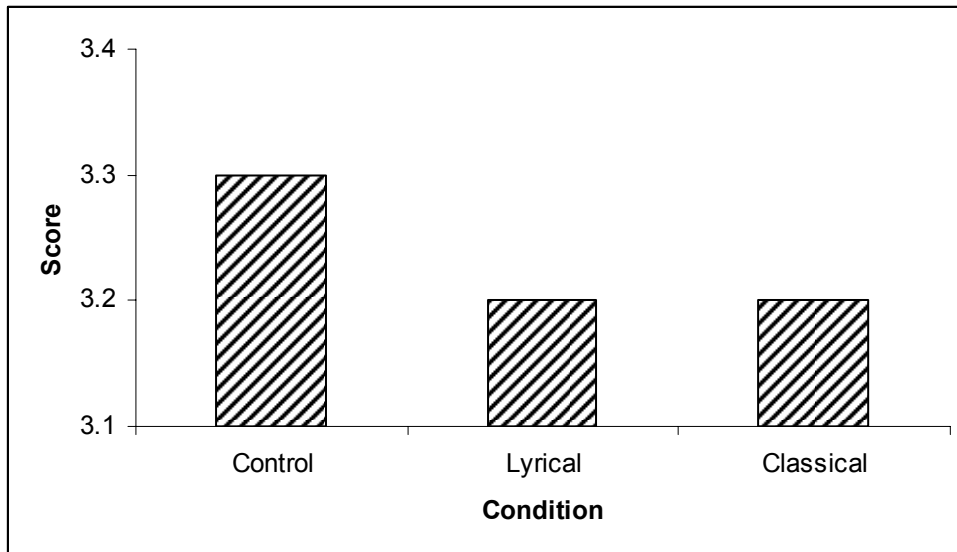


Figure 1. Comparison of mean test scores between conditions.

Discussion

Our hypothesis was that participants would perform better on a reading comprehension test while in the control condition than in the lyrical or classical conditions. We also hypothesized that participants would perform better on a reading comprehension test while in the classical condition than in the lyrical condition. The hypotheses were not supported. Although another study conducted by Cassidy and MacDonald (2007) found that high arousal music, which has more beats per minute, had a more negative effect on performance than low arousal music, which has fewer beats per minute, we found no significance between the effect of music on test-taking ability. Furnham and Stephenson (2007) found results that supported those of

Cassidy and MacDonald. They found that soft, 'lullaby like' music increased cognitive ability while more upbeat music decreased cognitive ability. Our results may have differed because it is possible that the classical music we used was not as calming and had more beats per minute than the music used for the previous studies.

There are other limitations to the study, in addition to the differences found in test difficulty. The sample used was a convenience sample made-up of Hanover College students from ages 18-21. The study did not incorporate older adults, other college-age students, or children, therefore this study lacked external validity and could not be generalized beyond the Hanover College student body. For example, children may react differently to a distraction because they have less ability to focus on the task at hand; while older adults are no longer in the habit of taking tests and usually work in a quiet environment. Also, participants of this study may not have performed to the best of their capabilities as there were no repercussions resulting from their grades. This could have brought down the mean grade of the tests.

Future studies should check for differences in test difficulty while conducting any or all pilot studies. Researchers examining the effects of music on test-taking ability, or even effects of noise distractions on ability in general, should first ask participants what their usual study conditions are, as this might affect their concentration habits during classroom tests or controlled study conditions. It is likely that if a student studies while listening to music, music will not have as much of an effect on his/her performance as it would on a student who studies in silence.

Our hypothesis, that participants would perform better on a reading comprehension test in the silent condition than in the lyrical or classical conditions, and that the participants would perform better in the classical condition than in the lyrical condition, was not supported.

Research in this area is important because it could carry implications for both the work and school environments. If it is found, as Furnham and Stephenson found, that classical music aids cognitive ability, it could be beneficial to play some soft classical music in the workplace, and possibly school and college classrooms. Research would have to be conducted on possible age effects; whether or not children would react to the music in the same way as adults.\

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