

A Study on Perceived Stress of University Students: Whether Reed Music Reduces Stress

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Abstract—Music is a key method used by therapists, psychologists and psychiatrists as a therapeutic intervention [1]. Even in ancient times, philosophers and doctors used music as an intervention; specifically, in the old Ottoman Healing Houses, where doctors of the Islamic world used Sufi Music for the treatment of various mental health conditions [2]. The current study takes this one step further and attempts to find out whether reed music, which belongs to Sufi Music, affects perceived stress. In order to evaluate the stress levels of participants, who are 49 psychology students of Anglia Ruskin University, the Perceived Stress Scale was used in the pre-test and post-test procedure [3]. According to the pre-test scores, participants were equally matched and split into three groups such as two control groups and one experimental group. The experimental group attend six reed music sessions during three weeks. Provisional results indicate that reed music may influence perceived stress.

Keywords— Perceived stress, music, intervention, reed music

I. INTRODUCTION

THIS work aims to analyse the effects of listening to reed music on the perceived stress level of university students by initially examining numerous theories of stress in detail. Stress has been one of the most crucial subjects in the study of Psychology, as a considerable amount of studies have been conducted for many years in order to find out the main reasons for stress [4], [5], [6], [7]. Additionally, numerous studies have attempted to analyse the main affective factors on the developmental process of stress and they also examined the question of *how stress can be reduced* [8], [9], [10], [11], [12]. In this, as stress negatively affects the way of life, scholars have also attempted to develop several methods in order to decrease stress.

According to Myers et al. [13] there are a great number of methods in order to be able to avoid the effects of stress; specifically, in previous work Flesher [14] indicated that physical activities and exercise are significant methods for reducing stress. Moreover, in their quantitative study Toyoshima, Fukui and Kuda [15] indicated that creative art activities, such as playing a music instrument, painting or producing something may also reduce stress.

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In this, authors assessed 57 healthy university students by separating them into four groups, and findings indicated that while there is no change on stress levels of control group, the stress levels of three experimental groups which attended 30 minutes daily creative art activity such as playing piano, calligraphy and moulding a piece of clay were significantly reduced. Moreover, authors also indicated that playing piano as a music intervention was the most significant factor on stress [15].

It is known that, listening to music may be another crucial way in order to reduce stress; for instance, in earlier work, Sezer [16] attempted to analyse whether listening to music is an appropriate method, which helps in decreasing the stress and anxiety levels of university student and high school students. Findings indicated that music positively affects anxiety and stress levels and also helps to control anger among participants. However, Sezer [16] emphasized that the music types, which were used in these sessions, were considerably effective factors. Moreover, the author also indicated that findings may have also been affected by the age and music taste of the participants.

In previous literature, although there is a considerable amount of work which has attempted to analyse the effects of listening music on stress, limited work has attempted to analyse whether listening to traditional music is an effective factor on the stress level of a multicultural sample. The current work takes this one step further and attempts to find out whether reed music, which was used by Ottoman scientist as a therapeutic intervention, positively affects the perceived stress level of university students who are from different cultures. In this, stress as a psychological concept will be defined, then the main stress theories will be analysed, next music will be evaluated as an intervention method, and finally, the findings of this study will be examined in more detail.

II. METHOD

A. Participants

The participants were selected from the Anglia Ruskin University student population, who are studying in the psychology department. The initial sample composed of 49 participants with 36 females and 13 males; however, five participants were removed due to missing data. Therefore, the final sample consisted of 44 participants (33 females and 11 males). The age of participants ranged from 18 to 48 years ($M = 22.57$, $SD = 5.94$). However, the average age of male and female participants was significantly different, ($t(36.31) = 2.18$, $p < .04$), and the age of males ranged from 18 to 28 years

($M = 20.18$ years, $SD = 3.09$). The age of females ranged from 18 to 48 years ($M = 23.36$ years, $SD = 6.47$), which meant that in the current study, females on average were 3 years older than males.

B. Design

This work attempted to analyse the effects of reed music that belongs to Sufi Music on the perceived stress level of university students by using a 3x2 mixed-subjects design with the stress scores of participants as the dependent variable and the sessions with three levels (reed music sessions, radio drama sessions and no sessions) as the independent variables. In this, the first factor consisted of three levels (one experimental and two control groups) and the second factor consisted of two levels (pre-test and post test procedure) which were measured by using PSS. According to the pre-test results, each participant's PSS scores were equally matched and they separated into three groups: one experimental and two control groups. After 4 weeks, each participant filled in the PSS one more time as a post test procedure and then the data was put into SPSS and analysed by conducting a repeated measures ANOVA, a mixed ANOVA and Correlation analysis.

C. Material

The current study consisted of a series of demographic questions and one psychometric test which measured the perceived stress level of participants. In the demographic information form there were seven questions, and participants were asked about their gender, age, music preference and how long do they listen to music daily on average. In this, question one consisted of two selections as male and female. Question two asked about the age of the participants and there was a gap in order to be able to write the age of participants. Question three was a Yes/No question which asked whether participants like music. Question four asked the average music listening in a day and had 4 items such as *less than 1 hour*, *1-2 hours*, *2-3 hours* and *more than 3 hours*. The fifth item which asked about music preference consisted of eight categories such as instrumental, pop, rock, R&B, dance, classical, jazz and other. In questions six and seven they were also asked for their mail addresses and phone numbers, in order to inform them about the specific session times and periods.

As the first hypothesis of the current work refers to positive effects of listening to reed music on the perceived stress levels, participants were also asked to perform the Perceived Stress Scale in order to be able to measure the perceived stress level of university students [3]. There are three versions of the Perceived Stress scale (PSS): 4 item, 10 item, and 14 item versions. However, since the PSS-4 and 10 item versions are usually carried out in a shorter period of time, the current work used the PSS 14 item version, which includes a 5-point Likert type scale which ranges from 0 (never) to 4 (very often). As Cohen [3] stated PSS is not a diagnostic instrument; therefore, there are no cut-offs for classification of stress such as *high*, *medium*, or *low*. However, each study can classify their own stress levels by using their samples such as higher scores correspond to higher perceived stress among participants.

In previous work, Shanon et al. [17] attempted to examine the relationship between self-care practices and perceived

stress levels among psychology graduate students. In this, the authors used the PSS (14 items) and in order to evaluate the reliability level of this instrument the researchers calculated the Cronbach's alpha coefficient and according to the results the reliability level of 14 items version was very good ($\alpha = .84$). The authors also obtained a satisfactory validity by comparing the PSS to measures of health-related outcomes [4]. The reliability score (Cronbach α) of PSS-14 was also evaluated by the current work, and the results demonstrated a very good reliability for this sample ($\alpha = .80$).

D. Procedure

Recruitment was made by attending undergraduate and post-graduate psychology lectures which are delivered at Anglia Ruskin University. Before, the researcher attended each lecture; a well lit room in Anglia Ruskin University was booked in order to complete the application process of the study. In this, the researcher attended the two undergraduate first year lectures, one undergraduate second year lecture, one third year lecture, and finally one postgraduate lecture where the willing participants were recruited. Then, the researcher explained the aim of this study and gave information about the place where the willing participants were able to read participant information sheets and fill the consent form, demographic information form and PSS scale. Finally, the exclusion criteria were made clear, in that the willing participants must be over the age of 18 and they were informed that their participation in the study would award them with 4.5 participation credits.

Then, participants were asked to perform the perceived stress scale (PSS) as a pre-test procedure. According to the PSS test results 49 participants were equally split into three groups as one experimental and two control groups. In this, each group consisted of participants whose scores range from low to high stress. The first control group consisted of 16 participants with 12 females and 4 males, the second control which was also a drama group consisted of 16 participants with 12 females and 4 males, the experimental group consisted of 17 participants (12 females and 5 males). However, 5 participants were excluded due to a lack of attendance of the sessions and/or not completing the post-test procedure. Therefore, the final sample of the current study consisted of 44 participants with 33 females and 11 males.

The sessions took three weeks for experimental and second control group which was also a drama sessions group, and in this three week period, six sessions were carried out in the dance studio of Anglia Ruskin University. The dance studio where the sessions were carried out was dimly lit and the music was played at a low volume. During this three week period, the experimental group attended the traditional reed music sessions. Each week, two music sessions were organized which took 45 minutes, and during the sessions the participants lay on a mattress as if they were sleeping and listened to the traditional Turkish reed music whilst closing their eyes. During these three weeks, there was no session for the first control group. However, in order to analyse the main effect of reed music sessions, the second control group attended the same amount of sessions where they listened to BBC radio dramas. The aim was to differentiate the main effect of music, however

being a part of a group session may also be of some benefit for decreasing the stress level. Therefore, the second control group attended the same amount of sessions in the same place with the same conditions.

After four weeks, participants carried out the PSS test as the post test procedure and this was also organized in a well lit room of Anglia Ruskin University. Then, the debrief forms were passed out and each participants was awarded with 4.5 participation credits.

III. RESULTS

In this study, obtained results were analysed by using the SPSS version 16 for Windows statistical package. Before this work analysed the obtained results, initially the reliability analysis was conducted in order to be able to assess the internal reliability of the PSS-14 as a psychometric scale. In this, Cronbach's alpha coefficient was calculated and results indicated that the reliability level of this scale was satisfactory ($\alpha = .81$).

In the second step of the analysis, in order to test the first hypothesis (listening to reed music reduces stress), the obtained data were entered into the SPSS and a repeated measures ANOVA was conducted. According to the Levene's Test, homogeneity of variance was not violated for the pre-test results ($F(2, 42) = 0.20, p < .82$). That means there was no significant difference between each groups overall stress scores; therefore, results which were obtained by conducting the repeated measures ANOVA were valid.

Initial results indicated that, there was no significant difference between each group's post-test scores ($F(1, 43) = 2.58, p < .12$). However, results also indicated that there was an interaction between groups and the main factor ($F(3, 41) = 3.93, p < .03$). According to these results it might be a significant difference between pre-test and post-test scores of groups. However, results did not allow differentiating which group causes this interaction. In order to be able to find out the effective group on this interaction, the differences between each group's pre-test and post-test scores were examined step by step by analysing each group's data. In this, the repeated measures ANOVA was one more time conducted by selecting each group's data on their own.

According to findings, there was no significant difference between the pre-test and post-test scores of the first control group which has no sessions in the experimental process ($F(1, 15) = 2.37, p < .15$). Results also demonstrated that there was no significant difference between the test scores of second control group which attended the BBC radio drama sessions ($F(1, 12) = 0.58, p < .46$). However, when taking the results of the experimental group into account, results indicated that there was a significant difference between pre and post test scores of this group ($F(1, 14) = 8.47, p < .01$).

The next step of the analysis also examined whether there is a significant difference between the pre and post scores of males and females. Results indicated that, there was no significant difference between the pre and post test scores of males ($F(1, 10) = 0.28, p = .61$) and females ($F(1, 32) = 2.45, p = .13$). Moreover, the effect of gender on the model was also analysed in order to find out whether it is also an effective

factor on the model. In this, gender was included on the model as a grouping variable and a repeated measures ANOVA was carried out one more time. Findings indicated that there was neither a significant effect of gender on the model ($F(1, 42) = 1.42, p = .24$), nor a significant interaction between gender and the main factor ($F(1, 42) = 0.21, p = .65$).

Subsequent analysis examined variables such as age, music preference, the number of sessions and the daily music listening amount. In order to analyse the effect of these variables on the model, they were also put in the model as "covariance" in order to measure the covariance effects on the main factor. Results indicated that there was not a significant covariance effect of the age of participants on the model ($F(1, 43) = 0.01, p < .93$). Moreover, there was also no significant covariance effect of the daily music listening amount ($F(1, 43) = 0.03, p < .86$) and the music preference ($F(1, 43) = 1.05, p < .31$) on the model. That means the age, music preference or daily music listening amount of participants are not secondary effective factors on the perceived stress levels of participants whilst they attended the reed music sessions gender effect on the model

The second hypothesis of the current work refers the effects of the number of sessions on the main factor. In order to be able to analyse this relationship, a mixed ANOVA should be conducted. However, for the first control group's participants there was no session, therefore this part of the analysis only focused on the second control group which is also a drama group and the experimental group by conducting a mixed ANOVA. The results indicated that there was a significant interaction between the main factor and the numbers of session ($F(1, 27) = 10.28, p < .01$). However, it was not clear which group causes this interaction; therefore, each groups' data were analysed one more time on their own. Findings indicated that there was not a significant interaction between the main factor and the number of sessions of the second control group ($F(1, 12) = 3.02, p < .11$). According to results this interaction was occurred by the relationship between the main factor and the numbers of sessions of the experimental group ($F(1, 14) = 8.58, p < .01$).

In order to be able to examine this relationship in all details, this work also conducted a correlation analysis for the relationship between the numbers of sessions and stress scores. In this, a new variable was created as the main difference between the pre and post test stress scores, and then a correlation analysis was conducted. Obtained results indicated that there was a negative correlation between the numbers of sessions and the main difference of pre and post test scores ($r = -.63, p < .01$). That means, the more participants take part in reed music sessions, the less stress they experience.

IV. DISCUSSION

The current work attempted to examine the relationship between listening to reed music and the perceived stress levels of individuals by conducting a 3x2 mixed subject design. According to initial results there was no significant difference between groups' scores, and it was clear that initial results did not support previous studies which were conducted by Sezer [16] Chen [18], and Clark et al. [19]. Specifically, in previous

work Sezer analysed whether listening to music reduces stress and the test anxiety levels of university students by using a sample of 117 participants. Findings indicated there was a significant difference between each group's pre and post-test scores; in addition it was clear that Sezer's findings were opposite to those of the current study. Moreover, Chen [18] also analysed whether listening to music reduces the anxiety and stress levels of pregnant women and his findings also demonstrated a significant difference between the pre and post-test scores of groups which does not support the current study.

An additional study that attempted to analyse whether listening to music reduces the stress levels of individuals was conducted by Clark et al. [19]. In this, the researchers assessed 63 patients by using a pre-test and post-test procedure and results indicated that there was a significant difference between the stress levels of the experimental and control groups which was also contrary to these current findings. However, when taking the sample size of the current work into consideration; it can be argued that this may be a limitation of the current project, which in turn explains the opposite results that were obtained, in comparison to past research. Specifically, while the current work was conducted by using 44 participants, Sezer [16] conducted his research by using 117 participants, Chen [18] with 236 participants and Clark et al. [19] with 63 participants. Moreover, previous work by Burns et al. [20] demonstrated that gender is a significant factor on the perceived stress levels of individuals. Specifically, females are more prone to present stressful events and their stress perception is more negative than males. However, the current work indicated opposite result to previous study by Burns et al. [20] and demonstrated no significant effect of gender on the model. When taking this into account, it is evident that the limited study sample and the inequality of gender may cause obtaining opposite results to previous literature.

This study also examined the findings of previous work, which was conducted by Sezer [16] and related to the effect of listening to music on test anxiety and stress among university students. The findings of this work indicated that music is a considerably effective factor on stress and test anxiety and the author obtained a significant difference between groups' scores which was opposite to this current work. However, when taking the data analysis of this work into consideration, it was found that the researcher examined his results by conducting a non parametric test (Wilcoxon Signed Rank Test for Paired Samples). Moreover, Sezer's results indicated that there was a significant difference between the pre and post test scores of the experimental and the control groups. As such, if the current work was analysed the data by using the same analysis, the difference between the pre and post test scores of participants would have also found a significant result ($z = -2.16, p < .03$). Additionally, the obtained result from the current work would be more significant than previous work. However, due to the validity and reliability level of the ANOVA and since the current work consisted of continuous variables, it analysed the data by using the repeated measures ANOVA. When taking this into account, it can be argued that this may

be another crucial factor for obtaining an opposite result from previous literature.

The current analysis also indicated that although there was not a significant difference between the group scores, there was a significant interaction effect between the main factor and the grouping variable. That suggests that one of the groups may have a significant difference between the pre and post test scores of participants. Findings indicated that although there was not a significant difference between the test scores of the two control groups, there was a significant difference for the experimental group which was similar to previous work conducted by Sezer [16], Chen [18], Lu et al. [21], Burns et al. [20], and Clark et al. [19]. Therefore, these results supported the first hypothesis of this work which claimed that listening to reed music considerably reduces the perceived stress level of university students.

The next part of the current work examined the effectiveness of the numbers of reed music sessions on the stress level. Results indicated that the numbers of sessions were significant predictors of the perceived stress level of participants during the reed music sessions. Moreover, findings also demonstrated that there was a significant negative relationship between the main factor and the numbers of sessions. In other words, it can be argued that the more frequently participants attend reed music sessions, the less stress they experience.

V. CONCLUSION

The current work aimed to examine whether listening to reed music reduces the perceived stress levels of university students. In this, two main hypotheses arose: *reed music reduces stress even in different cultures* and as second *the number of reed music sessions which were attended by participants also affects the perceived stress levels of participants in the experimental process*. In the first part of the current work, findings indicated that there was a significant difference between the pre and post test scores of the experimental group, although there is no significant difference between the pre and post PSS scores of the control groups. In other words, results demonstrated that listening to reed music significantly reduced the perceived stress levels of the participants. In this, it can be said that the first hypothesis of the current work was supported by the obtained results.

In the second part of the work, it was also analysed whether the number of sessions were effective factors on perceived stress levels of the participants. According to the findings, it was a significantly effective factor on stress; in other words, the more participants attend reed music sessions, the less stress they experienced. As a result of this, it can be stated that these findings also supported the second hypothesis. However, the amount of participants, who took part in different numbers of sessions, was not equal. Therefore, although the second hypothesis was supported by the findings, this result may not be reliable.

Consequently, when taking the sample size and the unbalanced gender as limitation of the current work into consideration, it is clear that further research with a wider sample is essential. Moreover, the current work focused on the

differences between pre and post-test scores of participants, over a period of one month. In this, further research may also focus on this difference in a more frequent period by using a scale which can measure the stress level of participants after each session. Therefore, this analysis may also help to examine the question of how many reed music sessions are enough in order to reduce stress. In conclusion, it is clear that the current work analysed the effects of a traditional music (reed music) on the perceived stress level of a multicultural sample by extending the research of previous literature, whilst also demonstrating that listening to reed music reduces the perceived stress levels of individuals; even with different cultural backgrounds.

REFERENCES

- [1] G. Ansdell, M. Pavlicevic, *Community Music Therapy*, New York: Kingsley, 2008.
- [2] A. Coban, *Music Therapy*. Istanbul: Timas, 2005.
- [3] S. Cohen and G. Williamson, Perceived stress in a probability sample of the United States. In: S. Spacapan & S. Oskamp (Eds), *The social psychology of health*, 1988, pp. 31-67.
- [4] S. Cohen, T. Kamarck and S. Mermelstein, A global measure of perceived stress. *Journal of Health Social Behaviour*, 1983, Vol. 24, pp. 385-96
<http://dx.doi.org/10.2307/2136404>
- [5] R. Lazarus, *Stress and Emotion: A New Synthesis*. New York: Springer Publishing Company, 1999.
- [6] R. Lazarus and S. Folkman, *Stress, Appraisal, and Coping*. New York: Springer Publishing Company, 1984.
- [7] M. Rutter, Stress, Coping, and Development: Some Issues and Some Questions. In: N. Garnezy and M. Rutter (Eds), *Stress, Coping, and Development in Children*. New York: McGraw-Hill, 1983.
- [8] D. L. Beck and R. Srivastava, Perceived level and sources of stress in baccalaureate nursing students. *Journal of Nursing Education*, 1991, Vol. 30, pp. 127-133.
- [9] S. S. Hudd, J. Dumlao, D. Erdman-Sager, D. Murray, E. Phan, N. Soukas, and N. Yokozuka, Stress at college: Effects on health habits, health status and self esteem. *College Student Journal*, 2000, Vol. 34, pp. 217-228.
- [10] L.E. Pearlin, Life strains and psychological distress among adults. In: A. Monat & R. Lazarus (Eds.), *Stress and Coping*, New York: Columbia University Press, 1991, pp. 319-336.
- [11] S. Roth, and L. J. Cohen, Approach, avoidance and coping with stress. *American Psychologist*, 1986, Vol. 41(7), pp. 813-819.
<http://dx.doi.org/10.1037/0003-066X.41.7.813>
- [12] N. Whitman, Student Stress: Effects and Solutions. Retrieved April 7, 2012 from, <http://www.eric.ed.gov/PDFS/ED284514.pdf> Digest 85-1
- [13] S. B. Myers, A. C. Sweeney, V. Popick, K. Wesley, A. Bordfeld, and R. Fingerhut, Self-Care Practices and Perceived Stress Levels Among Psychology Graduate Students. *Training and Education in Professional Psychology*, 2012, Vol. 6, pp. 55-66.
<http://dx.doi.org/10.1037/a0026534>
- [14] M. Fleshner, S. L. Kennedy, J. D. Johnson, H. E. W. Day, and B. N. Greenwood, Exercise and stress resistance: Neural immune mechanisms. In: A. Siegel & S. S. Zalcman (Eds.). *The euro immunological basis of behaviour and mental disorders*, New York, Springer Science Business Media, 2009, pp. 87-107.
http://dx.doi.org/10.1007/978-0-387-84851-8_6
- [15] Toyoshima, Fukui and Kuda, Piano playing reduces stress more than other creative art activities *International Journal of Music Educatio*, 2011, Vol. 29, pp. 257-263.
- [16] F. Sezer, The effects of Music Therapy on Test Anxiety, Anger Control and Psychological Signs, Unpublished PhD Thesis Atatürk University, Social Science Institute, Erzurum, 2009.
- [17] B. Shannon, A. C. Sweeney, V. Popick, K. Wesley, A. Bordfeld, R. Fingerhut, Self-care practices and perceived stress levels among psychology graduate students, *Training and Education in Professional Psychology*, 2012, Vol. 6, pp. 55-66.
<http://dx.doi.org/10.1037/a0026534>
- [18] C. H. Chen, Soothing Music Reduces Stress, Anxiety and Depression during Pregnancy, 2008, Retrieved April 9, 2012 from <http://www.sciencedaily.com/releases/2008/10/081006093020.htm>
- [19] M. Clark, G. Isaacks-Downton, N. Wells, S. Redlin-Frazier, C. Eck, J.T. Hepworth and B. Chakravarthy, Use of preferred music to reduce emotional distress and symptom activity during radiation therapy. *Journal of Music Therapy*, 2006, Vol. 43, pp. 247-265.
<http://dx.doi.org/10.1093/jmt/43.3.247>
- [20] J. L. Burns, E. Labbe, B. Arke, K. Capeless, B. Cooksey, A. Steadman, and C. Gonzales, The effects of different types of music on perceived and physiological measures of stress. *Journal of Music Therapy*, 2002, Vol. 39, pp. 101-106.
<http://dx.doi.org/10.1093/jmt/39.2.101>
- [21] Y. Lu, M. Liu, S. Shi, H. Jiang, L. Yang, X. Liu, F. Pan, Effects of stress in early life on immune functions in rats with asthma and the effects of music therapy. *Journal of Asthma*, 2010, Vol. 47, pp. 526-31.
<http://dx.doi.org/10.3109/02770901003801964>