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Effect of Different Genres of Music Listening on Simple Reaction Time in Young Adults

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Abstract- Reaction time is the duration between presentation of a sensory stimulus to the elicitation of an appropriate response. The technological revolution in the past few decades have brought music closer to our lives. This study was undertaken to assess the effect which listening to music had on ones reaction time while taking the genres of music into account. 35 young healthy students were selected and their reaction times were assessed without music then while listening to classical followed by rock music. The simple reaction time was assessed using the PC-1000 reaction time apparatus. The mean visual reaction time without music was found to be 181.60 ± 31.73 ms. The mean visual reaction time on listening to classical music was 187.71 ± 27.68 ms and while listening to rock music it was 191.20 ± 22.89 ms. Students Paired "t"- test was used to assess any changes between the different scenarios. P-value of <0.05 was taken to be significant. On analysis of the data it was found that the prolongation of reaction time while listening to rock music compared to while not listening to music was statistically significant (p = 0.041).

I INTRODUCTION

Music is a phenomenon loved by everyone. Human beings across all cultures since time immemorial were found to have some form of music associated with significant moments in their lives from festivals to funerals. The very idea of early man dancing around a bon fire to the beats of a drum captures our imagination as children. We in our fast paced lives of this technological age still make time to indulge ourselves with music while we commute to and from work. Music is known to affect our mood. Documentary evidence exists to support the effect of music listening on the mental processes. "The Mozart Effect"[1,2] is one such example coined by Alfred A Tomatis et al. The Mozart effect was further studied by Rauscher et al where subjects who were made to listen to Mozart's sonata for 2 pianos k448 were found to have better temporal spatial reasoning skills.

Reaction time is the time duration between the presentation of a sensory stimulus to the elicitation of an appropriate response. First coined by Austrian physiologist Sigmund Exner.

The general sequence of events taking place when eliciting a reaction:

Stimulus → Sensory Neuron → processing center → Motor Neuron → Response

There are different types of reaction times. Simple reaction time is where there is one reaction for one stimulus. Recognition reaction time involves one response to a particular set of stimuli and not for others and Choice reaction time involves different responses for different stimuli.

Reaction time is influenced by many factors such as the consumption of stimulants including nicotine[3,4]or caffeine[5] in the form of smoking or sedatives like alcohol[6]. Reaction time is also altered in disease conditions like hypothyroidism and hyperthyroidism[7]and parkinsons disease[8].

Reaction time reflects the level of physical and mental integration of a subject.

In this study we explore the effect of music listening of the classic and rock genres on reaction time.

Objective:

1. To determine the effect of music listening on visual reaction time.
2. To compare the effects of different genres of music on visual reaction time

II DESIGN AND METHODOLOGY:

Source of the data

Thirty five healthy students from Rajarajeswari Medical College were taken aged between 17-25years, based on the study criteria. The in house built PC-1000 reaction time apparatus was used to measure the reaction time.

Exclusion criteria

1. Alcoholics
2. Smokers
3. Psychological disorders or on treatment
4. Thyroid disorders
5. Uncorrected visual or auditory impairments
6. Musculoskeletal injuries or disorders
7. Subjects who skipped breakfast on the day of recording
8. Subjects who received inadequate sleep the previous night(<7 hours)

Statistical Plan For Data Analysis:

Paired "t"-test was employed to evaluate the difference in reaction time before and during listening to music. P-value of <0.05 was taken as significant. Microsoft Excel 2010 software was used to analyze the data.

IV RESULTS

The mean visual reaction time without listening to music was found to be 181.60 ± 31.73 ms. The mean visual reaction time insubjects listening to classical music was 187.71 ± 27.68 ms and in subjects listening to rock music it was 191.20 ± 22.89 ms. Significant prolongation of visual reaction time on listening to rock music was noted when compared the scenario without any music (p-value=0.041). The prolongation of visual reaction time while listening to classic music on statistical analysis was insignificant.

V DISCUSSION

In the present study, the subjects reaction time was evaluated while listening to music of different genres (classical and rock) and compared with that of a control group (no music)

The classical piece being Mozart's overture to the magic flute and the heavy rock song "Hopeless" from the band Breaking Benjamin. Both of which were found to prolong the reaction time.

A number of studies have been published on the effect of music on reaction time with varying conclusions. This could be due to the varied selection criteria in the study protocol for the different genres of music (like classical, rock, techno, dubstep, night core or hip-hop), whether it is vocal or instrumental and also could be due to familiarity of the song with the subjects.

Edward Mjoen[11]in his study oncomparing memory recollection and reaction time in which the subjects were made to listen to 3 forms of music:Popular Radio Music, popular Radio Music Played Classically and Unfamiliar Radio Music Played classically found that the unfamiliar music played classically yielded the fastest reaction times of the 3 scenarios though it was not clinically significant.

Prasad BK in his study on the effect of listening to rock and instrumental music on the reaction time showed a significant improvement to the reaction times of the subjects while listening to the music[12].

The findings in a study performed byMajaMesko et al in 2009 on the effect of listening to techno music

on reaction times to visual stimuli in 10 subjects had shown that there was a significant reduction in the reaction time of the subjects 30 minutes after listening to techno music and not during the time of the listening[13]. A possible explanation for this studies findings could be that that the human brain is not built to multitask but to tackle one task at a time including music. While listening to music the mind may be diverted from focusing on one particular task[14]. When carrying out two or more tasks at once one is merely juggling his/ her attention between each task. Hence any of the tasks becomes a distraction for the other one. Our mind has limitations on the extent of our cognition so when we carry out 2 or more tasks the attention given to one task there is little attention available for the other task. Music listening can be an engrossing task especially vocal music which could be understood by the listeners that could be compared to listening to a conversation. Another possible reason for rock music prolonging reaction time may be due to their faster beats or tempo which may have a negative influence on reaction time. The reaction time is influenced by the degree of arousal/stress which is best maintained to optimal levels, which when to low or too high is known to delay reaction times. On listening to rock songs there may have been increased level of arousal/stress which may have delayed the reaction time and on listening to the classical music there may have been a reduction in stress/ arousal that caused the slight though not statistically significant delay in the reaction time.[15,16]

Music though appearing harmless is actually able to delay reactions by distracting and possibly affecting cognitive processing by the brain.

VI CONCLUSION

Listening to both classical and rock music were found to prolong the reaction time in the subjects. But while the prolongation was significant with rock music it wasn't the case with classical music perhaps making it safer to listen to while performing tasks like driving.

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