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Music Evoked Nostalgia and Mood States

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Abstract

This study was in collaboration with the study titled “The determinants of affect, emotional arousal, and autobiographical memories” by principle investigator, Edward Roth, and student investigator Alycia Sterenberg. It addresses two questions examining the impact that music evoked nostalgia has on mood states and if this difference varies between musicians and non-musicians. The study included 19 participants ranging in age from 18-28 and used a multilevel model design. Participants completed a Positive and Negative Affect Schedule (PANAS) pre and post listening to nostalgia evoking music. Results revealed a decrease in negative affect pre to post-test, also showing a difference between musicians and non-musicians. Findings provide additional support that music, especially nostalgia evoking music, has an impact on mood and that this impact differs between musicians and non-musicians.

Keywords: nostalgia, mood, music, musicians, non-musicians


**Literature Review**

It is clear to both those who have not had the slightest amount of musical training and those who are professional musicians that music and mood are connected. People often use music to change their mood, particularly when they are experiencing negative affect. “Because music can access affective/motivational systems in the brain, it can influence and modify affective states” (Wheeler, 2014). Some people may listen to happy music to improve their mood and others may prefer to listen to sad music to cope with and self-regulate their negative mood (Van Den Tol & Edwards, 2014). Musicians are taught to express emotions through the way that they perform their music, both musically and through their facial expressions and body language. Many musicians will even agree that they are drawn to performing and practicing music because of the emotional expression that it allows them. Non-musicians would often say the same for why they listen to music. To summarize, there is an apparent connection between music and mood.

To further this, there is a strong connection between music, memory, and mood. This connection can be seen in nostalgia. Nostalgia is defined as a yearning or longing for the past and experiencing nostalgia has been found to provide a variety of benefits including increased self-esteem and improvement of mood (Wildschut, 2006). To connect this to music, researchers often use music to elicit nostalgic experiences. The question, then, is what effect does this music induced nostalgia have on mood?

**Mood and Music**

Studies have found that listening to music is connected to a pleasure response and that it has a correlation with an increased positive affect. Psychological testing has been used to show these connections. Salimpoor, Benovoy, Longo, Cooperstock and Zatorre (2009) used
electrodermal activity and physiological responses to examine the relationship between pleasure and the autonomic nervous system while listening to music. Their study found a strong positive correlation between pleasure and listening to music. This suggests that while listening to music, there is an increase in pleasure at a neurologic level. Additional research found heightened activations and significant interactions between the nucleus accumbens (NAc), the ventral tegmental area (VTA), and the hypothalamus while using fMRI to examine the brain responses of non-musicians while listening to classical music. The NAc, VTA, and the hypothalamus are all areas of the brain involved in mediating and processing reward and pleasure evoking stimuli (Menon & Levitin, 2005). This research provides additional support for music as a pleasure evoking experience and supports that music may be one of the most rewarding human experiences. (Menon & Levitin, 2005).

A third study examined emotional reactions to music in everyday life by examining the emotional responses recorded throughout the day within both musical and nonmusical emotion episodes. Musical emotion episodes were defined as randomized points in the day where emotions were experienced while music was occurring, with the music directly impacting the experienced emotion. In comparison, nonmusical emotion episodes were points in the day where emotions were experienced independently of music. The study found that positive emotions occurred more frequently in musical emotion episodes than in nonmusical emotion episodes, suggesting that music influences positive emotion (Juslin, Liljeström, Västfjäll, Barradas, & Silva, 2008). These studies clearly show that there is a relationship between mood and music at a physiological and neurological level, showing that listening to music is both associated with pleasure responses in the brain and is connected to experiencing a positive mood state.
Other research has shown music’s ability to change and induce mood. A pilot study examining the moods of women receiving chemotherapy for breast cancer before and after mindful music therapy sessions, involving both music listening and performing, showed significant reductions of negative mood states among participants (Lesiuk, 2015). Moss, Enright, and Cushman (2018) found an increase in vigor among participants while listening to motivating music during high intensity physical activity. Additionally, Pignatiello, Camp, and Rasar (1986) found music to be an effective tool for inducing mood in comparison to the Velten technique, a technique that has traditionally been used to induce mood in research using altered thought content (Lewis, 1988). These studies show support for music’s impact on mood, providing evidence that music can influence mood and that it has a correlation with positive affect.

**Music Evoked Nostalgia and Mood**

In addition to mood’s connection to music, there is a connection between mood, music, and nostalgia. Music is often found to evoke nostalgia, bringing back specific memories and associations. In the *Handbook of Neurologic Music Therapy*, de l’Etoile (2014) and Wheeler (2014), provide that people are better able to retrieve memories when their current mood reflects the mood that occurred when they first made that specific memory. This is explained through Bower’s associative network theory of mood and memory which states that memories are accessed through the activation of emotional nodes in the brain which are connected to the memory. These nodes are activated through the experience of the emotion associated with that specific node (Bower, 1981). De l’Etoile (2014) further explains that music therapists use this principle to help clients, specifically adults with dementia, retrieve memories from their pasts. Therefore, experiencing an emotion congruent with the one experienced when a memory was made can assist with recall of the memory and be effective in clinical practice.
In comparison, nostalgia itself can impact mood. Music evoked nostalgia, specifically, has been shown to affect mood. Looking at the relationship between music evoked nostalgia and mood, Barrett et al. (2010) found nostalgia evoking music to primarily elicit positive affect and to be more associated with mixed emotions in comparison to music that was not nostalgia evoking. This agrees with the findings of Wildschut, Sedikides, Arndt, and Routledge (2006) that nostalgia predominantly fosters positive affect and is a joyous experience. Similarly, Garrido (2018) found that nostalgia induced through music had a greater positive effect than negative effect on participants’ mood. This was determined by pre and post self-ratings of mood through mood selection and the Implicit Positive and Negative Affect Test (IPANAT). While looking at nostalgia evoked by music in undergraduate students, Cady, Harris, and Knappenberger (2008) found a significant decrease in negative affect between pre and post Positive and Negative Affect Schedule (PANAS) scores. This research suggests that current mood states affect the experience of nostalgia and in turn nostalgia affects mood state. Due to its ability to impact and induce mood, music can be beneficial in the process of creating nostalgic experiences and further influencing mood. This is an important variable in memory recall especially with dementia patients but could also be useful in helping to improve mood in a variety of populations.

The Impact of Music on Musicians and Non-Musicians

Musicians and non-musicians both have an emotional connection to music, but also differ in many neurobiological ways regarding emotion and the way they are emotionally affected by music (Dawson, 2011). After listening to music that elicits fear and sadness, musicians have been found to have significantly higher levels of arousal than non-musicians (Park et al., 2014). In addition, Nolden (2017) found differences in the oscillatory electric brain activity in response to emotional sounds, suggesting that musicians have a higher sensitivity than non-musicians to
the emotional content of sounds. Research has also shown differences in the neurologic pleasure responses to music of musicians and non-musicians. Brattico (2015) found a difference in response of the limbic system to preferred music between the two groups, finding a higher pleasure response in musicians. Based on these studies, it is clear that musicians process music differently than non-musicians particularly in regard to emotion, however it is unclear if there is a difference in affective response to nostalgia evoking music between the two groups.

Summary

Music is connected to the pleasure and reward processing areas of the brain and has been shown to have the ability to induce mood and reduce negative mood states. Value has also been found in using music to induce mood congruent states while retrieving memories. In turn nostalgic memories impact mood, showing to be useful in music therapy treatment. As a predominantly positive experience, nostalgia has been found to reduce negative affective states. Musicians and non-musicians, although both connected to music emotionally, show differences in their ability to process emotions particularly found in music and speech. However, few studies show if there are differences between musicians and non-musicians when it comes to music evoked nostalgia’s ability to impact mood. The purpose of this study is twofold. First, to further examine whether music that evokes nostalgia impacts mood and second, to examine the difference in mood states between musicians and non-musicians before and after listening to music that evokes nostalgia.
Research Questions

Research Question 1

Will listening to music that evokes nostalgia impact mood?

Research Question 2

Will the difference in mood states before and after listening to music that evokes nostalgia differ between musicians and non-musicians?

Methodology

This study was in collaboration with the study titled “The determinants of affect, emotional arousal, and autobiographical memories” by principle investigator, Edward Roth, and student investigator Alycia Sterenberg. The study used a multilevel model with repeated measures including person-level and context-level constructs. Measures included Electrodermal Activity (EDA) administered through BioNomadix, the Southampton Nostalgia Scale (SNS), and the Positive and Negative Affect Schedule (PANAS). The methodology for this research follows the protocol for their study. I assisted in data collection and analyzed data pertaining to my research questions.

There were 30 participants included in the study, both males and females ranging in age from 18 – 28. There are only 19 participants included in the data portion of my study. This difference in participants is due to post approval changes to include a post PANAS test. All participants met with the student researcher twice during the study. The first meeting was held to fill out a consent form and questionnaires. The questionnaires asked for demographic data, including the following question assessing whether they were a musician or not: Do you consider yourself a musician (meaning have you taken more than one year of musical training, or had any training within the last three years)? The questionnaires also asked participants for five songs
that they considered to evoke nostalgia. The songs were then used to generate a playlist on Pandora. During the second meeting, the participants were instructed to sit in front of a computer and electrodes were applied to their non-dominant hand while the graduate student researcher read instructions to them. Resting their hand in a supine position, the electrodes were placed on the distal pad of the third and fourth digits. The participants were asked to avoid movement of their hand. A towel was placed over their hand to keep it warm during the experience which would allow for better EDA readings. Headphones were then placed on the participant and the volume was adjusted to a comfortable level. After the volume was adjusted, participants completed the PANAS and SNS on the computer, then listened to four randomized music selections generated from their Pandora playlist. In between each song, the participant filled out a questionnaire rating their levels of nostalgia, arousal, and autobiographical association to the song. After listening to all four selections, the participant completed the PANAS for a second time.

My role in the research process included assisting with the monitoring of the musical selections. This included monitoring volume level, ensuring the correct participant’s playlist was used, starting and stopping the music at the appropriate time, and ensuring that the music was stopped at the same time that the EDA was flagged. I also assisted with clean-up after each participant.

My research questions were addressed using the PANAS. The PANAS is a 20-item Likert-type mood scale addressing positive and negative affect at a certain point in time (Watson & Tellegen, 1988). In this study, the PANAS was used to examine the mood states of the participants in the moment they took the survey, pre and post test (PANAS). The PANAS defines positive affect as “the extent to which a person feels enthusiastic, active, and alert”
(Watson & Tellegan, 1988, p.1063) and negative affect as a “general dimension of subjective distress and unpleasurable engagement” (Watson & Tellegan, 1988, p.1063). The scores are calculated by adding the individual scores of the positive and negative affect related questions (PANAS) (Appendix A). A high positive affect score may represent such mood states as high energy and pleasurableness, whereas a low positive affect may represent sadness and lethargy. A high negative affect score may represent mood states such as anger, contempt, and fear whereas a low negative affect may represent calmness and serenity. (Watson & Tellegan, 1988).

Results

A paired sample t-test was used to compare the difference between the pre and post PANAS scores of all participants. Two paired sample t-tests were run due to the PANAS scoring instructions requiring two separate scores, one for positive affect and one for negative affect. Independent sample t-tests were used to compare the PANAS scores of the musicians to the scores of the non-musicians. Again, two tests were used due to the PANAS instructions requiring separate positive and negative scores.
Pre and Post Positive Affect Scores

When comparing participants pre and post positive affect scores, on average, participants did not experience a significant difference in pre-positive affect (M=32.12, SE=1.68) compared to post positive affect (M=30.84, SE=2.30), $t(18)=1.02, p > .05, r=.23$. 

![Diagram showing average pre and post positive PANAS scores with error bars representing 95% CI. The pre-positive affect score is 32.11 and the post-positive affect score is 30.84.]
**Pre and Post Negative Affect Scores**

When comparing participants pre and post negative affect scores, on average, participants experienced a significant difference in pre negative affect (M=14.63, SE=1.16) compared to post negative affect (M=12.84, SE=.98), $t(18)=2.299$, $p < .05$, $r = .48$. 

![Average Pre and Post Negative PANAS Scores](image-url)
Positive Affect Scores for Musicians and Non-Musicians

When comparing the positive scores of musicians and non-musicians for the pre and post PANAS, on average, there was not a significant difference in pre positive affect scores for musicians (M=30.33, SE=7.92) compared to non-musicians (M=33.70, SE=6.75), \( t(17)=1 \), \( p>.05, r=.24 \). Additionally, there was no significant difference in post positive affect scores for musicians (M=27.56, SE=10.43) compared to non-musicians (M=33.80, SE=9.199), \( t(17)=1.34 \), \( p>.05, r=.31 \).
Negative Affect Scores for Musicians and Non-Musicians

When comparing the negative scores of musicians and non-musicians for the pre and post PANAS, on average, there was not a significant difference in pre negative affect scores for musicians (M=14.22, SE=3.46) compared to non-musicians (M=15.00, SE=6.31), t(17) = -3.28, p>.05, r=.62. However, there was a significant difference in post negative affect scores for musicians (M=10.78, SE=.67) compared to non-musicians (M=14.70, SE=5.27), t(17)=2.33, p<.05, r =.49.
Discussion

The results of this study support both hypotheses that music evoked nostalgia will impact mood and that the mood states before and after listening to music evoked nostalgia will differ between musicians and non-musicians. Although there were no significant results for a difference in positive affect between the pre and post PANAS scores, there was a significant difference in negative affect scores from pre to post PANAS. These results show that, on average, participants perceived their positive affect levels before and after listening to the music to be relatively the same. Considering the high positive scores that appeared on both tests, these results are not surprising as research does not support a decrease in positive affect after listening to music or experiencing nostalgia (Barret et al., 2010; Cady et al., 2008; Garrido, 2018; Juslin et al., 2008; Menon & Levatin, 2005; Salimpoor et al., 2009; Wildschut et al., 2018). However, the participants perceived their negative affect levels to be lower after listening to the music in comparison to before listening to the music, perceiving themselves to be generally more calm and serene than before they listened to the music. This is congruent with previous research (Barret et al., 2010; Cady et al., 2008; Garrido, 2018; and Wildschut et al., 2018), which suggest that music evoked nostalgia does have an impact on mood and may contribute to the reduction of negative mood states and have an overall positive effect on mood.

The study also supports the hypothesis that the mood states before and after experiencing music evoked nostalgia will differ between musicians and non-musicians. There were no significant results shown for the difference of positive affect scores between musicians and non-musicians. This is not surprising considering both musicians and non-musicians began with a relatively high positive affect. Negative scores were not significantly different between musicians and non-musicians for the pre PANAS. However, the musicians had a significantly
lower negative affect score than non-musicians on the post PANAS, suggesting that, on average, musicians perceived themselves to be calmer and more serene after listening to the music than the non-musicians did. This suggests a difference between the impact that music evoked nostalgia has on the mood of musicians in comparison to non-musicians, aligning with studies that support a higher emotional sensitivity of musicians to music (Brattico, 2015; Dawson, 2011; Nolden, 2017; and Park et al., 2014).

Limitations

Although the results suggest that music evoked nostalgia impacted mood, it is difficult to distinguish whether it was the nostalgic experience, the act of listening to music in general (whether nostalgia evoking or not), or the specific act of listening to the nostalgia evoking music that resulted in the change of mood in participants. In addition, with a small sample size, the results cannot be generalized beyond this study, especially when looking at the differences between musicians and non-musicians. Another limitation may lie in the definition of what makes someone a musician. The definition used, do you consider yourself a musician (meaning have you taken more than one year of musical training or had any training within the last three years?), may include a wide range of skill levels and amount of musical training. With this definition a person who does not consider themselves, or others do not consider, to be a musician may fall under the musician category, having had some training within the last few years or more than one year of training several years prior. A more standardized definition with stricter requirements could potentially lead to different results. It is also possible that musicians with varying levels of training and experience could yield different results.

Another limitation may fall under the presentation of the music stimuli. During the study, the researcher observed that Pandora often presented a music selection similar to one of the
songs chosen by the participant and then followed that selection with three or four songs in the
same category rather than songs similar to the other selections the participant listed. Due to this,
only using four music selections during the study may not have allowed for a robust enough
presentation of nostalgia evoking music.

A final limitation may include the participants’ high pre PANAS scores. On average,
participants had a high positive affect to begin which did not allow for much difference in post
PANAS positive scores. It is possible that the study would have yielded different results if
participants had begun with a lower average positive score or a wider variety in pre PANAS
positive scores.
Suggestions for Future Research

Future research may consider replicating the study using a larger sample size so that results can be generalizable. Additionally, future research may further examine the impact of music evoked nostalgia on musicians versus non-musicians. The literature alludes to neurological differences in musicians and non-musicians that may contribute to the difference in mood between the two groups, however what specifically is causing these differences could be examined further. Lastly, if the study were to be repeated, a different platform for presenting the music stimuli may be considered.

Conclusions

The results of this study serve to further support that music impacts mood and that using music to evoke nostalgic experiences may also affect mood. This provides additional support for the use of music in memory recall and mood induction and may support the use of music for this purpose by music therapists in a variety of settings. A difference between the negative affect scores between musicians and non-musicians after listening to the music provides additional support for differences in mood susceptibility in musicians and non-musicians. This may support that listening to music impacts the two groups differently, with a higher positive effect on musicians. This may pave the way for additional research on the benefits of musical training.
APPENDIX A

POSITIVE AND NEGATIVE AFFECT SCHEDULE

(Watson, Clark, Tellegen, 1988)

References


