Effects of Distraction on Fine Motor Performance

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Introduction:

What we studied was a person's ability to accurately respond to color specific signals while having an auditory distraction presented. Our participants played the video game Guitar Hero and played the song “I love Rock n’ Roll” on an easy level twice. Depending on which group they were placed into they either received the experimental condition one minute into the first time they played the song, or one minute into the second time they played the song. Guitar Hero uses colored “notes” that participants respond to in order to get higher scores. The statistics used were the percentage of correctly hit notes. Our results showed that there was no significant difference between the samples in the scores for no distraction (M=94.64, SD=5.82) and distraction (M=95.36, SD=4.99) conditions; t(32)=-.99, p=.331.
Article One: Impact of Auditory Distraction on User Performance in a Brain-computer Interface Driven by Different Mental Tasks by Friedrich, Scherer, Sonnleitner, & Neuper

This study looked at whether auditory distractions would affect participants’ abilities to maintain control with an imagery-based BCI (brain-computer interface), which is used to map and analyze brain signals.

**Participants:** Asked to perform four mental imagery tasks for 7 seconds each. They performed these with and without auditory distraction. In the distraction condition, distracting tones were presented during the 7 seconds of the imagery task that was being performed. The participants were asked to either ignore all of the tones (passive) or to press a button when each tone played (active).

**Results:** The participants were able to maintain performance and control during auditory distraction in all of the mental tasks. The passive condition was more difficult than the no distraction condition but the active condition was the hardest. This could be explained in that performance can decline as a result of divided attention (between the imagery task and the tone present).

This study relates to our current study in that auditory distraction was not shown to fully take away from successful performance. It shows that while playing Guitar Hero, the participants in our study may have been passive to the cell phone alarm.
The purpose of this study was to test whether braking behavior while driving would be significantly affected by the interaction of listening to music and having a phone conversation.

**Participants:** Took part in a driving simulation in which they were instructed to step on the brake pedal whenever a red light was activated. They performed eight trials for each of the six conditions: 1) braking only, 2) music at 72 dBA, 3) music at 86 dBA, 4) cell phone conversation, 5) cell phone conversation and music at 72 dBA, and 6) cell phone conversation and music at 86 dBA.

**Results:** Cell phone conversation alone had the greatest impact on slowing response time and reaction time. Response time and movement time were significantly faster under the music condition. There was no significant interaction between music and cell phone conversation.

This study is beneficial to our current study because it shows that other means of distraction, such as having an active conversation, may have had a greater impact on performance than the cell phone alarm.
The purpose of this study was to look at how susceptible people were to distraction dependent on their level of concentration. Researchers found that there are two general factors that influence level of concentration: exogenous factors such as a time restriction of intellectual challenge and endogenous factors such as motivation and individual capacity for attentional engagement (Sörqvist & Marsh, 2015). The results of this study showed that auditory distraction can easily be filtered out when concentration is present. This research provides an explanation as to why we did not see a significant difference in the performance with the distraction present and without.
This article was looking at WHY the use of instrument shaped controllers entertaining and engaging and how it corresponded with natural mapping. Natural mapping is used to explain the use of natural body movements in relation to learning. In this study they looked at natural mapping, challenge, and overall enjoyment of the game. This article is beneficial to our research because it provided the data showing that there was potentially intrinsic motivation for participants to do the experiment. The results of the present study found that the natural mapping of real guitars provided more enjoyment than that of game controllers shaped like a guitar, but neither natural mapping imply intuitive or easy handling, nor does challenge necessarily impact game enjoyment in a negative manner.
Methods:

Participants:

- We originally had 35 participants in our study (gathered by a convenience sample)
- Two of the 35 participants failed out of the song both times they played it so they were excluded from the data.
- 17 female; 16 male
- Age range 18-26 years old
- Mean Age: 19.33

Materials:

- PlayStation 2 gaming console
- Guitar Hero 1 video game disc and Guitar Hero guitar controller
- Projector
- DVD player
- Telephone for alarm sound (distraction)
- Two-Sided coin
Procedure and Design:

- During the experiment, participants entered one at a time to participate. While they were waiting for their turn, we had them sit out in a waiting area with an experimenter to keep them company.

- When each came in, they were told that they would be playing “I Love Rock ‘n’ Roll” two separate times on Level Easy.

- A coin was flipped to determine if the participant would receive the distraction on their first trial or on their second trial.
  
  - If placed in the distraction first condition, a cell phone alarm was played one minute into the first trial of the song; no alarm was played during the second trial.
  
  - If placed in the distraction second condition, no alarm was played during the first trial and a cell phone alarm was played one minute into the second trial.

- Each participant’s score was recorded for both trials and they were debriefed on the purpose of the experiment.
Results:

A paired samples t-test was conducted to compare the level of performance when an auditory distraction was present and when it was not present. There was not a significant difference in the scores for no distraction (M=94.64, SD=5.82) and distraction (M=95.36, SD=4.99) conditions; t(32)=-.99, p=.331.
Discussion:

- Our results did not align with the results of other articles. We did not find any significance within our data so our hypothesis was also not supported.

- Limitations for this experiment included: the type of distraction used, activity occurring in the hallway outside of the experiment room, not controlling for maturation.

- Our Post Hoc hypothesis would be that in future experiments what should be tested is the effect of a visual distraction on the game rather than the effects of the auditory distraction that was used.

- Of the two participants that failed out, one of the participants showed a DRASTIC increase in notes hit.

- One of the experimenters took notes while participants were playing the game and what some of the comments were: some participants made it apparent that their goal was to beat the high score, or to beat their previous score, and some even made suggestions after the debriefing about how we could have run the experiment differently by suggesting a visual distraction rather than auditory.

- On our first day of running the experiment when there was a lull in obtaining participants, we had two people who had participated previously come back and ask if they could play the game just as a game when there was free time!
Table 1.

Performance level with and without distraction present

<table>
<thead>
<tr>
<th>Condition</th>
<th>n</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Distraction Present</td>
<td>33</td>
<td>94.64</td>
<td>5.82</td>
</tr>
<tr>
<td>Distraction Present</td>
<td>33</td>
<td>95.36</td>
<td>4.99</td>
</tr>
</tbody>
</table>
Figure 1. This figure displays the number of notes correctly played in both conditions; the green bars represent the distraction condition and the blue bars represent the no distraction condition.

