Effects of Piano Practice on Anxiety in Teenagers and Young Adults

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Abstract

Context: students at the university may experience some kind of anxiety brought about by varied factors such as academic pressure, responsibilities, and social adjustment in a new environment. University students' lives are often demanding and thus exposing them to anxiety. **Objective:** To determine whether piano practice influences anxiety levels in teenagers and young adults. **Design:** In this repeated measures design, twenty-five (25) undergraduate students above 18 years of age participated in the study (*n* = 25). **Setting:** Public institution of higher learning in Florida. **Intervention:** Participants who were enrolled in studio piano from an institution of higher learning in Florida were enrolled in the study. **Hypothesis:** Pre- and post-intervention measurements of anxiety showed that piano practice in the studio had a significant effect on college students' anxiety levels compared to the baseline.

Keywords: Anxiety, Piano, Music Practice, Stress

Introduction

Anxiety is differentiated into two distinct categories; (a) State Anxiety, a transitory emotional reaction to the individual's perception of a threatening or dangerous situation; and (b) Trait Anxiety, a relatively stable tendency to interpret situations as threatening or dangerous and to react to them with anxiety (Basco & Olea, 2013). It is certainly not unusual for a college student who has worked long and hard in the week including moments of overnight class discussions and term papers to exhibit some form of anxiety. Music and anxiety have been studied for more than three decades both as intervention through music therapy applications or as investigative studies on cognitive and other outcomes. For the most part of the last three decades, scholars have had great interest in the use of music to control anxiety. Alleviation of stress anxiety has been addressed by Hammer (1996), who studied the relationship between music therapy and participants' perceived stress level. Participants in the Hammer study joined in music therapy sessions that included relaxation techniques and guided imagery. The State and Trait Anxiety Inventory (STAI) was administered before and after the music therapy sessions. In the experimental group, there was a slight reduction in STAI levels and a perceived decline in stress levels after the music therapy sessions. When considering the results of the study, Hammer concluded music could be effectively used to reduce stress anxiety.

In another experiment, Brennan & Charnetski (2000) studied the effect of music in reducing stress anxiety by bringing music into the workplace. Their experiment studied the effect music has on self-reported stress levels and the immune system. The researchers obtained baseline levels of self-reported stress and measured the presence of salivary immunoglobin A (S-IgA) in the blood of the participants. S-IgA usually is an indicator of immune system activity. This pretest and posttest experimental design was designed in such a way that after playing smooth jazz in the participants' high-stress newsroom workplace, they measured the participants' levels of self-reported stress and the levels of S-IgA in the blood. The researchers were able to conclude that the playing of recorded smooth jazz music resulted in a reduction on the participants' perceived level of stress anxiety.

Researchers have continued to show the effect of music on human health. Brownley et al. (1995) carried out a research study on the influence of music on physiological and affective exercise responses in eight trained and eight untrained runners under three music conditions

https://doi.org/10.52202/078697-0001

("no," "sedative," and "fast") during low, moderate, and high intensity exercise. Repeated results of this study revealed increased respiratory frequency (greater excitation) during fast music as compared to the no music and sedative music conditions.

In a study on music and labor pain, Geden et al., (1989) carried out two studies to examine the effects of music on analogue labor pain using volunteer nulliparous subjects who were randomly assigned to treatment groups. Assessments of the treatments were made in a 1-hour session involving twenty 80-second exposures to a laboratory pain stimulus patterned to resemble labor contractions. In the first experiment, it was hypothesized that subjects listening to easy-listening music would report lower pain ratings and cardiovascular responses than subjects listening to rock music, self-selected music, or a dissertation (placebo-attention) as subjects in a no-treatment control group. Significant group effects were found between each listening and between all other groups. Subjects spontaneously reported using imagery as a pain reduction technique. In the second study a combination of music and imagery was examined by randomly assigning subjects to one of five groups: self-generated imagery with music (SIM), guided imagery with music (GIM), self-generated imagery without music (SI), guided imagery without music (GI), or no-treatment control. Again, significant differences were obtained between the with music and the without music for all groups.

In another study on the effect of music on stress anxiety levels, Migneault et al. (2004) examined the effect of music on the neurohormonal stress response to surgery under general anesthesia. Their study found that several pharmacological interventions reduce preoperative stress hormone release during surgery under general anesthesia. They also studied listening to music and therapeutic suggestions where they found a positive effect on postoperative recovery and the need for analgesia. In this study, they evaluated the effect of listening to music under general anesthesia on the neurohormonal response to surgical stress as measured by appropriate medical procedures. Music therefore had an effect even under anesthesia.

In their research where they attempted to the answer the question: “Does Singing Promote Well-Being?”, Grape et al., (2004) carried out an empirical study of professional and amateur singers during a singing lesson. This study explored the possible beneficial effects of singing on an individual’s well-being during a singing lesson. Eight amateur (2 males, 6 females, ages 28-53 years) and eight professional (4 males, 4 females, ages 26-49 years) singers who had been attending singing lessons for at least six months were included. Five visual analogue scales

(VAS, sad-joyful, anxious-calm, worried-elated, listless-energetic, and tense-relaxed) were scored before and after the lesson. In addition, a semi-structured interview was performed. Heart rate variability analyses showed significant changes over time in the two groups for total power, and low and high frequency power. Power increased during singing in professionals, whereas there were no changes in amateurs. This indicates an ability to retain more "heart-brain connection," i.e., more cardio-physiological fitness for singing in professional singers, compared to amateur singers. In another study on anxiety, Yilmaz et al. (2003) carried out a study to find out if music decreases anxiety and provides sedation in a procedure known as extracorporeal shock wave lithotripsy (ESWL). In this procedure, sound waves are used to break a kidney stone into small pieces that can more easily pass into the bladder. The researchers of this study revealed that listening to music by patients during (ESWL) treatment is a feasible and convenient alternative to sedatives and anxiolytics.

Winter et al. (1994) observed the well-known fact that many patients become stressed and anxious prior to and after surgery and that one means of helping reduce anxiety in patients is to incorporate music in the Surgical Holding Area. In their study, they divided their subjects into two groups: one group of patients listened to music while a second group did not. The researchers observed that patients who listened to music while in the Surgical Holding Area had significantly less stress and anxiety than did those who did not listen to music. Both groups spent similar lengths of time in the Surgical Holding Area. Winter et al. concluded that patients preferred the musical intervention since they experienced less anxiety.

In another study, researchers at the Bryan Memorial Hospital, Lincoln, investigated the influence of music therapy on mood and anxiety of patients undergoing heart surgery (Miers, 2018). Ninety-six patients who underwent elective, heart bypass surgery at the cardiovascular intensive care and progressive care units of a Midwestern community hospital participated in the study. Data relating to anxiety and mood was obtained through blood pressure and heart rate using the Spielberger's state-trait anxiety inventory (STAI). Through their study, the researchers revealed that the patients' mood ratings showed significant improvement in mood among those patients who were in the "music therapy" group after the second intervention. There were also significant main effects over time for heart rate and systolic and diastolic blood pressure in the music therapy group, which indicated a generalized physiologic relaxation response. Reduced

https://doi.org/10.52202/078697-0001

anxiety and improved mood were observed in all three groups, and the researchers noted that all the interventions resulted in a generalized relaxation.

Augustin & Hains (1996) examined the role that music therapy might play in a postoperative setting for ambulatory patients. In the Day Surgery Unit of St. Mary's Hospital, Mequon, Wisconsin, they investigated forty-two ambulatory surgery patients where they assigned them to either an experimental group to receive music therapy along with the standard preoperative instructions or a control group to receive the standard preoperative instruction alone. The results revealed that the patients in the experimental group showed significantly lower heart rates compared to the patients in the control group. The experimental group also showed greater improvements in blood pressure and respiration rate. The researchers concluded that music therapy offers demonstrable benefits for ambulatory surgery patients and recommend that the patients be offered music as an effective option to help alleviate postoperative anxiety.

The effect of music in the alleviation of physiological conditions such as anxiety is a historical phenomenon. This practice is evidenced by several mythological reflections, which have explained the origins of music in healing. One belief derives the use of music in healing from the Old Testament in the Bible (circ. 1445 B.C.) where David played his harp to Saul for curative purpose (Benenzon, 1997; Moreno, 1985; Darrow et al., 1985). Some attribute the rise of music in healing to the life in Stone Age, which is saturated with the practice of using music for health. The Stone Age cultures did not view music as a self-contained experience apart from life. The connection between music and healing has come a long way from its primitive stage; but this connection has been retained with the human existence. In this regard, we may speak of music as a universal agent that transcends all time and space, barriers withstanding in alleviating suffering such as that caused by pain and anxiety. Its use as a healing agent has been shaped over thousands of years through human experience.

Method

All subjects were either majoring in piano or studying piano as one of their secondary instruments. The subjects practiced music in the practice rooms in a university in the USA. The selection process was based on opportunity sampling. Thus, there was no random sampling but those who wished to participate in the study were recruited and given the State Trait Anxiety Inventory questionnaire to fill 10 minutes before practice and immediately after practice. The

criteria for subject participation included students being able to practice music on piano for at least half an hour in order to participate in the study. The subjects also had to be at least in their intermediate level of musicianship, and they had to be over the age of 18. The subjects had to be able to read and understand English (as only the English version of the STAIC scale was used). Prior to participation in the study, subjects were informed of the study's purposes. If the subjects agreed to participate, they reviewed and signed a consensus form. The study was approved by the Institutional Review Board (IRB).

Materials

Informed Consent forms were used which informed the participants of the purpose of the study and explained that the participants would be filling out two surveys. The tool used to measure anxiety was The State-Trait Anxiety Inventory (STAI), which was invented by Spielberger, Gorusch, and Lushene in 1957. Forms C-1 and C-2 of the State Trait Anxiety Inventory (STAI) were used to measure the participants' current level of stress anxiety on two occasions. According to Spielberger et al., (1983), state anxiety reflects a transitory emotional state or condition of the human organism that is characterized by subjective, consciously perceived feelings of tension and apprehension, and heightened autonomic nervous system activity. State anxiety may fluctuate over time and can vary in intensity. In contrast, trait anxiety denotes relatively stable individual differences in anxiety proneness and refers to a general tendency to respond with anxiety to perceived threats in the environment.

Design and Procedure

The study used a single-variable pre-test/ post-test within groups design. The independent variable included music and practice time while the dependent variable was anxiety. STAIC forms C-1 and C-2 at least 10 minutes before their practice. Subjects had to practice at least for 30 minutes without interruption. The subjects had to complete the STAIC forms C-1 and C-2 one more time after the practice session.

Results

The mean pretest state anxiety score was 34.8, while the mean post-test state anxiety score was 33.44. The mean pretest trait anxiety score was 34.48 while the mean posttest Trait anxiety score was 34.64. I hypothesized that post measures of stress anxiety for state would differ significantly with the sexes with female being the least stressed and the male group being the most stressed.

https://doi.org/10.52202/078697-0001

This hypothesis was not supported by the results obtained (male M= 33.2, female M= 31.2) However, there was a correlation relationship between the pre-test and the post-test STAI scores (r = .903.)

Discussion

The researcher hypothesized that same levels of stress anxiety would be reported after the music practice in every participant. It was also hypothesized that females would not show any significant differences in the pretest and posttest anxiety levels from those of males. The present data were not found to be significant, and the null hypothesis cannot be rejected. The mean scores went down for both sexes on the posttest of the STAI, but it did not reach significance. Even though there were very minimal controls to this study, physiological measures of heart rate, respiration rate, blood pressure, skin temperature, EEG, and neurohormone levels would all have been beneficial and would provide more comprehensive assessment. In this study, one respondent indicated that he often felt better after his music practice. Another respondent said that he normally practices for

long hours and that the longer he played the better he felt.

Some possible reasons why the data is not congruent with past research could be the length of time that the participants were exposed to music and the type of music they played. The other reason could be that the participants played music only for a short period of time. In this experiment, the participants were exposed to music for a short period of time, about thirty minutes, whereas in much of the past research, participants were exposed to the music for longer periods of time (Hammer, 1996), and in some cases an entire day (Brennan & Charnetski, 2000). Participants were exposed to music for only a short period of time in this current study in order to increase the external validity of the study. People often cannot practice for long periods during the day, and maybe only while they are driving or exercising. In an effort to increase the external validity, the internal validity was compromised and that could have contributed to the data not being significant.

Another possible reason could be the use of the STAI. Some of the past research used more objective measurements such as salivary recordings and measuring the nervous system activity (Brennan & Charnetski., 2000; McCraty et al., 1998). Because the participants were administered two similar surveys within a short period of time, their answers on Form C-2 might have been influenced by their answers on Form C-1, an idea supported by the correlation

between the pre-test and post-test scores. The high positive correlation (r= .903) between participants' answers on the two surveys indicated that their answers on the first survey would be the best predictor of their answers on the second survey, rather than the type of music they practiced. The study did discover some significant relationships between the sexes and how their anxieties fluctuated with music practice. General Linear Model indicated that the State anxiety overall decreased across time. There was a trend for the female participants to show a larger decrease than the male participants, but it does not reach significance suggesting that sex might not have as much of an effect as was originally hypothesized. Because the participants were only exposed to the music for a short time, the results could be indicative of the fact that participants must be exposed to music for a much longer time for the music to significantly affect stress anxiety levels. Therefore, practicing music will not significantly lower stress anxiety levels if people only practice for short periods of time. Also, music therapy was not incorporated into this study. Music therapy, such as the guided imagery used in Hammer's (1996) experiment or the positively induced emotional state used in McCraty et al.'s (1998) experiment, compels the participant to become actively involved in reducing their stress levels while playing music. This study could have implications for people who passively practice specific types of music intended to relieve stress, for short amounts of time, and think that they are lowering their stress levels. The results of this study may indicate that this belief is not valid. People may need to practice music throughout the day and incorporate some type of music therapy, such as guided imagery, into their music experience to gain any of the possible benefits.

Because this study did not discover a significant relationship between music practice and stress anxiety, it could be viewed as weakening the prevailing view that music does indeed affect stress anxiety. But rather than negate the bulk of the past research (Hammer, 1996; Brennan & Charnetski, 2000; Standing & Stace, 1980) that does support the hypothesis that music does affect stress anxiety, the results of this study could have greater implications for the perceived strength of the relationship between stress and music practice. Since music was only practiced for a short period of time, the relationship between music practice and stress anxiety would have to be strong for the results to be significant. A relationship could exist, but it might be too weak to have been demonstrated in this study.

For future studies, researchers should expose the participants to music practice for longer time periods so that the music could have a greater effect. Also, using biological methods to

https://doi.org/10.52202/078697-0001

measure stress anxiety such as physiological measures of heart rate, respiration rate, blood pressure, skin temperature, EEG, and neurohormone levels would be preferable. These methods are more expensive but provide more objective and reliable data.

It would be interesting to do further studies on the effects of forced music practice on stress and anxiety. Future studies could also focus on the effects of music practice on stress anxiety and the physical health of the participant and additionally focus on the strength of the relationship. The results of future studies could be used to implement simple and inexpensive ways to alleviate stress anxiety in the general population by providing music practice rooms in hospitals, schools, and workplaces.

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