THE IMPACT OF MUSIC ON EMOTION: A WORD RECALL STUDY
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Our goal was to find out if the type of music, emotionally positive, negative, or neutral, would have an effect on what type of words people remembered (positive, negative, or neutral).

Music is a major part of people's lives and typically has an emotional impact depending on the type of music being listened to.

It is common for many people to listen to music while they study and hopefully learning something about the connection between music and memory can lead to finding ways to better improve study habits.
INTRODUCTION: PAST RESEARCH

  - Wanted to look at how features of music and negatively provocative images impact physiological, emotional, and cardiovascular reactivity.
  - They found that pleasantness and arousal interact to impact cardiovascular responses to music (Baldwin et al., 2017).
  - These findings give idea to look further into how different types of music can affect mood and memory.

- Looked at how LSD affects emotional response to music (Kaelen et al., 2015).
- They found a positive relation between the intensity of LSD's effects and emotional arousal to music (Kaelen et al., 2015).
- This study could be helpful in leading to future research in psychoactive drugs and their affects on emotion and memory.

- Tse, and Altarriba (2009) did a study on remembering words based on concreteness and emotion (positive or negative).
- They found that concrete words were better recalled than abstract words and that positive and neutral words were better recalled than negative words.
- This study can lead to future research based on finding relations between emotion and memory.
If there is a relation between emotion and music, maybe it is possible to improve musical therapy.

Musical therapy is used in many areas such as cognitive skills in helping with Alzheimer's and motor skills to help the elderly.

Music is something that can still be studied in many ways and may also help improve lives.
INTRODUCTION

- A priori hypotheses:
  - Listening to positively tuned music will while trying to remember a list of positive, negative, and neutral words increase the probability of remembering the positive words.
  - Listening to negatively tuned music will while trying to remember a list of positive, negative, and neutral words increase the probability of remembering the negative words.
  - Listening to neutrally tuned music will while trying to remember a list of positive, negative, and neutral words increase the probability of remembering the neutral words.

- We collected our participants at random and if they agreed, we had them participate in the experiment.
- Data was collected and from each experimenter and combined.
- The data was analyzed using a Between groups one-way ANOVA
METHOD: PARTICIPANTS

- 45 total participants
- 23 Female and 22 Male
- Age range for the participants was from 18-31
  - Mean age of 21.22 (SD=2.27)
METHOD: MATERIALS

- 3 musical selections (A positive, negative, and neutral one)
  - Negative Song
  - Neutral Song
  - Happy Song
A list of 15 words

- 5 Positive Words: Transcendence, Wonder, Power, Tenderness, Euphoria
- 5 Negative Words: Apathetic, Belligerent, Repugnant, Sorrowful, Bleak
- 5 Neural Words: Nostalgic, Temperate, Prudent, Candid, Baffled

The list of 15 words was randomly mixed

<table>
<thead>
<tr>
<th>Repugnant</th>
<th>Power</th>
<th>Tenderness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transcendence</td>
<td>Bleak</td>
<td>Baffled</td>
</tr>
<tr>
<td>Apathetic</td>
<td>Candid</td>
<td>Euphoria</td>
</tr>
<tr>
<td>Nostalgia</td>
<td>Temperate</td>
<td>Sorrowful</td>
</tr>
<tr>
<td>Belligerent</td>
<td>Wonder</td>
<td>Prudent</td>
</tr>
</tbody>
</table>
METHOD: PROCEDURE

❖ Design: Multiple level one independent variable between subjects design
  ❖ IV: Song type

❖ Positive, neutral, or negative were written on 3 card sized pieces of paper

❖ After participants agreed to participate they randomly selected 1 of the 3 shuffled cards, which indicated which song they would receive
  ❖ Positively toned instrumental song
  ❖ Neutrally toned instrumental song
  ❖ Negatively toned instrumental song
METHOD: PROCEDURE

❖ Step 1 – Play song for 10 seconds without the list of words
❖ Step 2 – Give participants the list of scrambled words and explain instructions
❖ Step 3 – Play song again for 30 seconds with the list of words
❖ Step 4 – Stop music, take list away, and explain instructions again
❖ Step 5 – Give participant a blank sheet of paper and a writing utensil
❖ Step 6 – Participants have 30 seconds to recall as many words from the list as possible
RESULTS

- Between groups one-way ANOVA used to analyze data
- 3 conditions analyzed: "positive words," "negative words," and "neutral words"
- Closest to .05 alpha level was "neutral words" \( (p < .29; \text{see figure on left}) \)
  - "Negative" \( (p < .41) \); "positive" \( (p < .39) \)
- Thus, type of words participant selected was not significantly impacted by type of song listened to (table on next slide)
### RESULTS (CONT.)

#### Means and standard deviations for the dependent variable “Positive Words”

<table>
<thead>
<tr>
<th>Song type</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>2.00</td>
<td>0.04</td>
</tr>
<tr>
<td>Neutral</td>
<td>1.69</td>
<td>0.04</td>
</tr>
<tr>
<td>Negative</td>
<td>1.93</td>
<td>0.04</td>
</tr>
</tbody>
</table>

#### Means and standard deviations for the dependent variable “Neutral Words”

<table>
<thead>
<tr>
<th>Song type</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>1.36</td>
<td>0.04</td>
</tr>
<tr>
<td>Neutral</td>
<td>0.81</td>
<td>0.04</td>
</tr>
<tr>
<td>Negative</td>
<td>0.87</td>
<td>0.04</td>
</tr>
</tbody>
</table>

#### Means and standard deviations for the dependent variable “Negative Words”

<table>
<thead>
<tr>
<th>Song type</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>1.71</td>
<td>0.04</td>
</tr>
<tr>
<td>Neutral</td>
<td>2.19</td>
<td>0.04</td>
</tr>
<tr>
<td>Negative</td>
<td>1.87</td>
<td>0.04</td>
</tr>
</tbody>
</table>
Neutral words in the current study were not non-emotional as in a previous word recall study; perhaps too subjective in making neutral words emotional.

Also, many factors appear to be involved in memorizing words (e.g. concreteness of word):


Perhaps study may be flawed because we did not play songs long enough, as done in LSD study:

After results were calculated, there was no significance found in any of the categories:

The lack of significance could be explained possibly as a flaw in the design of the study (i.e. may need more time to process words and music style); rather than the actual question of emotional response.
There were several limiting factors in this experiment:

- As explained prior a major limitation of this study was quite possibly the difficulty level of some of the words, and the amount of time allotted for significant memorization of all words and their meanings.
  - It seems many participants were just remembering words in order without meaning
- The length of time the song was played may have been too short to significantly affect emotion.
- Individual memory retention capabilities varied greatly among participants.
There are numerous possible studies that can be done to further understand the link between music and emotion.

- This study could be replicated using more words, however more simplistic words (e.g. happy, dark, anger, calm)
- Further studies could include:
  - Attempting to find the link between speed of music and its effect on anxiety levels, stress etc.
  - One could go further and attempt to determine if certain instruments/audio effects lead to certain distinct emotions and feelings


QUESTIONS?