

Letter to editor

Psychoacoustic and cognitive effects of brain oscillations during listening to Fatihah Chapter

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Dear Editor,

The Holy Quran has a complete literary structure includes diction, phonology, rhetoric, composition, morphology, syntax, architecture, rhythm, style, and in addition, tone, voice, intertextuality, intratextual resonance, and other literary aspects that described by many linguists as a sensitive piece of genre that exemplifies the peak of literary beauty¹. In the context of innate stimulus, language is such an exogenous stimulus to human. As musicologists assent that rhythm is crucial to music and has relaxation effect², Holy Quran also does. Quranic rhyming system was suggested to have capacity to relax people and eliminate negative thoughts and stress besides embracing the positive thought³.

Besides, its sweet euphony sound of Holy Quran recitation psychoacoustically is thought to give harmonious effect to brain as it generates synchronization with neuronal oscillation during

melodious Quranic listening. This significantly rhythmic in the global, frontal and temporal brain regions as suggested by⁴ indicates the relaxing and cognitive enhancement effect as the frontal and temporal regions denoting emotional processes. Interestingly, these brain areas had also been previously shown to be involved in the attention and cognition from meditation practices⁴.

Enticingly, how the *huffaz* make it possible to memorize the whole Holy Quran supported the idea that memorizing this original scripture from The Almighty could enhance one's memory capacity and cognition, and for those who are listening to its recitation it is believed that the Holy Quran alters the brainwaves producing neuronal excitation⁵ engaging with cognitive enrichment. This brainwave entrainment could support neural communications producing tonic and phasic synchronization in delta and theta wave ranges⁶. The phenomenon

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of brainwave synchronization likely precedes the process of synaptic plasticity that underlies the learning and long term memory development. Synapses changed and neurons connected each other. Each are producing their own electrical signals and brain oscillation that humming together when they get stimulated by auditory brainwave stimulation from Holy Quran recitation. Frontal midline theta (Fm θ) power changes have also been documented in⁷ music listening study that had been correlated to relaxation. MEG visualization over attentional processing suggested that Fm θ reflects alternative activation of the prefrontal and anterior cingulate cortex (ACC) in human brain during attentional demanding task using arithmetic calculation^{8,9}. In addition, theta and alpha oscillation are attributed with multifunctional neuronal network associated with orienting, attention, memory, affective and cognitive processing¹⁰. Thus, activation of theta, alpha and even delta power would be a robust indicator of relaxing and cognitive effect produced during listening to the seven repeatedly of the Fatihah Chapter.

“This is the Book. In it is guidance surely without any doubt, to those who fear God, who believe in the Unseen, are steadfast in prayer, and spend out of what we have provided for them.”
(Baqarah Chapter, Verses 2 and 3)

Besides being supreme authority in Islam and source of fundamental and essential of Islamic creed, laws, ethics and guidance, The Holy Quran has additional effects to human. Listening to its unique and beauty literary rhythms psychoacoustically gives effects to human emotion, cognition and speech¹¹. Its effect as a therapy and relaxation to an individual even if the person who does not understand the meaning of the verse¹² has propagate the relaxation effect to Muslims the world over. Compared to music and sound therapy which has the similar relaxation effect, listening to Fatihah Chapter recitation is expected to have a better result since its content could be psychotherapeutic whilst music has some adverse effects and can interfere with complex cognitive process¹³.

Music dominates human cultural universals since decades, conjures a wide range of emotions from joyous to miserable, from exhilarating to relaxation, fear to comfort and even combination of these¹⁴. In

facts, the notion of ‘music is medicine’ has been rooted in history and extended to contemporary clinical settings as for pain management, relaxation, psychotherapy¹⁴ and personal development¹⁵.

For its miraculous potential, we seek to decode its linguistic rhythmic neural and cognitive correlates of its psychoacoustical effect which was believed to act as therapeutic ingredient as had been proven giving enhancement in cognitive function. In this study, The Holy Quran is recognized provisionally as Quantitative Verse for its nature of prose-poem metric rhythmicity and beautiful audible that gives fascinating brainwave entrainment on every single listener. This study is done by stimulating subjects’ auditory evoked potentials by listening to Fatihah Chapter recited by Sheikh Qari Abdul Basit Abdul Samad compared to Arabic News and rest for control treatments. These verses were given in measured lengths those in 5, 8, 6, 6, 10, 8 and 20 seconds. Subjects were sitting with closed eyes in a sound treated quiet room with dimmed light while the brain electrical data were recorded by using electroencephalography (EEG) and 128-electrode sensor net with the impedance of <50K Ω . Their brain oscillatory waveforms were analyzed by Fast Fourier Transform to get power in specific frequency bands. These upcoming results in relate to cognition, emotion and relaxation is hoped to give impetus for knowledge of harmonization effects provided by Quranic recitation to the human mind, body and soul.

Ethical approval:

This research proposal was accepted and approved by Human Ethical Committee at Universiti Sains Malaysia, Kelantan (Human Ethical Committee of University Sains Malaysia (USM/KK/PPP/JEPeM [234.3.(09)]).

Conflict of interest: None declared

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Author contribution statement:

Ismail Samhani, Tahamina Begum and Mohammed Faruque Reza carried out the experiment. Mohammed Faruque Reza is idea owner of this study. Ismail Samhani performed data analysis, prepare this manuscript and submit with support by Mohammed Faruque Reza, Zamzuri Idris and Jafri Malin Abdullah. Hafizan Juahir verified the analytical method. All authors provided critical feedback and helped shape the research, and analysis.

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