Classical Music and Its Effects on Verbal and Nonverbal Memory Performance

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Classical Music and Its Effect on Verbal and Nonverbal Memory Performance

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Purpose and Background
The purpose of this study was to test the effect that music has on memory. To date there have been several studies done that fail to agree on the question of whether music affects memory.

The fairly well-known phenomenon called the Mozart effect found that spatial-temporal memory increased due to exposure to classical music. This research is intended to determine whether the Mozart effect in fact increases verbal and nonverbal memory; employing the Rey-Auditory Verbal Learning Test (RAVLT) and the Rey-Osterrieth Complex Figure Test (ROCFT).

Methods

Hypothesis: Listening to classical music while doing the RAVLT and the ROCFT will increase participants' memory performance while silence will decrease memory scores.

Participants:
- 28 male and female undergraduates from Brigham Young University
- ranged in age from 18-24 with a mean age of 20.13 and a standard deviation of 2.08
- average amount of rest: 6.6 hours with a standard deviation of 1.83

Materials:
- RAVLT
- ROCFT
- FAS Fluency Test

Procedure: The experiment consisted of multiple tasks
1. 7 Trials of the RAVLT were administered
2. Participants copied the ROCFT complex figure
3. FAS Fluency Test administered
4. 30-minute recall of the ROCFT complex figure
5. 30-minute recall of the RAVLT

Results

- The presence of classical music did not have a significant effect on composite cognitive performance as demonstrated below.

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music</td>
<td>1</td>
<td>14.26</td>
<td>14.26</td>
<td>0.10</td>
<td>0.754</td>
</tr>
<tr>
<td>Error</td>
<td>26</td>
<td>3703.59</td>
<td>142.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>3717.85</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- There was a strong correlation between cognitive performance and ability, see below.

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music</td>
<td>1</td>
<td>33.02</td>
<td>33.02</td>
<td>0.249</td>
<td>0.6197</td>
</tr>
<tr>
<td>Ability</td>
<td>1</td>
<td>66999.4</td>
<td>506.0</td>
<td>&lt;0.00</td>
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</tr>
<tr>
<td>Interaction</td>
<td>1</td>
<td>50.16</td>
<td>50.16</td>
<td>.3788</td>
<td>0.5409</td>
</tr>
<tr>
<td>Error</td>
<td>52</td>
<td>6866.36</td>
<td>142.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>73968.98</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Since the results of the one-way and two-way ANOVAs showed no statistically significant difference between the groups with and without music, the null hypothesis was not rejected.

Discussion

Limitations:
- It is unknown whether participants had been exposed to RAVLT or ROCFT previously.
- On average, this sample was highly educated and 92.9% white. Therefore, whether these findings extend to other ethnic populations or less educated groups is unknown.

- While college students often participate in psychological research, the use of this single subject pool limits the generalizability of Mozart effect findings (Jones & Estell, 2007).

Conclusion:
- There were only 28 participants, which is not an adequate sample size, therefore, it is not representative of the population. A larger sample size could provide further insight into the Mozart Effect.
- The complicated relationship between intelligence, verbal recall ability, arousal levels, and personal preferences in music, might explain why the Mozart effect has been difficult to consistently produce.
- Future research should be done to disentangle these effects to understand the Mozart effect.

Research Design:
- Between Subjects Design
- Independent Variable: Presence of Classical Music
- Dependent Variable: Composite Cognitive Performance Score

Statistics:
- Composite cognitive score was created by equally weighting the 30-minute recall scores of the RAVLT and the ROCFT; this score was then turned into a percentage.
- The data was close to being a normal distribution, demonstrated by Figure 1, so the data was analyzed using a one-way and a two-way ANOVA.
- The one-way ANOVA was used to determine the interaction between the composite cognitive performance score and the presence of music.
- The two-way ANOVA was used to determine the interaction between ability and memory performance.
- The alpha level was set at 0.05.

References