Active Music Medicine's Impact on Internalized Disorders: A Pilot Study

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Abstract

The positive consequences of music intervention on depression and anxiety symptoms were investigated in a small sample of college students randomly assigned to the experimental and control groups. Experimental group participants created music daily using an online program called Soundtrap. A 2 (Group: experimental and control) x 3 (Time: baseline, week 1, week 2) mixed factorial design was used. Baseline, midline, and one-week follow-up scores were measured using the Beck Depression Inventory, State-Trait Anxiety Inventory, and General Self-Efficacy Scale. It was expected that there would be a decrease in anxiety and depression symptoms, as well as an increase in self-efficacy for intervention participants. Results showed that state anxiety and depression decreased, while self-efficacy increased from intervention. It can also be noted that more sessions completed by a participant lead to a greater decrease in symptoms and scores on the BDI and STAI. These results exemplify a practically significant correlation between active music medicine, a decrease in anxiety, and an increase in general self-efficacy.

	Medicine	Therapy
Active	**Music creation without the presence of a licensed therapist**	Music creation under supervision of a licenced therapist
Passive	Music listening without the presence of a licensed therapist	Music listening under supervision of a licenced therapist

Tang et al. (2020)

Introduction

Correlational studies found that the use of music interventions was successful in increasing positive social and psychological well-being (Gustavson et al., 2021), and increasing mood and self-esteem (Lawendowski & Bieleninik, 2017; Liddiard & Rose, 2021; Hargreaves & North, 1999). Studies using passive and/or active music therapy saw a significant decrease in stress (de Witte et al., 2020), as well as depression and anxiety symptoms (Chen, et al., 2015; Gustavson et al., 2021; Trimmer et al., 2016, Geipel & Kaes, 2018). It was also shown to improve gait, rehabilitation, cognitive/motor function, and socio-emotional skills in patients suffering from internalized mental illnesses such as Alzheimer's disease (de la Rubia Orti et al., 2017), PTSD (Gustavson et al., 2021), dementia, and Parkinson's Disease (Schneider et. al, 2022). Other disorders seen to improve from music therapy include autism spectrum disorder (Schneider et. al, 2022), ADHD (Gustavson et al., 2021), schizophrenia and other personality disorders (Hannibal et al., 2012).

Considering the studies presented, the current pilot study assessed the effectiveness of music intervention on internalized disorders, such as anxiety, depression, and self-efficacy. As a result of previous definitions, this study identifies separately from active and passive music therapy and music medicine. The intervention type used in this study is called "active music medicine", as the participants are actively creating and listening to music on their own time without the presence of a licensed music therapist or mental healthcare professional. The intent of this study is to find a non-pharmaceutical alternative for those with depression and anxiety symptoms that is more affordable and easier to access. It was expected that intervention would decrease the symptoms of anxiety and depression while increasing feelings of self-efficacy in participants.

Participants

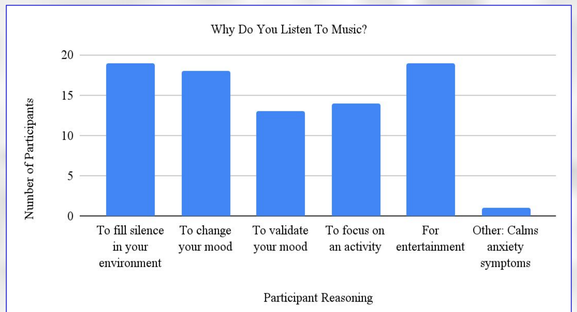
Participants were 22 18-27 year-old college students (M_{age} = 20.05, SD=1.99) attending Rider University in Lawrenceville, New Jersey. They were volunteers recruited through convenience sampling. Of the 22 participants (16 experimental and 6 control) that started the study, 10 participants completed the study (8 experimental and 2 control). Participants were mainly Caucasian (61%) and female (67%). A consent form was given at the start of the procedure for the participants to read through and electronically sign if they voluntarily agreed to the conditions of the study. This study was approved by Rider University's Institutional Review Board.

Procedure

Before the study, participants completed an online questionnaire on their usual music-listening activity. Participants received a baseline test for anxiety using the STAI, depression using the BDI, and self-efficacy using the GSE. Participants in trial one were matched by STAI score and then randomly assigned to either the control or experimental group, but as a result of dropout rates, matching was unsuccessful. During trial two, to ensure the maximum amount of results, all participants were placed into the experimental group.

This study was three weeks long including two weeks of active music creation and one week of cessation. During the first two weeks, participants in the experimental group created music daily for any amount of time using the Soundtrap program. All participants used their initials to name their projects. At the end of weeks one and two, participants in both groups filled out a form regarding how many sessions were completed, how much time was spent on the program for the week, and reassessments using the STAI, BDI, and GSE. Weekly reminder emails about completing the forms as well as daily reminders for music session completion were used.

During week three, the experimental group stopped music creation and both groups were reassessed at the end of the third week. During the final reassessment, participants received a debriefing questionnaire. Participants also received an email with a list of online resources for those struggling with mental health issues including depression and anxiety at the end of the study.



An example of a Baseline question

Design & Analysis

A 2 (Group: experimental and control) x 3 (Time: baseline, week 1, week 2) mixed factorial design was used. The dependent variables were the scores of each assessment.

An analysis of assessment scores was completed with a 2x3 mixed factorial ANOVA for each measure, using SPSS. The Type I error rate (α) was .05, and the minimum effect of interest was (MEI) $\eta = .25$ or $d_{MEI} = 0.50$. Data were collected, sorted, and depicted in Figures using Excel.

Results

Descriptive statistics for the STAI are depicted in Figure 1. The main effect of group assignment was not significant, $F(1, 12) = 0.49$, $p = .50$, $\eta = .20$. The main effect of time was not significant, $F(2, 24) = 0.13$, $p = .88$, $\eta = .10$. The interaction of group assignment and time was not significant but was practically significant, $F(2, 24) = 1.76$, $p = 0.19$, $\eta = .36$.

Descriptive statistics for the BDI are depicted in Figure 2. The main effect of group assignment was not significant, $F(1, 12) = 0.15$, $p = .71$, $\eta = .11$. The main effect of time was not statistically significant but was practically significant, $F(2, 24) = 1.44$, $p = .26$, $\eta = .33$. The interaction of group assignment and time was not significant, $F(2, 24) = 0.40$, $p = .67$, $\eta = .18$.

Descriptive statistics for the GSE are depicted in Figure 3. The main effect of group assignment was not significant, $F(1, 12) = 0.49$, $p = .0.50$, $\eta = .20$. The main effect of time was not statistically significant but was practically significant, $F(2, 24) = 1.72$, $p = .20$, $\eta = .35$. The interaction of group assignment and time was not statistically significant but was practically significant, $F(2, 24) = 2.79$, $p = .08$, $\eta = .43$.

While matching was not successful at the beginning of the study, after dropout, participants were equally matched for pre-form STAI and GSE scores and closely matched for pre-form BDI scores.

Figure 1: Changes in STAI

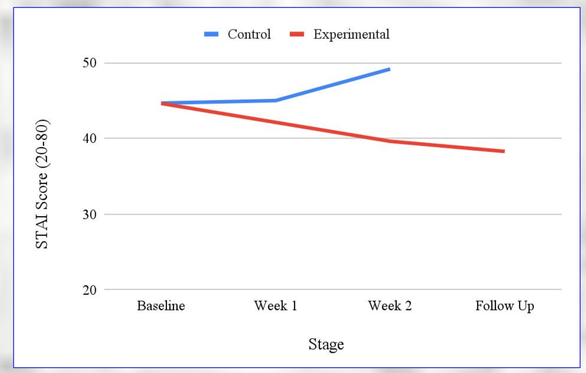


Figure 2: Changes in BDI

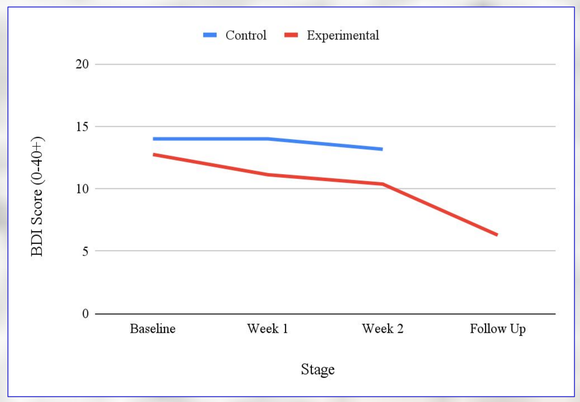
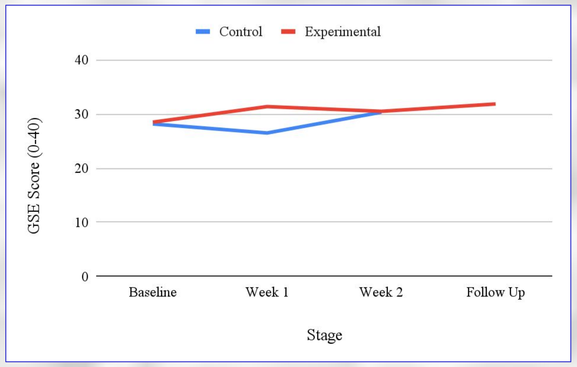


Figure 3: Changes in GSE



Discussion

Based on these results, the interactions of group assignment and time were practically significant for the STAI and GSE, but not for the BDI. Time effects and MEI were practically significant for STAI and GSE. With the use of music agency, anxiety scores for the experimental group lowered over the course of the study, while the self-efficacy of the experimental group increased. These findings imply a correlation between increased self-efficacy, decreased anxiety symptoms, and active music therapy. With future research, this therapy could be a possible replacement or used in addition to medical interventions that are not only low-cost but also easy access. This study also has the benefit of being done in a non-laboratory setting, where it can replicate "real life" since completion was done whenever and wherever the participants were.

While highlighting a new way to treat anxiety and depression, this study is not without its flaws. As a result of the length of this study, the dropout rate was 66.67% for the control group and 50% for the experimental group. This led to a need to stop the randomization and matching of participants to either group so that the study would be able to have a reasonable amount of participants and data. There was also a built-in issue with time controls as a result of when the two trials were conducted. Being that the first trial was before Spring Break and the second was after, there is some variability placed on how high or low anxiety and depression symptoms would be, seeing as midterms were coming up for the first trial participants and for the second trial participants they had just come back from a break. Another possible limitation of this study is evaluating if people are willing to do this on their own. Some people may not prefer to have the ambition to handle these symptoms by themselves, so having a licensed therapist for either music or non-music therapy would create the best outcome for the person. As well, there were issues with an equal amount of cognitive load between groups as there was a lack of activity for control group participants, leaving possibilities for skewed data.

For future iterations of this study, I would encourage creating an active task for the control group participants. This would be an activity close in cognitive load like completing a puzzle, playing a chess game, or even participating in meditation. Future research should also run this study as a full-fledged study instead of as a pilot, meaning there would be a significantly larger sample size. With that in mind, expansions and changes can be made to the procedure, dependent variables, and inclusion criteria. Procedural changes can include creating a set amount of time spent per session, a certain time of day for the session to be completed, and varying the frequency of sessions per week. A final suggestion would also be to find a way to correlate how the instruments, tone, and tempo of the participants' music session corresponds to how they feel in the moment. More specifically if their mood changes from before and after music creation and if that is reflected in their creation.

References

Gustavson, D. E., Coleman, P. L., Iversen, J. R., Maes, H. H., Gordon, R. L., & Lense, M. D. (2021). Mental health and music engagement: Review, framework, and guidelines for future studies. *Translational Psychiatry, 11(370)*, 1-13. https://doi.org/10.1038/s41398-021-01483-8.

Tang, Q., Huang, Z., Zhou, H., & Ye, P. (2020). Effects of music therapy on depression: A meta-analysis of randomized controlled trials. *PLOS ONE, 15(11)*. doi.org/10.1371/journal.pone.0240862.

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