

A PRELIMINARY STUDY ON EFFECTS OF READING AL-QUR'AN AND COMIC TO HUMAN BRAINWAVE USING EEG

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Abstract - This research focuses on the effects of reading Al-Qur'an and comic to human brain wave activity measured using EEG. In this research, both left and right side of human brainwave is recorded using non-invasive technique called EEG. All 30 samples were testing almost five minutes per reading and all results were recorded. Before being tested with EEG, each sample will be interviewed with several questions that were related to this research. During this test, each sample must read same surah of Al-Qur'an and same comic to get results consistently. This research only focuses on the beta wave. In conclusion there is correlation on beta wave signal for left and right side before reading and during reading Al-Qur'an and comic.

Keywords: EEG; Brain Waves; Al-Qur'an; Comic; Beta Wave

1.0 INTRODUCTION

The brain is the most complex part of the human body. This organ is very important because intelligence, senses, body movement, and behaviors depend on it [1]. The brain in each person has their own wave depending on the situations or state of the person is currently in. This brainwave can determine a person's behavior and also their personality because of differential types of brain wave that can associated with certain types of personality. It is very important to find the correlation between the brain wave and type of readings to discover a new connection in a human's body.

1.1 Brainwave

The brainwave is defined as a rhythmic fluctuation of electric potential between parts of brain as seen on electroencephalogram [2]. A human brain consists of neuron that can emit electrical impulses in the form of

waves [2]. These waves have their characteristics and commonly can be divided into four groups mainly alpha, beta, delta and theta.

1.2 EEG

The brainwave of a person is measured using EEG. EEG is the recording of electrical activity along the scalp produced by the firing of neurons within the brain. Listening, speaking, blinking and other activities can bring disturbances to different mental task EEG signals [3]. However in this research it takes almost 15 minutes for before reading and during reading Al-Qur'an and comic. Brainwave activity is measured by the number of waves, or electrical frequencies that occur in a given unit of time that are measured in Hertz (Hz). Electrodes are placed on specific sites on the scalp to detect and record the electrical impulses within the brain [4]. This electrical signal can be detected and recorded by EEG machine. The electrodes are connected by wires and EEG machine converts the electrical signals and records them into the computer by the specific software.

1.3 Reading sources

Reading has cognitive consequences that extend beyond its immediate task of lifting meaning from a particular passage. Furthermore, these consequences are reciprocal and exponential in nature [5]. In this study, the sources of reading are Al-Qur'an and comic book. Al-Qur'an is the holy Book for Islam and humanity as guidance to Muslim fulfills as Islamic duty [6]. Meanwhile a book of comic is strips or cartoons and often relating a sustained narrative.

1.4 Problems Statement

In this research actually conducted to investigate and identify on how will be the brainwave patterns affected based on the reading of Al-Qur'an and comic.

This research was focused on human brain wave pattern especially on beta wave. This is because when brain in active concentration, beta wave will be produced. The activity was specified to read surah *Yaasin* and *Ujang* comic for five minutes and make comparison between the values of beta wave. Besides that, this research is also to discover the advantage of reading more from the good sources that enhance usage of specific brain hemisphere.

1.5 Objectives

The main objective of this research to look at the brain wave pattern before reading and during reading Al-Qur'an and comic and analyze effect of reading to brain wave pattern by using EEG among 30 students of University Teknologi Mara.

1.6 Scope and Limitation of the Project

From the four types of brainwave, this research only will be focusing on the beta wave signal because it has a highest related frequency and amplitude. In addition, it was chosen to be analyzing because this brainwave pattern will be produce during a person is awakened and alertness situation. Therefore, for this research it is only focus on beta wave to determine its values when reading Al-Qur'an and comic.

There are many types of reading material such as English language books, magazines, newspaper, and novels but in this project will be focusing only on Al-Qur'an and comic. The reason why choose these materials because Al-Qur'an and comic can give effect

to our brain quickly in short period although its content is a short message. Therefore, this research will be done to find the effect of reading Al-Qur'an and comic relating to brain wave signals.

However, EEG has several limitations. EEG is most sensitive to any movement that make fluctuated to EEG reading. Therefore, during the test the samples need to decrease blinking eyes and avoid much movement to avoid any disturbances and make system perform well.

2.0 METHODOLOGY

In order to get correct information and data, it is very important to use correct methods of data collection. A combination of methods has been used of this study to be more comprehensive in gathering the information of analyze the effect of reading Al-Qur'an and comic to human brain wave signal focusing on beta wave.

2.1 Experimental Procedures

For this project needs 30 samples to be tested to verify the brain wave patterns by using EEG. Before start the brain wave test, each sample required to answer questionnaire that related to this research. Then, the test started with recording before reading Al-Qur'an. Every sample must read Al-Quran in five minutes and comic in five minutes more. Each sample must read the same surah in Al-Quran and same comic to get the consistent result. After the recording the result of reading Al-Qur'an, each sample must take their rest first about one minute to refresh back the brain. The session continued by reading comic for another five minutes. From this session, brain wave will be recorded and hence a graph will be plotted.

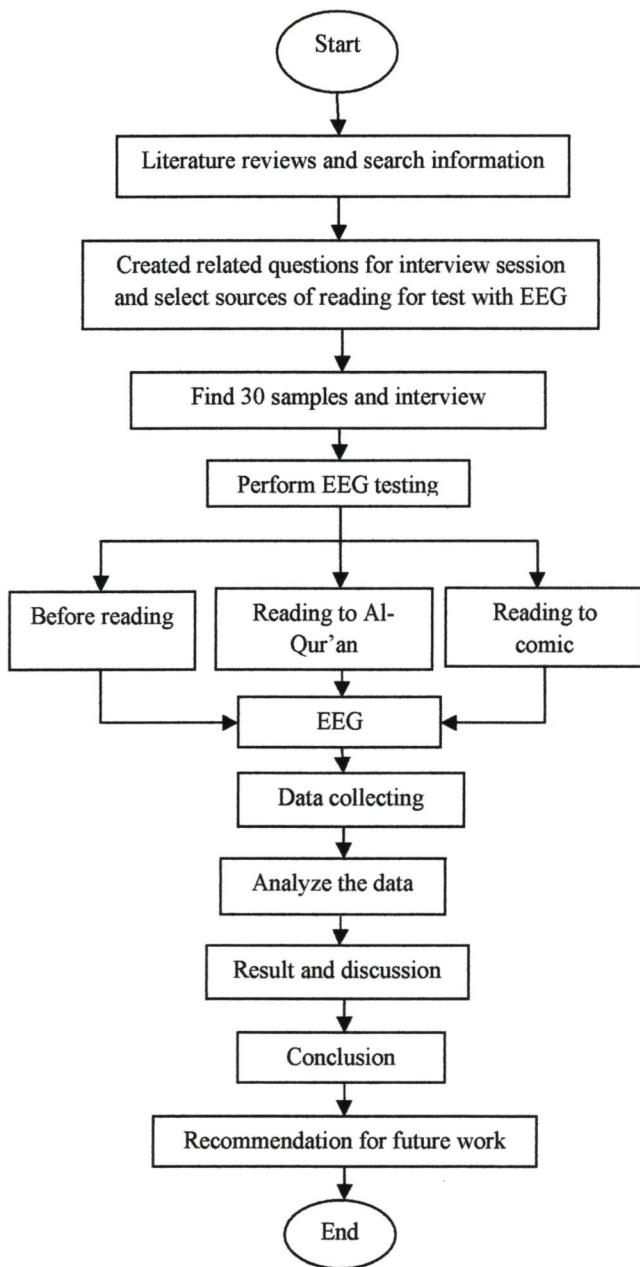


Figure 1: Flow chart of project

2.2 Experimental Design

Table 1: EEG Record for each session

Before Reading (5 minutes)	1 minute	During Reading Al-Qur'an (5 minutes)	1 minute	During Reading Comic (5 minutes)
<ul style="list-style-type: none"> • Close eyes • EEG recording • No movement 	Rest	<ul style="list-style-type: none"> • EEG recording • Avoid much movement and eye blinking 	Rest	<ul style="list-style-type: none"> • EEG recording • Avoid much movement and eye blinking

Table 1 show the experimental design for the project that involves three sessions which are before reading and during reading Al-Qur'an and comic. A total of 30 samples of students participated in this study. For the first session, each sample was asked to relax while signals were recorded. Next session each sample was required to read Al-Qur'an in five minutes. While EEG recorded the brain wave signals, each sample is required to avoid much movement and eye blinking to get the accurate data. After finish this session, the sample has taken a break for a minute to regain the freshness of the brain and it continued during reading comic.

3.0 RESULTS AND DISCUSSION

The analysis of this research was divided into two parts which are interview and EEG test analysis.

3.1 Analysis Of Interview

Samples were being distributed with sets of question related to this research. Before start the EEG test, samples required to answer the question given. The results will be compared with the EEG test result.

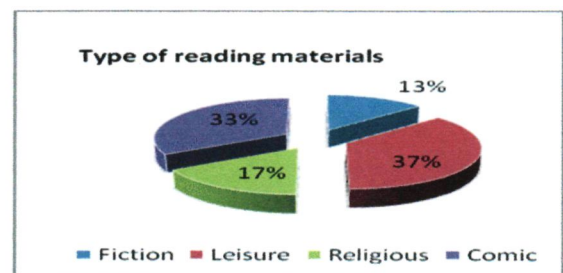


Figure 2: Types or reading materials.

Figure above shows the percentage of types of reading materials that most popular among respondents. The highest percentage is leisure material which is 37%. The percentage followed with comic with 33%. Next is 17% for religious and the last one is 13% fiction material.

3.2 Analysis Of EEG Test

Below are the results for EEG test.

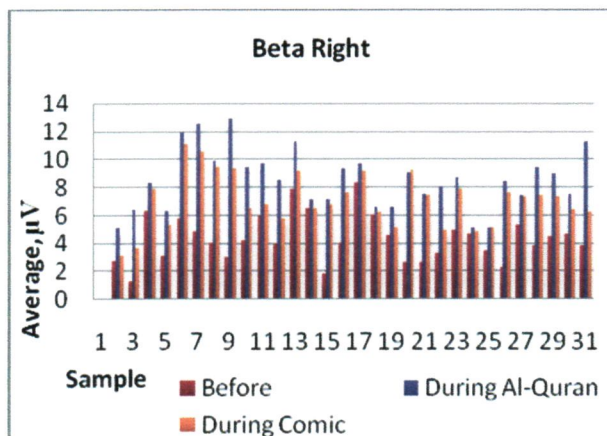
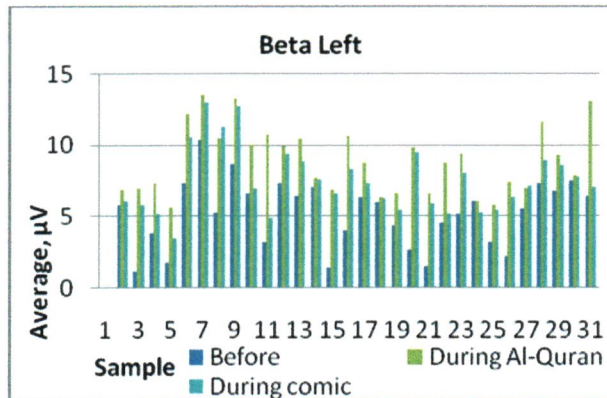


Figure 3: Comparison of Beta Left and Right for before reading, during Al-Quran and comic.

Figure 3 shows the comparison of beta left and right wave for before reading and during reading Al-Quran and comic. From the both charts, it shows that beta left and right wave is increased during reading Al-Quran and comic compared with the value of beta before reading. From the result, it shows that the brain activity more focus during reading, either Al-Qur'an or comic.

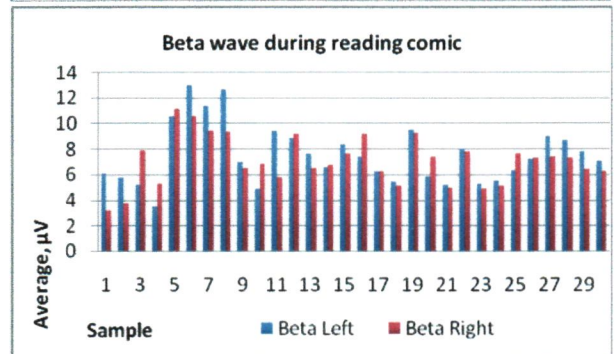
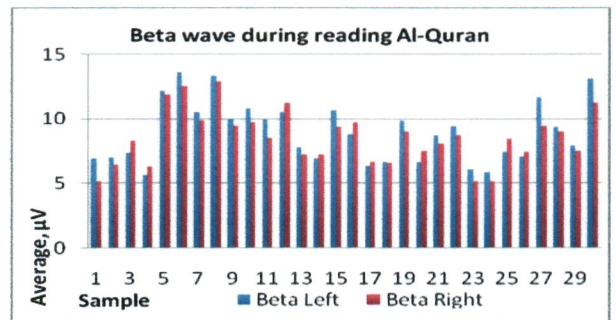
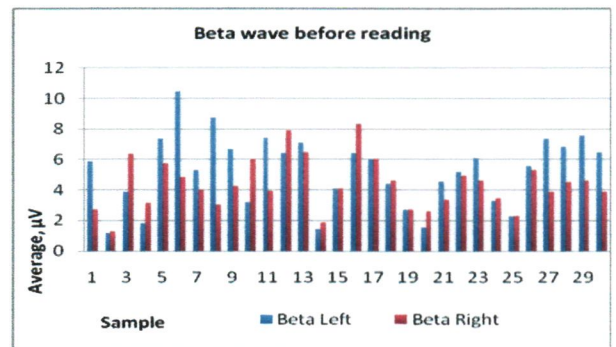


Figure 4: Comparison of Beta Wave for before reading, during reading Al-Quran and during reading comic

Figure 4 shows the comparison of beta wave for each state. For first session which is before reading, the values of beta wave for both sides is less than 9 but only one sample is differ than other. Besides that, it shows that almost beta left wave is higher than beta right wave. For next session, the value of beta for both sides increased during reading Al-Quran rather than previous session. It is clearly shown that the beta wave are almost balance for left side and right side.

At the last session, the values of beta wave decreased during reading comic. It shows that most of respondents less focus on reading comic compared to reading Al-Quran. From the research that was done by Akio Mori is a professor at Tokyo's Nihon University that observed the effects of video games on brain activity and the

results also showed the decreasing of beta wave. He concluded that decreasing of beta wave activity and usage of the prefrontal region of the brain may correlate with the aggressive behavior [7]. Since the research shows decrease of beta wave during reading comic, it might lead to the same results.

Table 2: Correlation between sessions

	Comparison	Correlation
Pair 1	BEF L & BEF R	0.463
Pair 2	AL L & AL R	0.929
Pair 3	CO L & CO R	0.738

Table 2 shows that the comparison between several sessions to determined the correlation values based on analyzed the paired sample T-test SPSS. From this software, it can measure correlation between two variables that possible occurred and thus make comparison. Based on this table, it shows that correlation value between beta wave for both sides during reading Al-Quran nearly to one means that the brainwaves were balanced rather that others value.

Table 3 shows that the maximum value reached for beta left wave is 10.44 μ V and 4.85 μ V for beta right wave for before reading. This is sample number 6. For sample number 19, his brainwave before reading is small about 2.71 μ V and 2.7 μ V for both sides. However, after reading Al-Qur'an the wave values were increased until reached 9.90 μ V for beta left wave and 9.05 μ V for other side. In addition, the values of beta wave during reading comic also increased which are 9.50 μ V and 9.23 μ V compared to before reading. However, reading Al-Qur'an leads to higher percentages which are 71.9% for beta left wave and 63.5% for right left wave.

Table 3: The value of beta wave for left and right side before reading and during reading Al-Quran and comic.

No of Sample	Before		AL-QURAN		COMIC		Average
	Beta Left	Beta Right	During		During		
			Beta Left	Beta Right	Beta Left	Beta Right	
1	5.88	2.73	6.95	5.17	6.07	3.15	4.99
2	1.16	1.27	6.97	6.43	5.80	3.71	4.22
3	3.85	6.34	7.39	8.31	5.21	7.85	6.49
4	1.83	3.13	5.66	6.29	3.48	5.27	4.28
5	7.36	5.75	12.18	11.89	10.58	11.10	9.81
6	10.44	4.85	13.60	12.55	13.00	10.55	10.83
7	5.31	4.00	10.53	9.90	11.34	9.43	8.41
8	8.75	3.01	13.33	12.90	12.71	9.36	10.01
9	6.69	4.23	10.02	9.43	7.00	6.50	7.31
10	3.2	5.98	10.80	9.72	4.91	6.81	6.90
11	7.4	3.92	9.94	8.50	9.40	5.76	7.48
12	6.44	7.88	10.52	11.23	8.85	9.15	9.01

13	7.08	6.49	7.76	7.19	7.62	6.54	7.11
14	1.44	1.86	6.93	7.19	6.62	6.75	5.13
15	4.06	4.06	10.67	9.34	8.37	7.63	7.36
16	6.39	8.35	8.81	9.72	7.39	9.15	8.30
17	5.98	6.05	6.34	6.64	6.26	6.26	6.26
18	4.4	4.62	6.65	6.56	5.45	5.09	5.46
19	2.71	2.7	9.90	9.05	9.50	9.23	7.18
20	1.55	2.62	6.66	7.48	5.89	7.42	5.27
21	4.54	3.32	8.76	8.07	5.19	4.95	5.81
22	5.19	4.95	9.41	8.71	8.05	7.84	7.36
23	6.12	4.64	6.08	5.13	5.28	4.87	5.35
24	3.27	3.44	5.87	5.13	5.51	5.13	4.73
25	2.29	2.27	7.44	8.45	6.34	7.61	5.73
26	5.58	5.28	7.04	7.43	7.20	7.32	6.64
27	7.36	3.86	11.70	9.42	8.98	7.43	8.13
28	6.82	4.5	9.36	9.02	8.66	7.34	7.62
29	7.56	4.64	7.91	7.54	7.80	6.39	6.97
30	6.45	3.87	13.09	11.27	7.09	6.27	8.01
Average	5.24	4.35	8.94	8.52	7.52	7.06	

4.0 CONCLUSION

By conducting this research, the effects of reading Al-Quran and comic to human brain wave using was found and studied using EEG. The sources of readings were chosen to indicate the brain wave pattern that gives more focus to human brain activity. For each session, respondents required to read Al-Quran for five minutes and another five minutes to read comic.

This research more focuses to beta wave because the wave is related to focus state. From the findings, all the respondents have increased in both sides at the beta wave. However these values become smaller during reading comic and brain activity become decreased because of lacking elicited by attentiveness and concentrated mental activity.

FUTURE RECOMMENDATION

For the future recommendation, this project can be proceeding by adding extra session which is observing the effects after reading Al-Quran and comic to human brain wave. Besides that, the same research can be done but using Radio Frequency Imaging.

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