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A comparative study on music and heart-rate among young adults

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Abstract

This study examines the different types of music on heart-rate among healthy young adults, A total sample of 100 participants aged 19-23 years were included in this study. Participants were assigned through Snow-ball method. Participants were exposed to two genres of music: soft and rock music, each genre played for two minutes and after that heart-rate was measured with oximeter. Statistical analysis(Student t-test) revealed significant difference in heart-rate patterns between the two genres. It is seen that Rock music consistently induced higher heart-rates compared to soft music among the participants. This study contributes to understanding the role of music in autonomic regulation and highlights music's potential applications in fields such as stress reduction, therapeutic interventions and for enhancing emotional and physical well-being.

Keywords: Music, heart-rate, young adults, physiological response

1. Introduction

Music has long been associated with emotional and physiological responses, making it a subject of interest in both psychological and medical research. Among these responses, heart rate variability serves as a significant physiological indicator, reflecting the autonomic nervous system's reaction to external stimuli such as music (Thayer et al., 2012). Understanding how different genres, tempos, and rhythms effect the heart rate may offer insights into the potential use of music in stress management, therapy, and overall well-being. Now-a-days the dynamic lifestyle of young adults provide an ideal group to explore these effects, offering insights into the potential of music for stress management and well-being. Recent studies suggest that music can significantly alter heart rate depending on the genre, tempo, and personal preference of the listener (Sills & Todd, 2015). Fast-tempo music tends to elevate heart rate, engaging the sympathetic nervous system, while slower music or personal favorites can lower it, promoting relaxation (Park et al., 2017). The heart, a vital organ that pumps blood throughout the body, is controlled independently of the central nervous system. External stimuli, such as sound, have been shown to affect heart rate, and music is considered a therapy for anxiety. Music is also widely important in the lives of adolescents, as listening to calming music can help reduce stress, lower heart rate levels, enhance mood, and improve cognitive performance. (Cordi, M. J., Ackermann, S., & Rasch, B., 2019). Music, whether it's classical or pop and rock, has the power to uplift our spirits and transport us to different states of mind. Soft music can calm the mind, reduce stress, and boost energy and motivation. In today's fast-paced world, music provides a sense of escape and deeper connection that is uplifting, inspiring, and healing. Rock music, with its powerful rhythms and passionate lyrics, can be a powerful therapy for individuals dealing with anger or

frustration. Its raw energy and intensity help break free from societal constraints and allow listeners to express themselves authentically.

2. Objectives:

The objective of the present study is to compare between the difference of Soft-music & Rock-music on heart-rate among young adults.

Hypothesis:

1. There is no significant difference between soft-music and rock-music on heart rate.
2. There is no significant difference between No music & Soft Music on heart rate.
3. There is no significant difference between No music & Rock Music on heart rate.

Method

Research Design

The research method used in data collection was performance based. After taking the consent and informing them the purpose of the study the test was conducted.

Sample: The sample initially consisted of 100 young adults between ages 19 to 23 years.

Tools

• Oximeter- is a medical device used to measure heart-rate and oxygen level in the blood non-invasively. The first pulse oximeter was developed in 1942 by British scientist Glen Millikman with conventional pulse oximetry being developed in 1972 by Japanese bioengineer Takuo Aoyagi.

•Earphone- is a mode of listening music. Research has shown that listening to slow music can decrease heart-rate, systolic and diastolic blood pressure, making it a calming and stress-reducing activity, the soft music which is used “Hamsadhwani” song. Rock music its rhythmic patterns, upbeats and dynamic instrument may increase heart-rate.

Procedure

The participant who gave the consent to participate in the research were provided with a consent form to fill up. The socio-demographic sheet was also provided which contain following details like: the name, age, sex, education qualification, residence, history of any physical or psychological illness, if he/she plays any instrument. They were given a brief about the procedure and purpose of the research. At first, we measured the heart-rate of the participant through oximeter, the participant was told to put earphone and they hear soft-music with 2 minutes duration after hearing the music we use the oximeter to measure the heart-rate. After listening to soft-music he/she is given rest for 3 minutes. The participant was told to put earphone and they hear rock-music with 2 minutes duration after hearing the music we use the oximeter to measure the heart-rate. After collecting all the data, we calculated the Mean & SD of Rock Music and Soft Music. Then we have done comparison between Rock Music & Soft Music; Soft Music & No Music; Rock Music & No Music. Normality of the data was checked and at the end, the results were drawn in tables, they were discussed below

3. Results and Discussion

Table 1: Values shown are the Mean & SD of Heart-rate for Soft-music & Rock-music

	No Music	Soft-Music	Rock-Music
Mean	92.6	91.7	93.1
SD	14.1	13.7	14.0

As the result table above depicts (Table 1) the mean score of No Music is 92.6; Soft Music is 91.7; Rock Music 93.1. The SD of No music is 14.1; Soft music is 13.7; Rock music is 14.0. It displays the proportional distribution of descriptive statistics, with no music having a mean score of 92.6, soft music having a score of 91.7, and rock music having a mean score of 93.1. These results indicate that individuals exposed to rock music tend to have slightly higher scores compared to those who listen to soft music or no music. It is worth noting that the difference in mean scores between the three music conditions is relatively small, suggesting that music may have a subtle in on overall performance. Further analysis is needed to determine the significance of these findings and explore potential underlying mechanisms. Further analysis is needed to determine the significance of these findings and explore potential underlying mechanisms to draw more definitive conclusions.

Table 2: Values shown are the T-values between Rock Music & Soft Music

	Statistic	Df	p
Rock Music	66.2	99.0	<.001
Soft Music	65.5	99.0	<.001

As the result table above depicts (Table 2) the statistic of rock music is 66.2, Degree of Freedom is 99.0, p value is <.001. The statistic of soft music is 65.5, Degree of Freedom is 99.0, p value is <.001. The results (Table 2) of this study shed light on the relationship between music and heart rate, especially when it comes to the difference between rock music and soft music on heart rate. This suggests that listening to rock music increases the heart rate and listening to soft music decreases the heart rate. This result proves the generally held belief that music increases or decreases the heart rate. Soft music induces a calming effect, reducing heart rate due to emotional, physiological, and psychological factors. It acts as a distraction, synchronizes with the body's natural rhythms, and releases neurotransmitters like dopamine and serotonin. Individual responses vary based on personal preferences and experiences. Some people may find that rock music has a calming effect on them, while others may feel more relaxed listening to soft music (Halbert, J. D., 2018). The important thing is to find the type of music that works best for everyone in terms of managing their stress levels and overall well-being. Regardless of personal preference, due to music there is physiological difference in our bodies and can be used as a tool for relaxation and stress relief (Van Dyck, et al,2017).

Table 3: Values shown are the T-values between Soft Music & No Music

	Statistic	Df	p
Soft Music	66.2	99.0	<.001
No Music	64.8	99.0	<.001

As the result table above depicts (Table 3) the statistic of soft music is 66.2, Degree of Freedom is 99.0, p value is <.001. The statistic of no music is 64.8, Degree of Freedom is 99.0, p value is <.001. The results (Table 3) of this study shed light on the relationship between music and heart rate, especially when it comes to the difference between rock music and soft music on heart rate. There is a significant difference in the heart rate between the control condition (no music) and the experimental condition (soft music). This suggests that listening to soft music increases the heart rate as compared to when there is no music. On the other hand, the results also showed that there was a decrease in heart rate when participants listened to rock music compared to the control condition. This indicates that rock music has a calming effect on the heart rate. These findings support the idea that different types of music can have varying effects on the body's physiological responses. Further research is needed to explore the mechanisms behind these effects and how they can be utilized in therapeutic settings (Sills, D., & Todd, A., 2015).

Table 4: Values shown are the comparison between Rock Music & No music

	Statistic	**Df**	**p**
Rock Music	66.5	99.0	<.001
No Music	64.8	99.0	<.001

As the result table above depicts (Table 4) the statistic of rock music is 66.5, Degree of Freedom is 99.0, p value is <.001. The statistic of no music is 64.8, Degree of Freedom is 99.0, p value is <.001. The results (Table 4) of this study shed light on the relationship between music and heart rate, especially when it comes to the difference between rock music and soft music on heart rate. There is a significant difference in the heart rate between the control condition (no music) and the experimental condition (rock music). This suggests that listening to soft music increases the heart rate as compared to when there is no music. This suggests that listening to rock music decreases the heart rate as compared to when there is soft music. These findings highlight the potential of using music as a tool in therapeutic interventions for managing heart rate and stress levels. Incorporating soft music into relaxation techniques may help increase heart-rate variability and promote a sense of calm. On the other hand, utilizing rock music in interventions aimed at reducing heart rate may be beneficial for individuals who experience high levels of anxiety or arousal. Overall, the results of this study provide valuable insights into the relationship between music and heart-rate regulation, offering new possibilities for incorporating music into therapeutic practices (Van Dyck et al., 2017)., particularly for those dealing with stress-related conditions such as anxiety disorders. The findings suggest that music can be a powerful tool in managing heart rate and promoting emotional well-being. By incorporating music into therapeutic interventions, individuals with anxiety disorders may find relief and support in managing their symptoms. This research opens up new avenues for exploring the potential benefits of music in promoting overall mental and physical health. Further studies can continue to investigate the specific ways in which music can be utilized to support individuals in managing stress and anxiety.

4. Implication

The implication of this study highlights the significant effect of auditory stimuli on physiological response, suggesting potential applications in therapeutic settings. By demonstrating that various genres and tempos of music can alter heart-rate, this research supports the notion that tailored music interventions could be effective in stress management and relaxation techniques (Smith et al.,2023). Such findings align with prior studies indicating music elicits autonomic responses, which could guide future research toward

developing personalized music therapies to support cardiovascular health and emotional well-being in young adults (Johnson & Liu, 2021).

5. Conclusion

This research attempted to study the difference between Rock Music and Soft Music on Heart-rate of young adults aged 19 to 23 using Rock Music and Soft Music. The result obtained shows that “There is a significant difference between soft-music and rock-music on heart-rate”. “There is a significant difference between No music & Soft Music”. “There is a significant difference between No music & Rock Music”. So, we are rejecting the null hypothesis and accepting the Alternative hypothesis.

Author Biography

Shrishti Guha is currently Masters student of Sister Nivedita University working under Sudeshna Roy who is an Assistant Professor at Sister Nivedita University.

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Appendix

Consent form

Name: Shrishti Guha

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Supervisor: Dr. Sudeshna Roy (Assistant Professor, Department of Psychology, Sister Nivedita University, Kolkata) Institutional contact: Sister Nivedita University, Newtown, West Bengal.

Hello, you are invited to participate in a study conducted by Shrishti Guha, a first-year student of M.Sc. in Applied Psychology, Department of Psychology, Sister Nivedita University, Kolkata. Participation in this study is voluntary. If you agree to participate, I will explain this study to you. Your name will not be revealed anywhere and except me, no one will be able to see your information or even know whether you have participated in this study or not. When the study is completed and the data have been analysed, the list linking participants to the study numbers will be destroyed. I would remain obliged if you provided data honestly. Your participation will help in making this research successful. If you have any doubts or queries, feel free to ask. Thank you for your participation and cooperation.

I _____, age _____, residing at _____ Give my consent to Miss. Shrishti Guha, to use the details which is needed for her research purpose. I also understand that I can waive any claim for copyright to this material should the researcher ever publish it in a scholarly journal and electronic format online. I was fully informed about the procedure and I also have been informed that all the information and the data gathered will fully be used for research purposes. I also understand my details and information will be kept confidential and she will maintain my anonymity with regard to my response to the questionnaire items. I hereby give my consent in the form of my signature below.

Signature of the participant _____

Date _____

Signature of Researcher: _____

Socio-demographic Sheet

Name (in initial):

Age:

Contact details (any):

Sex: Male / Female / Any other

Education Qualification

Residence: Urban/Rural

If you play any instrument: Yes/No

Do you have a history of any physical illness? (If yes then please specify) Yes/No

Do you have any history of psychological illness? (If yes then please specify) Yes/No

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This research paper builds upon work titled "A comparative study on music and heart-rate among young adults", supported by insights and foundational research in the field. The study has been drawn from methodologies and prior experiences in exploring the intersection of psychology, physiology, and music. I acknowledge the contributions of earlier studies and guidance from experienced mentors in shaping the research. I extend my gratitude towards the participants whose involvement made this study possible and for their support and resources during the process.