

The Comparison of Classical Music, Relaxation Music and The Qur'anic Recital: an AEP Study

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Abstract. Some Moslems believe that their holly book (The Qur'an) had special features besides just the divine revelation of God. They recite (reading or listening to) certain chapters or verses for some certain occasions, i.e. when some ones is dying, exorcism, healing the sickness or illness, etc. They also said that they feel composed after The Qur'anic recitals. Meanwhile, classical music and relaxation music are the common auditory stimulus. The relaxation music is the instrumental music mixed with natural sounds. So, we studied the effects of these auditory (classical music, relaxation music and the Qur'anic recital) in the electroencephalography record and compared to each other. It is an auditory evoked potential (AEP) study. We recorded the AEP of 5 subjects of volunteer while they are listening to classical music, relaxation music and the Qur'anic recital that we were prepared. The AEP records of classical music and relaxation music are same as any others study. They are dominated with α -wave. But, the AEP record on the Qur'anic recital was dominated with δ -wave. Worrying of this sleep response, we took another 5 subjects of volunteer to record theirs AEP response under the others Qur'anic recital. Again, they're dominated with δ -wave, tough all subjects did not fall asleep. So, we concluded that the Qur'anic recital has different feature from the others two: it could be used for sleep-disorder therapy.

Keywords: The Qur'anic Recital, Auditory Evoked Potential, δ -wave and sleep-disorder therapy.

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INTRODUCTION

The brain is the greatly modified and enlarged portion on the central nervous system (CNS), surrounded by three protective membranes and enclosed within the cranial of the skull. Any psychomotor activities are controlled from central nervous system. Electric record from the surface of the head demonstrates continuous oscillating electric activity within the brain. Both the intensity and the patterns of this electric activity are determined to a great extent by overall excitation of the brain. The undulations in the recorded electric potential are called brainwaves and the entire record is called an electroencephalograph/EEG (Webster, 1992).

TABLE 1. Brainwave categories.

Category	Frequency (Hz)
δ (Delta)	0.5 – 3.0
θ (Theta)	3.0 – 7.0
α (Alpha)	7.0 – 13.0
β (Beta)	13.0 – 22.0
γ (Gamma)	22.0 – 30.0

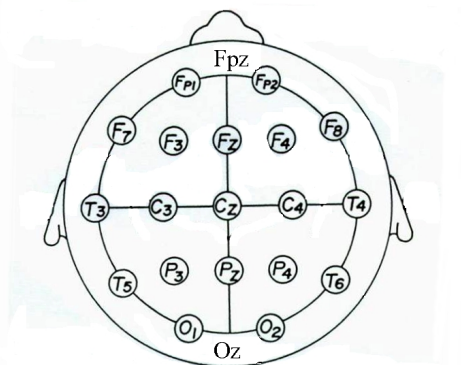


FIGURE 1. 10-20 electrodes placement system

The use of sensory stimuli evoked brain potentials in the study of attention and cognitive processing has a long history. Early studies have made extensive use of "transient" evoked potentials, which are computed by averaging a large number of repetitive responses to separate the desired signal from concurrent "noise" (Collura, 1996). The common stimuli are vision (visual) (Collura, 1996) (Kim, 1998) and auditory (sound) (Collura, 1996) (Ohashi, Nishina and Kawai,

1991) (Miki, Watanabe, and Kakigi, 2005), so, the brain response known as auditory evoked potential (AEP) and visual evoked potential (VEP).

In the field of AEP the researchers use tone (Ohashi, Nishina and Kawai, 1991), music (Esmeralda and Tjokronegoro, 2003) (Karmilasari, Muchtadi and Kurniadi, 2003) and human sound (Miki, Watanabe and Kakigi, 2005) that was words or non-words, as the stimulus.

In addition, we use the Qur'anic recital considering to the phenomenon that are occurred in Moslems societies. They believe that some Qur'anic recitals had some kind special features including can bring the reader and/or the listener composure or relaxed. Meanwhile, some previous researchers have found out that when subjects are composure or relaxed, their brains produce α wave which could be seen in their EEGs records (Esmeralda and Tjokronegoro, 2003). We wonder if the Qur'anic recital had same effect as the music does to the brainwaves which are categorized based on their frequency range to δ , θ , α , β and γ , as presented in Table 1.

TABLE 2. Bipolar recording method

Channel	LOCATION (BIPOLAR)	
Channel 1	RIGHT	Fp2 - F4
Channel 2		F4 - C4
Channel 3		C4 - P4
Channel 4		P4 - O2
Channel 5	LEFT	Fp1 - F3
Channel 6		F3 - C3
Channel 7		C3 - P3
Channel 8		P3 - O3

RESEARCH METHODOLOGY

First stage of our study is taking 8 EEGs bipolar recording method (Table 2) using 10-20 electrodes placement system (Figure 1) from all subject-volunteers while hearing auditory stimulation as the data to be evaluated. On preparation stage before the study, we picked an instrumental music from Therapy Sound: Wind of Change, Badinerie from Orchestral Suite No.2 in B minor of Johann Sebastian Bach and the Qur'anic recital for auditory stimuli. Then we arranged them in the order as shown in Table 3., with 20 seconds spatial time in between. We also picked 5 subject-volunteers that classified into three categories based on their understanding to the Qur'anic recital: non-Moslems (2 subjects), mild-Moslems (2 subjects) and advance-Moslems (1 subject).

TABLE 3. The Auditory stimuli

No.	Auditory Stimuli	Duration (minute)
1	Relaxation Music1	3:53
2	Classical Music1	1:35
3	Qur'anic Recital	13:46
4	Classical Music2	1:35
5	Relaxation Music2	3:53

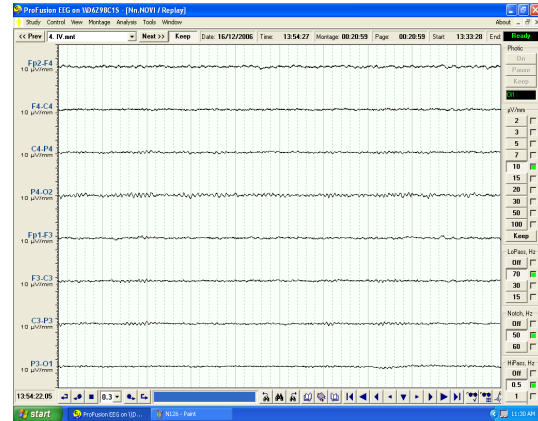


FIGURE 2. A 10 seconds data segments

For each stimulant, we collected all data from every channel (Figure 2) to form data segments. These segments, for each stimulant and every channel, were merged in serial time as one sequent (Figure 3). So, for every subject-volunteer we had 8 sequent to be analyzed.

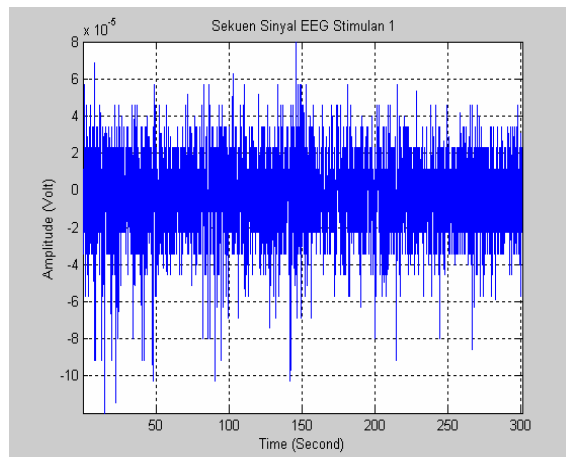


FIGURE 3. A sequent from channel Fp2-F4

Since the data we had in time domain (Figure 3), we need to transform them to frequency domain for evaluating. We used Fast Fourier Transformation (FFT) to do the job, and we got the frequency spectrum, i.e. frequency spectrum of Figure 3 is seen

on Figure 4. Then, the frequency spectrum filtered fitting the brainwave categories in Table 1 and representing in histogram spectrum (Figure 5). The EEG record is split to its brainwave components, so we could found out its component ratio.

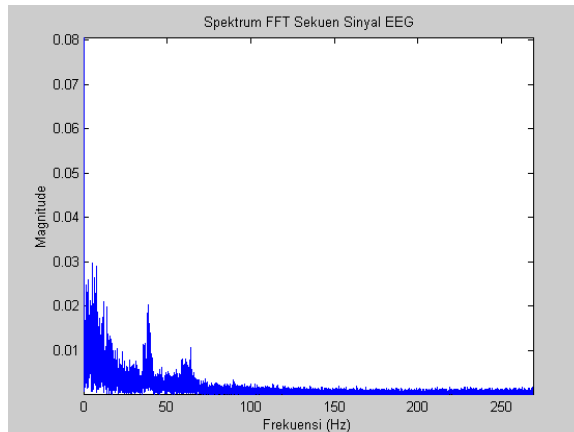


FIGURE 4. Frequency spectrum of Figure 3.

The data are evaluated in absolute and relative point of view. The absolute evaluation is to see the dominant brainwave, which occurred as averaging spectrum-frequency along the hearing duration for each recital. To see the response for each stimulant, we took relative evaluation. We analyzed the dynamic of brainwave components under the auditory stimulation relative to the pre-stimulation condition.

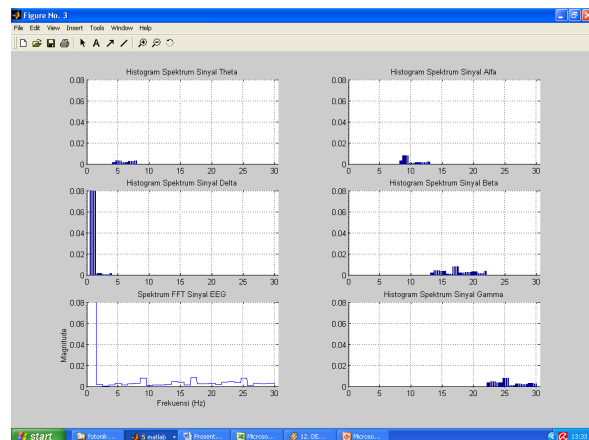


FIGURE 5. Histogram spectrum of Figure 4.

RESULT AND DISCUSSION

From the 5 subject-volunteers we acquired a graph of the brainwave components under auditory stimulation as shown in Figure 6 and a graph of the dynamics of brainwave components under stimulation relative to pre-stimulation as shown in Figure 7 (Wulandari and Abdurrochman, 2007).

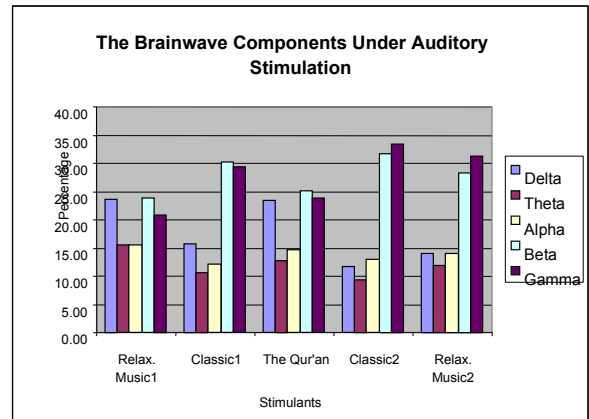


FIGURE 6. Brainwave components under auditory stimulation.

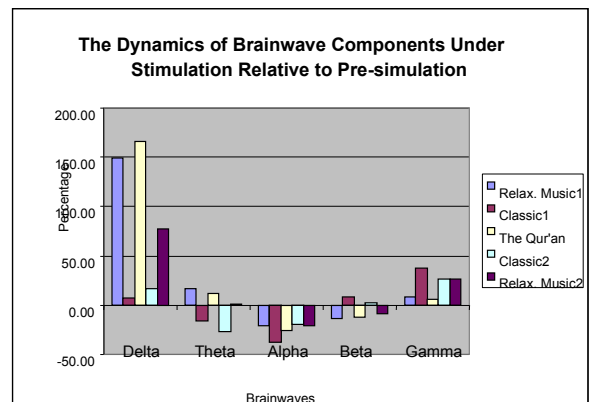


FIGURE 7. The dynamics of brainwave components under stimulation relative to pre-stimulation.

The first three stimulations (Figure 6) are dominated with δ and high frequency component while the last two stimulations are dominated with β and γ . Perhaps, it indicates the stressed that occurs from the long recording process. So, we just concentrate to the first three stimulations.

The brainwave components of Relaxation Music1 and the Qur'anic recital possessed identical figure (Figure 6). Their dynamics also increased δ (Figure 7). It might be the evident of the same response of brain to these two stimuli, that the Qur'anic recital could be used for relaxation therapy. As for classical music, some therapist used certain classical composer for different purposes. They usually used Bach's music for expanding the courage or spirit. Its brainwave components composition has graphed it all (see Figure 6).

But, the Qur'anic recital duration (13:46 minutes) that much longer than Relaxation Music1's might be the suspect of its dynamic high percentage on δ (166.47%) as seen in Figure 7. To test this possibility, we took another experiment. We picked another 5

different subject-volunteers that also classified into three categories based on their understanding to the Qur'anic recital: non-Moslems (1 subject), mild-Moslems (2 subjects) and advance-Moslems (2 subjects). And, we prepared 4 different Qur'anics stimuli as seen in Table 3 (Fatimah and Abdurrochman, 2007).

TABLE 3. The Qur'anic recitals

No		Duration (minute)
1	Shalawat recital (Q1)	5:01
2	Pass-praying Dzikir recital (Q2)	7:44
3	Healing Tahlil of Ustadz Haryono (Q3)	2:54
4	Asma'ul Khusna recital (Q4)	3:27

Then, we used the same methodology as previous experiment resulting Figure 8 and Figure 9.

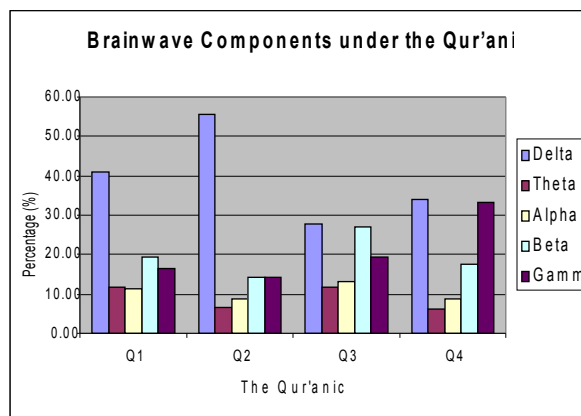


FIGURE 8. Brainwave components under the Qur'anic stimulation.

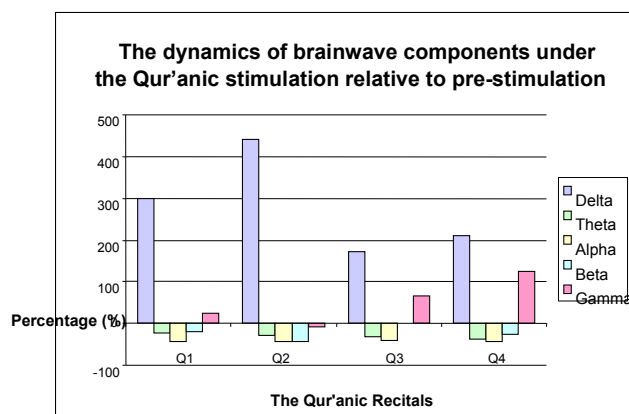


FIGURE 9. The dynamics of brainwave components under the Qur'anic stimulation relative to pre-stimulation.

Brainwave component during the Qur'anic recital stimuli are dominantly evoked δ above 25% (Figure 8). And, all of their dynamics increase the percentage ratio of δ waves (Figure 9).

It is turn out, that the entire Qur'anic recital (from experiment 1 and 2) evoked δ dominantly and dynamically increased the percentage ratio of δ wave, the typical wave produces when one is sleeping.

Before and after the EEGs recording session we collected additional data by interviewing subject-volunteers. They all claim that during the recording session they were not sleeping, but awaking, even though they were blindfolded. It is an interesting phenomenon; the brain was indicating sleeping in awaking condition. Kakigi said, if the frequency bands peaking at low frequency (alpha) was much increased when compared with non-stimulating state, it might mean the subject was very relaxed, though he did not fall asleep (Kakigi, et.al., 2005).

SUMMARIES

Our study on this AEP study had confirmed that music, i.e. from the album Therapy Sound: Wind of Change, could bring relaxation to the subject who heard it. It might be so, if it was prepared for this purpose. And, the same effect occurred when you heard the Qur'anic recital. But, if you preferred classical music, it must be noticed that not all classical compositions had the same effect in relaxation.

As for the Qur'anic recital, they posses another features. It is slowing down the brainwave, as Relaxation Music, but even slower to frequency of sleep condition but still awake. It is giving us the idea, that the Qur'anic recital may be used as the operating therapy in sleep disorder.

Delta wave is appearing in Stage 3 (20%-50%) and Stage 4 of sleep (above 50%), the most important part of sleep. These two stages, also known as slow-wave sleep, are the restorative sleep stage (Kirtland, 2003). It may serve to conserve energy because metabolism and body temperature decrease at this time.

Finally, not every auditory (music) had all therapy effects. It depended to the purposes and the effect that mend to be gaining with.

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