

How Sanskrit Hymns Affect the Human Brainwaves

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ABSTRACT

I have always been passionate about the Sanskrit language and the mysteries that lie behind it. I have for a long time tried to connect Sanskrit to science and find a common link between them. While doing some research I came across this fascinating idea of the effect that Sanskrit hymns have on the human brainwaves and decided to explore on this topic further. After detailed research I conducted this experiment to show the effect of the Sanskrit hymns on human brainwaves on a computer, by conducting the EEG test. This research opens a window to new ideas that can show the wondrous effects of Sanskrit on the human body.

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Questions I want to Address

1. What is the effect of Sanskrit stotrams (hymns) on brainwaves?
2. What makes it stand out from general music which also has an effect on brainwaves?

Hypothesis

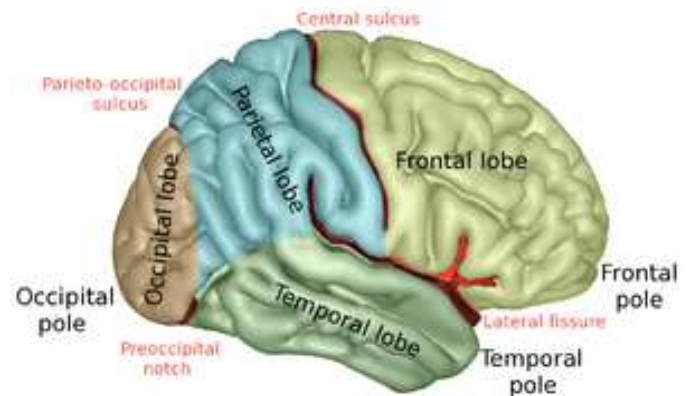
3. Different genres of Sanskrit hymns affect the state of our brain in a predictable manner and therefore can be harnessed as a cure for problems like depression, insomnia and focus issues for students

Aim of the Project

4. To find out effect of Sanskrit stotrams (hymns) on the brainwaves. The primary tool used is the Electroencephalogram (EEG) which is a test that measures electrical activity in the brain using small, metal discs (electrodes) attached to the scalp. Brain cells communicate via electrical impulses and are active all the time and shows up as wavy lines on an EEG recording.

SIMILAR STUDIES

5. There have been many studies done before, correlating music to the effect it has on the brainwaves. However I have only referred to a few below, that I could relate with my topic wherein music has been proven to have a soothing effect on brainwaves.



- a. Changes in alpha band EEG activity in the frontal area after stimulation with music of different affective content - *T Iwaki, M Hayashi, T Hor*
- a. This study investigated the stimulating effects of music. Twelve-channel EEGs (Fp1, Fp2, F7, F8, Fz, C3, C4, Pz, T5, T6, O1, O2) were recorded on 10 students during periods of baseline, premusic rest, music (stimulating or calming), and postmusic rest.
- b. The findings implied close relationships between the interhemispheric transmission of information in the frontal areas and positive attention to stimulating music.

- B. Emotions, arousal, and frontal alpha rhythm asymmetry during Beethoven's 5th symphony- *Christian Mikutta , Andreas Altorfer, Werner Strik, Thomas Koenig*
- a. A total of 19 participants listened to the first movement of Ludwig van Beethoven's 5th symphony (duration: ~7.4 min), during which a continuous 76-channel EEG was recorded. In a second session, the subjects evaluated their emotional arousal during the listening.
- b. The results indicate that music is a powerful arousal-modulating stimulus. The temporal dynamics of the piece are well suited for sequential analysis, and could be necessary in helping unfold the full emotional power of music.
- C. Emotions induced by operatic music: psychophysiological effects of music, plot, and acting: a scientist's tribute to Maria Callas - *Felicia Rodica Balteş 1, Julia Avram, Mircea Miclea, Andrei C Miu*
- a. The present study investigated the effects of music, plot, and acting performance on emotions induced by opera
- b. These results indicate that the multiple musical and dramatic means involved in operatic performance specifically contribute to the genesis of music-induced emotions and their physiological correlates.
- D. The impact of music on the bioelectrical oscillations of the brain – *Domantė Kučikienė1, and Rūta Praninskienė*
- a. This study seeks to determine the impact of music in such conditions as disorders of consciousness, psychiatric diseases, and chronic conditions, as well as to further explore the role of music for rehabilitation purposes.
- stotram' and 'rudrastakam stotram' composed by Ravana and Rama respectively. Now, both the stotrams convey the same message. But the only difference is in the way the syllables are produced.
8. This is a very subtle yet strong depiction of the power of the Sanskrit language. This shows that its not just hearing the language that makes the difference, there are various factors that come into account. Namely-
- a. The person's understanding of the language
- b. The way the person is pronouncing the syllables
- c. The rhythm with which the stotram is sung (if it is just pronounced as a poem or if it is sung as a song)
9. This is why temples for so many centuries have been playing the Vishnu Sahasranam in the morning and the Lalitha sahasranam in the evening. Even the temple architecture was such that In the confines of the prayer hall and the sanctum sanctorum constructed with stones, the sound is amplified and has an mesmerising effect on the subject.
10. Unfortunately, the reason for following the rituals was never revealed by the temple priests and over time scientific thought became rigid practices to be followed without application of thought or debate. One possible reason could be that though the popular language of the era was sanskrit, not everyone had a scientific temper. So to ensure that everyone benefited from the knowledge of a few, scientific practices was imposed in the garb of religious diktats. The fear of celestial / mortal punishment rather than rational thought was the incentive used to ensure compliance to rituals.
11. Irrespective of the reasons, we are not fully aware about the scientific rationale behind many rituals followed as stipulated in the vedas and upanishads.

CONNECTIONG MY RESEARCH TO THE ABOVE SHOWN RESEARCHES

6. The study I did was to show how each syllable in the Sanskrit language has a unique effect on brainwaves. The studies I have referred above, connect various forms of music to the effect they produce on the human brainwaves. And in my hypothesis, sanskrit slokas or hymns, has varied effects on the impulses produced by the brain thereby having a direct correlation on the behavioral pattern of the person under observation.
7. Through my project, I am trying to bridge the gap with these well-known researches and show how sanskrit hymns can either energise or calm down the brainwaves. There are two very famous stotrams in the Indian history dedicated to lord shiva, a hindu god. They are the 'shiv tandav

ADDITIONAL REQUIREMENTS TO BE FULFILLED

12. The research I have undertaken is to prove that there is a connection between sanskrit hymns and our brain waves. A lot more detailed research needs to be undertaken to come up with data backed conclusions. A few of the areas which need to be explored are:-
- a. Study the effect of rock music on our brain.
- b. Compare the behaviour of EEG under influence of 'rock music', 'Lalitha Sahasranam stotram' and 'Vishnu Sahasranam stotram' with EEG under silent surroundings.

- c. Detailed study of different types of Sanskrit hymns to establish the uniqueness of the language and its difference from modern music.
- d. Quantify and Qualify the effect of different types of music on our brain and whether this knowledge can be harnessed to achieve the original aim that is, to cure problems like Insomnia, Depression and focus issues in students.

CURRENT LIMITATIONS

13. I only performed the experiment on two participants whereas the subject group needs to be diverse from different backgrounds, intellectual levels, economic state, religious beliefs etc.
14. The duration of test needs to be longer with a neurologist at hand to analyse the variation in the EEG as the environment conditions are changed.

METHODOLOGY OF THE EXPERIMENT -

15. For conducting my experiment I went to the hospital which was situated nearby my residence, The Army Base Hospital. My father, an officer in the Indian Navy, requested the Head of Neurology department who facilitated the conduct of the EEG experiment.
16. When I entered the lab, I observed a lot of interesting things, the EEG graphs showing various factual input, the bed, the scanner that was connected to the stand and the electrodes that were kept nearby. There was also a camera which relayed the live feed of the patient to the Neurology specialist enabling him to monitor the state of the patient under test.
17. For the test I had to lay down on a bed. The EEG specialist attached the electrodes to my head with the help of a certain adhesive. These electrodes were of different colours as they had to be attached specifically to certain parts of my head.

These electrodes were connected to a computer which then mapped my brainwaves.

18. For each subject under test, the neural impulses were mapped under three different circumstances. The first reading we took was when there was no music played and my brainwaves were in a normal state. The second reading was when the Vishnu Sahasranam stotram was being played and the third reading was when the Lalitha Sahasranam stotram was being played.
19. The same test was conducted for my mother as well to see if there was any differences being observed. Her brainwaves did react differently to the music that was played. After observing both of our readings I concluded that the factors on which the outcome of the readings depend on are-
 - a. The subject's understanding of the language
 - b. The way the subject is pronouncing the syllables
 - c. The rhythm with which the stotram is sung (if it is just pronounced as a poem or if it is sung as a song)
 - d. The subject's general behavior (if they are chirpy by nature or quiet by nature)
 - e. The emphasis of certain syllabi helps to give positive signs to the brain.
20. In conclusion, I would like to state that our ancestors had knowledge about many aspects of science including the effect of sound on the brain and used this knowledge effectively to lead a healthy life. These practices though moored on the foundation of science, were presented to the public clothed in the veneer of religion to ensure widespread acceptability. It should therefore be our endeavour to unearth the science behind our habits to benefit from the knowledge of our ancestors.