Does that "Ring a Bell?" The Effects of Music-Induced Emotions on Recall of a Story

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Recommended Citation

"Does that "Ring a Bell?" The Effects of Music-Induced Emotions on Recall of a Story" (2015). Stander Symposium Posters. 605.
https://ecommons.udayton.edu/stander_posters/605
Background

- Music is an extremely powerful stimulus for evoking emotion, in both the realm of research and daily use (Panksepp & Bernatzky, 2002).
- Previous research has shown that music is a reliable tool for mood manipulation (Vuoskoski & Eerola, 2012), and emotion has also been shown to be a memory enhancer (Jänke, 2008).
- There are two major theories on how emotion effects memory: Emotional Arousal Theory (Cahill & McGaugh, 1998) and the Mood Congruence theory (Bower & Forgas, 2000).
  - Emotional Arousal Theory: Predicts enhanced recall of information when participant is emotionally aroused.
  - Mood Congruence Theory: Predicts enhanced recall of information that is congruent with the emotional valence of the participant.
- Music activates the entire limbic system, which is involved with emotion processing and memory (Jänke), and has an intrinsic capacity to modulate memory consolidation (Judd & Rickard, 2010).
- This research study addressed the effect of music and emotion on memory. Specifically, if participants read a fearful story, will their memory for the story be enhanced if paired with fearful music?
- The fearful story was created by the researcher to be used as the fear inducing stimuli. The fearful music used was a compilation of three different musical numbers seamlessly fused together. The titles included were Mussorgsky’s A Night on Bald Mountain, Respighi’s Michael the Archangel, and Shostakovich’s Symphony no. 8, 3rd mv.

Hypotheses

Music on Emotion

- Fearful music paired with a fearful story will enhance the self-reported levels of fear in the participants.

Music on Memory

- Fearful music paired with a fearful story will enhance performance on a test of memory for information of the fearful story.

Movement on Memory

- Movement of the test will effect the performance on a test of information for fear of the fearful story.

Method

Participants: A total of 62 participants took part in this study. Thirty-five of the participants were female and 27 were male. The average age of the participants was 18.78 years with a standard deviation of .728 years and an age range from 18-21 years. All participants were Introductory Psychology students at the University of Dayton. A heart rate monitor was used to record heart rate throughout the experiment for all participants.

Tasks:
- PANAS-X: “assesses the specific, distinguishable affective and emotional states that emerge from within the broader general dimensions of positive and negative emotional experience” (Watson & Clark, 1994).
- SAM: “non-verbal pictorial assessment technique that directly measures the pleasure, arousal, and dominance associated with a person’s affective reaction to a wide variety of stimuli” (Bradley & Lang, 1994).

Fear Story - Displayed as a lyric video, the story was created to induce a fear response in the participant. Depending on the condition, fearful music and or movement of the test would be present during the trial.

Recall Test - 23 question test, developed by the researcher, was used to evaluate memory of information of the fear story.

Results

- Performance criteria eliminated 11 participants and 4 recall questions. All data analyses conducted with 51 participants and all participants’ recall test scores were calculated out of 19 possible points.
- The story did elicit a fear response. Fear, measured by the PANAS-X, was elicited in both the dynamic and static conditions, F(2,98) = 21.642, p < .0005, η² = .306, and in both the music and no music conditions, F(2,98) = 22.001, p < .0005, η² = .310.
- Music, surprisingly, had no significant effect on fear as measured by the PANAS-X, F(1,49) = 2.306, p = .135, η² = .045.
- There was a significant effect of both music and movement on memory. There was a statistically significant effect of music on memory, specifically at the level, F(1,47) = 3.184, p = .081, η² = .063. Movement was determined to be a distractor as participants performed significantly worse in the dynamic condition, F(1,47) = 5.242, p < .05, η² = .100.

Discussion

- The results of this study support the research on music’s effect on memory.
- The peculiar aspect about these findings is that while music is shown to have a statistically significant effect on memory at the .10 level, music did not have an effect on fear.
- The hypothesis was that the effect music has on emotion, specifically fear, would cause the enhanced memory performance. While music was shown to have no effect on fear, the participants performed better on the memory test when music was played.
- One possibility for this finding was the choice in emotion measured. While it was predicted that fear would be the optimal emotion to evaluate for this memory effect, other unevaluated emotions may have caused the enhanced memory.
- For example, results from the responses to the SAM indicated that the participant’s level of excitement was increased in the music condition. This provides one of many possible explanations for the enhancement in memory.
- During the formation of this study, no lengthy fear inducing reading stimulus was located. Because of this, one had to be created by the researcher. Due to the inconvenience of the fear response generated by the fear story, this stimulus is a valid tool that can now be used by other researchers.
- Future research on the effect of music and emotion on memory should evaluate the differences between happy, sad, fearful, and neutral stories to isolate the strongest musical memory enhancer while evaluating the validity of the Mood Congruence Theory.