

## The Study Effect of Listening Photchong Chanting on Brain Mechanism in Buddhists

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### Abstract

This study aimed to investigate the effect of listening to Photchong chanting on that brain mechanism in Thai Buddhists. The result may be nominated for the alternatives in health promotion and together with modern medication could assist in curing various diseases. The samples were forty healthy Buddhists with age ranged between twenty to sixty years. All participants were equally divided into two groups; one with the exposure to listening to the Photchong chanting and the other with non-exposure. During the experiment, both groups were asked to focus on the picture of Buddha image about three minutes and later closed their eyes for three minutes. The stress levels were then measured by Thai Stress Test (TST) both before and after the experiment. In addition, their brain wave activities were individually recorded before and after listening to the Photchong chanting by the Electroencephalogram (EEG) at precisely one and three minutes after the experiment begin. The findings revealed two interesting results. First, the group that were exposed to the Photchong chanting demonstrated the statistically significant decreased in the stress level with the significant level at 0.05 ( $p = 0.017$ ). The mean positive feeling exhibited statistically significant increases at 0.05 level ( $p = 0.013$ ) while the mean negative feeling went down at 0.01 ( $p = 0.003$ ), respectively. The other group demonstrated the statistically significant decreased in the stress level with the significant level at 0.01 ( $p = 0.005$ ). The mean positive feeling did not show any significant difference at 0.05 while the mean negative feeling went down at 0.05 ( $p = 0.028$ ). Second, the exposed group displayed statistically significant increases in Delta brainwave at 0.05 and after listening to the Photchong chanting, there was a statistically significant increase in Theta brain wave at 0.05. On the other hand, the non-exposed group did not exhibit any significant change in both brain waves activities. Additionally, sitting with eyes closed with or without listening to Photchong could lower stress level. While listening to the Photchong chanting, the positive feeling level rose and negative feeling level was restricted. On the other hand, without listening to the Photchong chanting, there was no change in positive feeling level while the negative feeling level decreased. However, there was an escalation in Delta brainwave during listening to the Photchong chanting. Ultimately, the Theta brainwave also upsurges after listening.

**Keywords:** Photchong chanting/Brain wave/Stress

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## Introduction

“Mind - Body Medicine is one of the five Alternative Medicine categorized by National Center for Complementary and Alternative Medicine (NCCAM), a division of the National Institutes of Health (NIH) United States. A group of various techniques performed by physical act but focus on change the mental status have effect on body functions and therapy; self –therapy without inject any substance into body. Knowledge and techniques that have been developed from the wisdom of the Eastern, Western people brought the knowledge back for research. I see the good result that happens in the treatment of diseases and symptoms that led to a combination with therapy of modern medicine according to principle of Buddhism “strong mind strong body” (Worapongpichet, P., 1998). As we all know that “Health is Wealth”, experiencing the illness will only bring many problems such as economic, family and society. Two big problems human faced in every age, especially present are (1) Physical illness like heart disease, diabetes, hypertension, cancer, paralysis from burst blood vessel in brain etc. These are all illness from food contamination, pollution, lack of exercise, stress from politics, society and economy; unemployment can be the cause of physical and mental illness that have to take pills and risking the side effects, and (2) Mental illness, people in present have to face many stresses one way or another from study, work, family, love, money, debt, and economy problem. The three best seller drugs in the world are tranquilizer, antihypertensive and drugs used for Peptic Ulcer, are all stress-related pills. When we feel stressed, Adrenaline is produced, the more we feel stressed the more Adrenaline is produced, can lead to decreasing the functions of essential organs such as heart, kidney, liver, lung and also immunity. Low immunity makes a person vulnerable to frequently illness. “One part of the cause of these illness come from mental health, if it can be solved many problems will be decreased, good things happen in the country for example, saving budgets on treatment , productivity of medical personnel and medical tools. People feel happy, lower economic problems so finding the way to heal mental status is very necessary” (Sornpaiboon, B., 2010).

Modern doctors have tried finding new ways of treatment focus on body and mind at the same time to make a balance both on body and mind related to Buddhism ways such as wai phra, prayer, sharing the merit and meditation. In science consciousness way; the brain and nervous system is operated by electrical signal and balance the functions of all the parts of the body. Activate the nervous system too much can be dangerous to the body and mind relaxation will make the autonomic nervous system works regularly. Neo-Humanist indicate that human are different from machine because sometimes we do something that come from happiness and love, while doing something the brain waves were sent from our brain. The waves are different depends on emotion, feeling, sadness and happiness. Neo-humanist has interested and emphasize on brain waves, the Alpha brain waves are benefit to us, making balance on left-right brain, body-mind relaxation, no stress, high performance functions of internal organs and also daily activities, memory, creativity and positive thinking. Thus, continuously entering Alpha state will make used to it and easily entering.

Relaxation methods that will help enter the Alpha state easily: (1) Alpha Brainwave Music, (2) Close the eyes, (3) Take a deep breath, slowly, fills the lung with the air, (4) Relax the whole body and finally, and (5) Living close to nature or imagine it. (Amatyakul, K. 2002). Prayer is spiritual development activity in religious since the ancient times. Prayer can make us feel relaxed, for Thailand the Photchong chanting is one of the dharmic principles also known as pochangkaparitra gatha, chanting for patient to be cured from disease.

Many research of modern medicine show that chanting help generate happiness, satisfaction in life, good mental status and solve life problems. Carlson and working group (**CR,PE & DA,1988**) had studied 36 Christian students, 18 mans and 18 women, divided into 3 groups. First group were taught relaxation technique 6 times in 2 weeks by listened to sound tape for 20 minutes. Second group were chanting and devotional meditation also by listened to sound tape 20 minutes. Third group were taught nothing. In the middle of the training in second time and sixth time, found that muscle tension in second group became lower, muscle tension in first group were increasing. When the experiment finished, the result were the second group had

lower stress and anger than first and third groups. Byrd (1988) A doctor specialized in heart disease had studied in prayer. The experiment took place in therapy room at San Francisco General Hospital by divided 396 patients in two groups, first group had 192 patients and had people prayed for them, second group had 201 patients and nobody prayed for. The result were the first group that had people prayed for, used antibiotics 5 times less than second group, had Pulmonary Edema 3 times lesser, had Endo tracheal Intubation 12 times lesser. This experiment were accepted from scientists that the result were reliable. Thanawut, W (Manger Weekly 2004) had studied on 393 patients with heart disease, divided in 2 groups, group with general treatment and group with treatment plus prayer. The conditions of a group with prayer were getting better compared to a group with general treatment. A study in HIV patients shown that mortality rate in group with prayer were less than half group with general treatment.

In order to have good health, World Health Organization defined that you must have Physical, Mental, Social and Spiritual Well-Being (Worapongpichet, P., 1998). In terms of physical well-being, methods of building a healthy body and develop a strong immune are food, exercising, walking, running, yoga, swimming, Tai Shi Shuan and all types of sports. In terms of mental well-being, the implementations are breathing exercise, music therapy, art therapy, imagination therapy, hypnotherapy and other mental therapies. In terms of social well-being, the implementations are to have therapy group, generosity group and true friend group participate the dharma helping each other, forgiving each other, no envy, live as friend with good will for each other, all these will make us not to feel lonely, proud in ourselves. All of these will help us get well from the disease faster and develop a strong immune. In terms of spiritual well-being, the implementations are practice the dharma, compassionate prayer and meditation. These will make our mental status always in good state, greed, anger and infatuation will be decreased. Be able to accept the changes, adapting with all conditions and prepared when the time of life has ended. Taking care of health is our duty, done by self-care, need sufficient time to learn both theory and practical section to understand and do it right and must hold fast to it as the way of life. Not only prevent from infected and cure the disease without using too much drugs, some disease that cannot be cured will getting weaker.

Thailand had much concerned social capital and spread out to related sectors like body of knowledge, organization and personnel specialized in Buddhism not only monk but also layman. Thai people have strong faith in Buddhism as one part of the life, learning and adopt the implementations in Buddhism way influenced to health combined with medical services to help provide aid to people. Using our intellect with the supported reliable data from the study of western, initiate the idea aimed at study on listening to Photchong chanting influenced brain functions in Thai Buddhists by experimental study. The outcome should benefit in terms of practice the dharma to treat disease and to promote mental health influence the physical health used in scientific and medical research and as guideline for further research.

### **The purpose of research**

1. To study the result from listening to Photchong chanting influence on brain functions
2. To study the result from listening to Photchong chanting to reduce stress.

### **Research process**

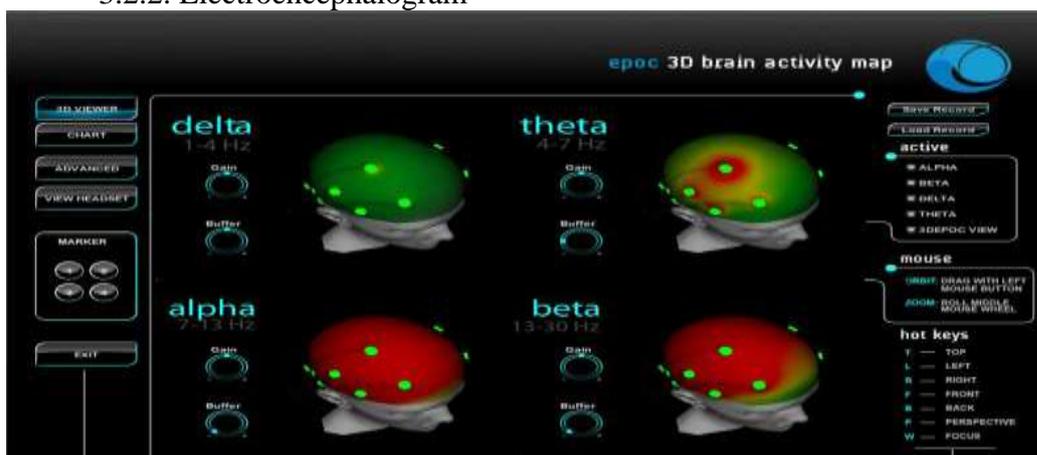
#### **3.1 Experimental group**

The 40 healthy Buddhist people match to required qualifications, divided into 2 groups; first group; experimental group with 20 people with the exposure to listening to the Photchong chanting and the other group; control group with 20 people with non-exposure.

#### **3.2 Research tools**

3.2.1. Thai Stress Test (TST) (Phattharayuttawat, S., 2000) is the measurement instrument developed from criteria based on stress definition. It is a set of questionnaire that consists of 24 questions, which consists of a two-dimension rating scales, termed as negative scales and positive scales. Each scale is consists of 12 questions; questions 1-12 are negative scales and question 13-24 are positive scales. Each question consists of three answer choices, described as follows, never, sometimes and often (feel stress).

### 3.2.2. Electroencephalogram



**Figure 1:** show the brain wave activity

### 3.2.3. Photchong chanting three-minutes

## 3.3 Data compilation

### 3.3.1. Baseline characteristic data of participants

### 3.3.2. Stress level before and after listening to the Photchong chanting

### 3.3.3. Brainwave level before and after listening to the Photchong chanting

## 3.4 Data analysis: analyze the gathered data by processing program and Statistical data following;

## Results

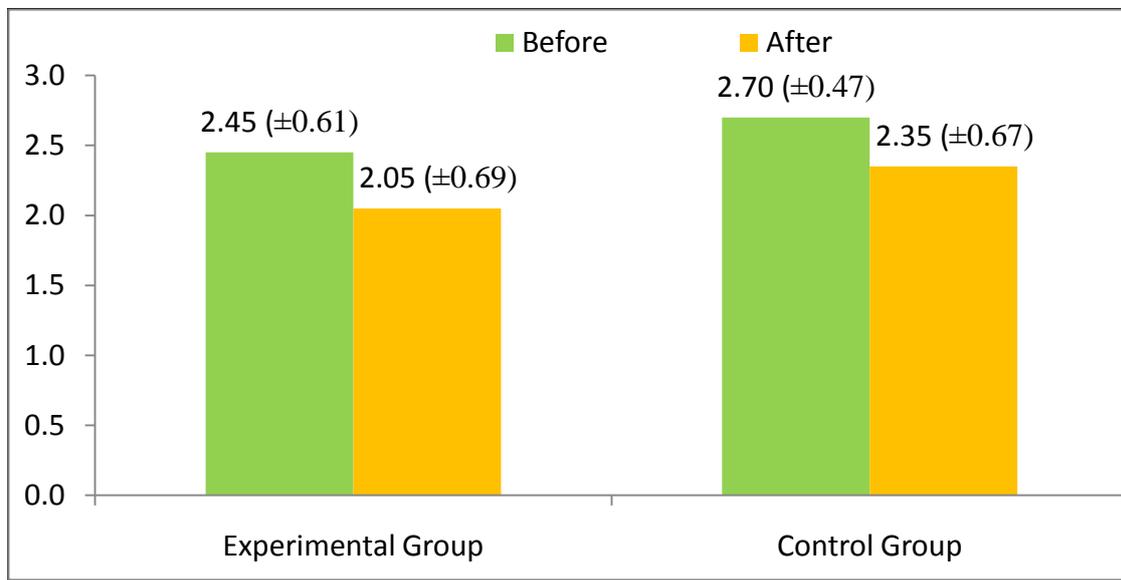
**Table 1** participants' general data categorized by gender, age and educational background.

Variable	Experimental Group (quantity)	Percentage	Control Group (quantity)	Percentage
Gender				
Male	1	5	3	15
Female	19	95	17	85
Age (years)				
<25	3	15	3	15
26-30	5	25	5	25
31-35	2	10	2	10
36-40	2	10	2	10
>41	8	40	8	40
Educational Background				
Grade 6	1	5	1	5
Grade 9	1	5	1	5
Grade 12	2	10	2	10
Vocational	12	60	12	60
Diploma	3	15	3	15
Bachelor's Degree	<b>20</b>	100	<b>20</b>	100
Master's Degree				

There were forty participants, thirty six female accounted for 90 percent, four male accounted for ten percent. The study of participants' general data in experimental group and control group revealed that had female participants more than male accounted for 95.00 percent and 5.00 percent. Control group also had female participants more than male accounted for 85.00 percent and 15.00 percent. The mean age of two groups is 35.85 years and graduated from Bachelor's Degree more than Master's Degree accounted for 60.00 percent and 15.00 percent.

**Table 2** stress level before and after listening to the Photchong chanting

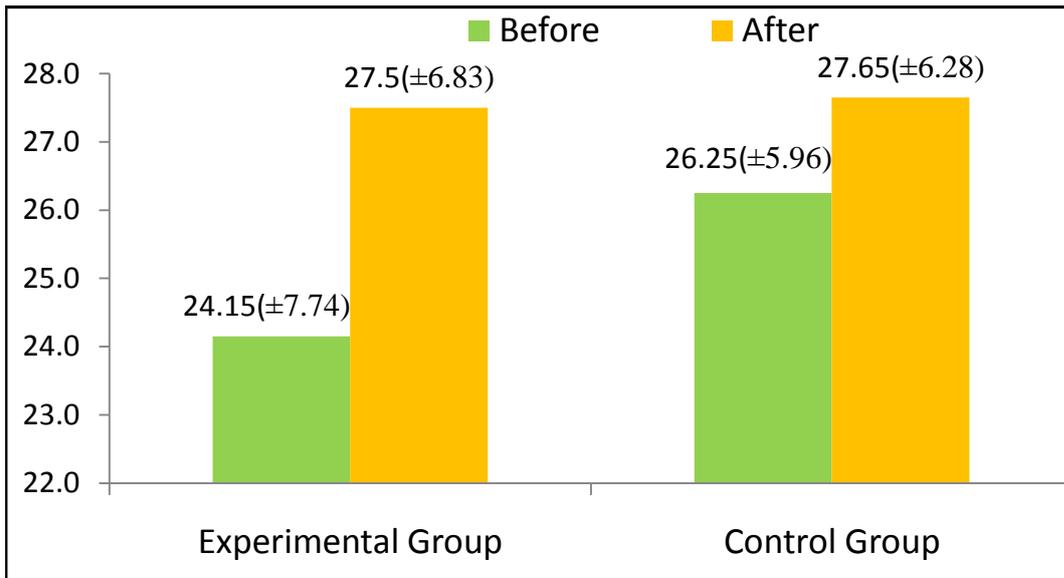
Stress Group	of Before	After	$\bar{d}$	t	p-value	Results
Experimental		2.45(±0.61)		2.05(±0.69)	0.40	2.63
Different						.017
Control	2.70(±0.47)	2.35(±0.67)		0.35	3.20	.005
Different						



**Figure 2** stress level comparison between two groups

**Table 3** positive feeling before and after listening to the Photchong chanting

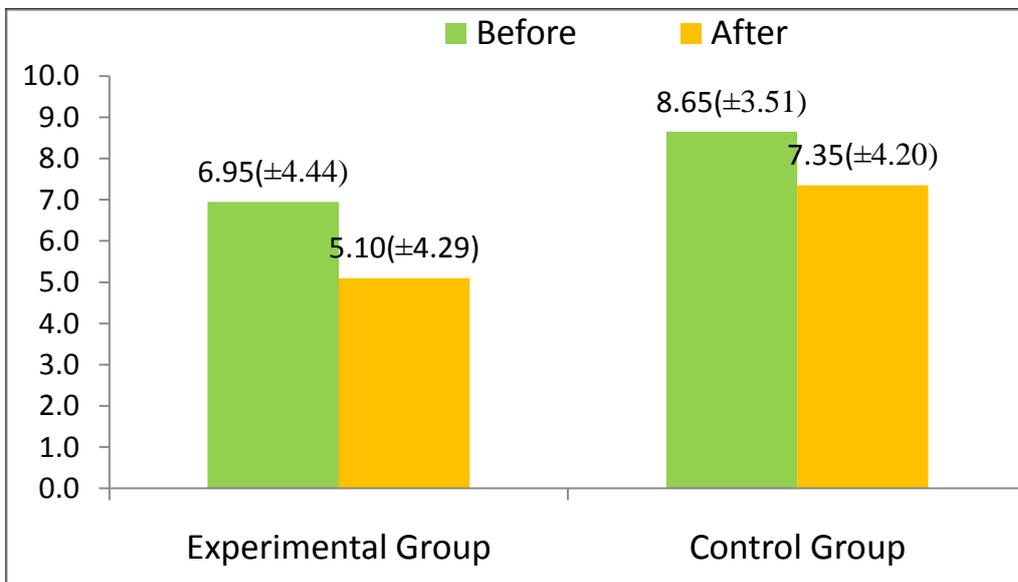
Feeling Group	of Before	After	$\bar{d}$	T	p-value	Results
Experimental	24.15(±7.74)	27.50(±6.82)	-3.35	-2.73	.013	Different
Control	26.25(±5.96)	27.65(±6.28)	-1.40	-1.27	.218	No Difference



**Figure 3** positive feeling comparisons between two groups

**Table 4** negative feeling before and after listening to the Photchong chanting

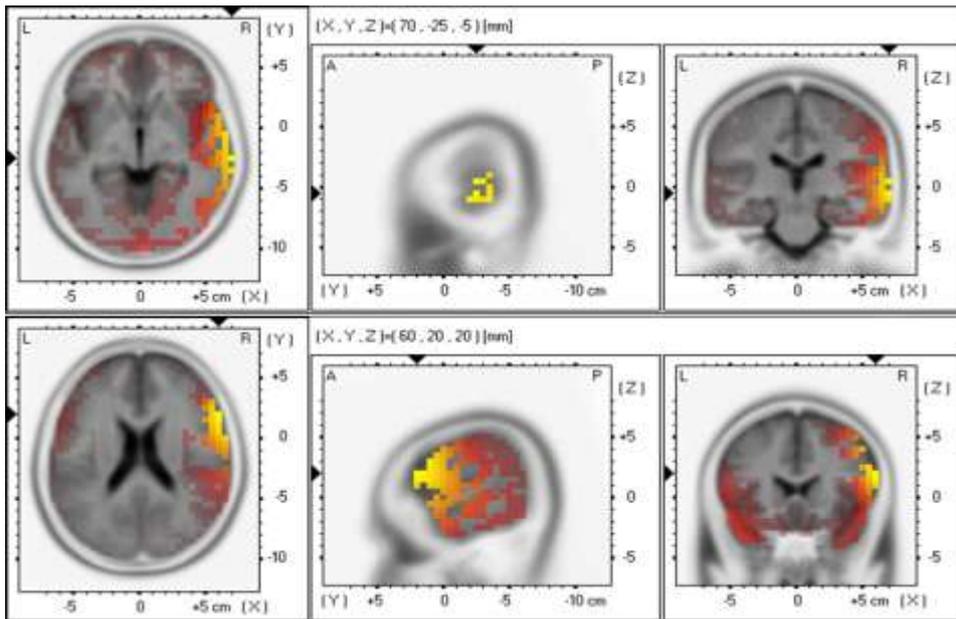
Feeling of Group	Before	After	$\bar{d}$	t	p-value	Results
Experimental	6.95(±4.44)	5.10(±4.29)	1.85	3.46	.003	Different
Control	8.65(±3.51)	7.35(±4.20)	1.30	2.37	.028	Different



**Figure 4** negative feeling comparisons between two groups

**Table 5** Theta brainwave comparison while open the eyes before and after listening to the Photchong chanting

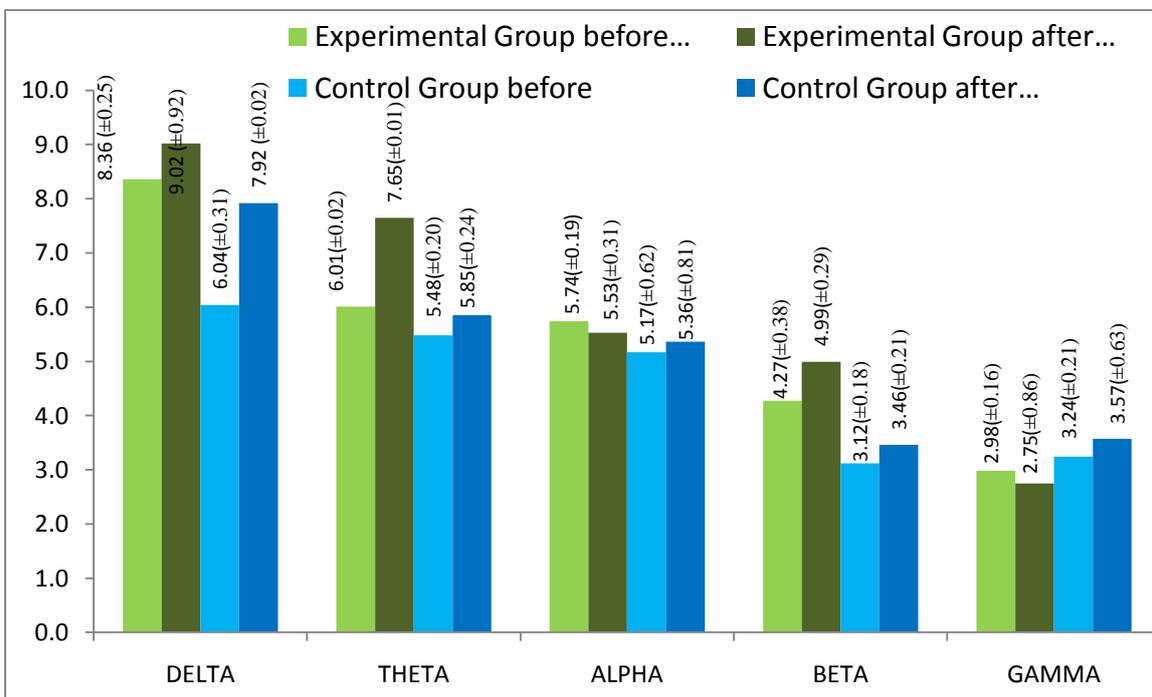
Group	Before	After	$\bar{d}$	t	p-value	Results
Experimental	6.01(±0.02)	7.65(±0.01)	-1.64	11.94	0.05	Different
Control	5.48(±0.20)	5.85(±0.24)	-0.37	8.51	0.41	No Difference



**Figure 5** Theta brainwave comparison while open the eyes before and after listening to the Photchong chanting

**Note:** (Top picture) Theta brain wave activity in the Temporal lobe while open the eyes before listening to the Photchong chanting ( $\bar{X}=6.01 (\pm 0.02)$  Microvolt).

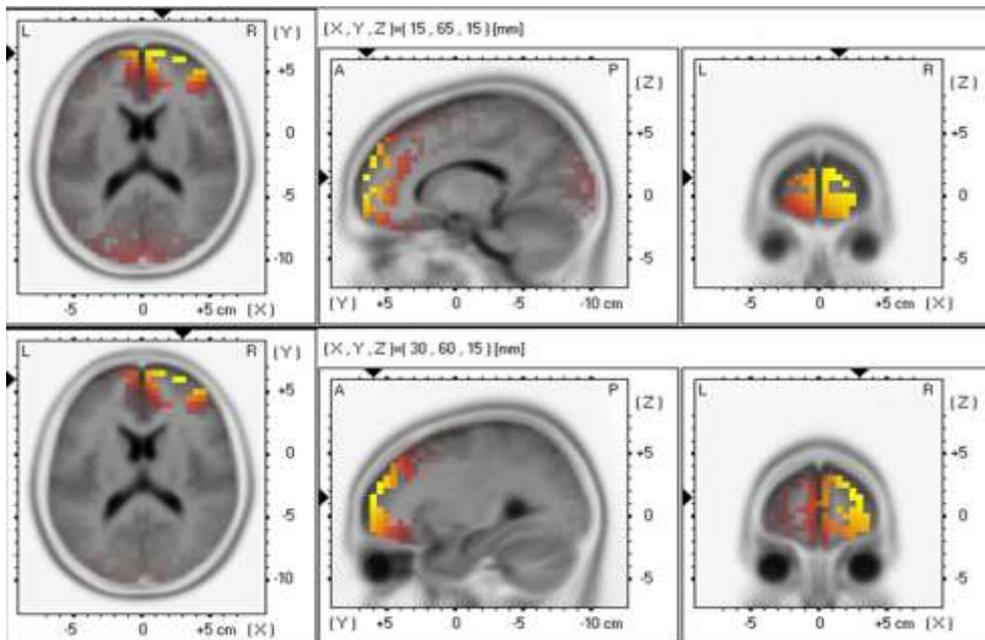
(Bottom picture) Theta brain wave activity in the Temporal lobe while open the eyes after listening to the Photchong chanting ( $\bar{X}=7.65 (\pm 0.01)$  Microvolt) in order; yellow refers to highest.



**Figure 6** Brain wave comparison while open the eyes before and after listening to the Photchong chanting

**Table 6** Delta brainwave comparisons while open and close the eyes listening to the Photchong chanting

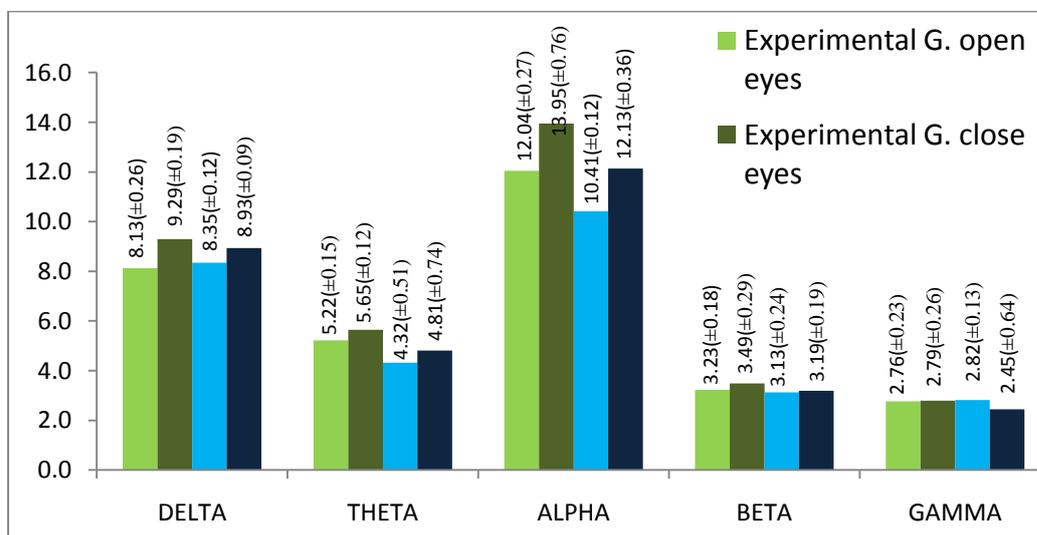
Group	Before	After	$\bar{d}$	t	p-value	Results
Experimental	8.13(±0.26)	9.29(±0.19)	-1.16	11.51	0.05	Different
Control	8.35(±0.12)	8.93(±0.09)	-0.58	3.64	0.25	No



**Figure 7** Delta brainwave comparisons while open and close the eyes listening to the Photchong chanting

**Note:** (Top picture) Delta brain wave activity in the Frontal lobe while open the eyes listening to the Photchong chanting ( $\bar{X}=8.13\pm0.26$  Microvolt).

(Bottom picture) Delta brain wave activity in the Frontal lobe while close the eyes listening to the Photchong chanting ( $\bar{X}=9.29\pm0.19$  Microvolt). In order; yellow refers to highest.



**Figure 8** brain wave comparisons while open and close the eyes listening to the Photchong chanting

After the experiment finished, the results revealed two interesting results. First, the group that were exposed to the Photchong chanting demonstrated the statistically significant decreased in the stress level with the significant level at 0.05 ( $p = 0.017$ ). The mean positive feeling exhibited statistically significant increases at 0.05 level ( $p = 0.013$ ) while the mean negative feeling went down at 0.01 ( $p = 0.003$ ), respectively. The other group demonstrated the statistically significant decreased in the stress level with the significant level at 0.01 ( $p = 0.005$ ). The mean positive feeling did not show any significant difference at 0.05 while the mean negative feeling went down at 0.05 ( $p = 0.028$ ). Second, the exposed group displayed statistically significant increases in Delta brainwave at 0.05 and after listening to the Photchong chanting, there was a statistically

significant increase in Theta brain wave at 0.05. On the other hand, the non-exposed group did not exhibit any significant change in both brain waves activities.

## **Discussion**

The study revealed the group that were exposed to the Photchong chanting had the stress level went down, positive feeling increased, negative feeling went down and concentration in thinking process and decision making were increased accord with Chanpo, K. (2013) said that prayer can help decrease the stress level. Account for a percentage, after listening to the Photchong chanting, high stress level went down accounted for 0.00 percent, trivial stress level went down accounted for 25 percent, normal mental health level went down accounted for 55 percent but high mental health (no stress at all) level raised up accounted for 20 percent accord with Kulsirichai, B. (2012) said major depressive disorder has decreased and happiness feeling in mental health increased by listening to the Photchong chanting.

The study found that listening to the Photchong chanting had effect on Delta brainwave in the frontal lobe, Theta brainwave in the temporal lobe and Alpha brainwave in the occipital lobe. Sankanan, P. (2012) said Delta brainwave is related to deepest state of body relaxation, found during sleep while human body has low metabolic rate, low blood pressure, body temperature and heart rate; it is the state of physical therapy. The study also found more activities in dorsolateral prefrontal cortex which concerning to intellect on management, parietal lobe which concerning to processing information relating to the sense, hippocampus which plays an important role in the formation of memory, temporal lobe which processing sensory input, pregenual anterior cingulated cortex which plays role in error detection, anticipation of tasks, attention motivation, and modulation of emotional responses, striatum have role in the planning and modulation of movement pathways and pre-post central gyrus have role in attention and nervous system. Study also found that brain work slower due to decreased of function in heart and blood vessel (Lazar SW and working group, 2000). Pender (1987) said that stress relaxation benefit to the autonomic nervous system by reduce concerned hormone and increase Alpha brain wave. Doufesh and working group (2012) found that mean of Alpha brain wave rise up in parietal (P3, P4) occipital (O1, O2) while Salat and Dhuha (worship of the Allah's kindness). The Theta brain wave activities were found in temporal lobe while open the eyes after listening to the Photchong chanting.

Sankanan, P. (2012) said that Theta brain wave activity is normal state when we are sleeping or have high relaxation but sometimes could also occur when we are awake like while in meditation. This condition concerning to creativity in deep mind, calm and being optimistic, high concentration, capacity in long term memory and Temporal lobe which processing interpretation, long term memory, learning in sound and music and emotional behavior (faculty of teachers in department of physiology faculty of science Mahidol university, 2002). The study revealed the group with non-exposed to the Photchong chanting had the stress level went down, negative feeling decreased, concentration increased but positive feeling had no change. Sitting with eyes closed could lower stress level accounted for 45 percent, high mental health (no stress at all) level raised up accounted for 10 percent accord with Valerie (2000) mentioned that stress from work environment could not measure the stress level because people have different endurance to stress limit from experiences, cultivation, learning, desire and expectancy.

Thinking process and decision making were increased accord with Chanpo, K. (2013) said that prayer can help decrease the stress level. Account for a percentage, after listening to the Photchong chanting, high stress level went down accounted for 0.00 percent, trivial stress level went down accounted for 25 percent, normal mental health level went down accounted for 55 percent but high mental health. The study revealed the group with non-exposed to the Photchong chanting had change in brain wave activity while sitting with eyes closed. Found Alpha brain wave activity in occipital lobe accord to Sankanan, P. (2012) said that Alpha brain wave were found in many condition, while muscle or body relaxed, while feel sleepy, before or just sleep and in high level meditation. No change in Delta brain wave probably that the body of group with non-exposed to the Photchong chanting had not relaxed in deep state according to Maman

& Fabien (1997) said that good sound wave could eliminate germ cell and reinforce strong cell led to a cure for some disease, most of sound wave therapy purpose are to restore and strengthening.

### **Conclusion**

Listening to the Photchong chanting to observe the change of brain function found that Delta brain wave activity were increased while close the eyes listening to the Photchong chanting, Theta brain wave activity were increased while open the eyes after listening to the Photchong chanting concerning to being optimistic, high concentration, capacity in long term memory and awareness but Delta and Theta brainwave were not found in group with non-exposed to the Photchong chanting, only found Alpha brain wave while eyes closed cause trivial decreased stress and improved concentration.

### **Recommendation**

The study compared the results of the change in brain function from in group with exposed to the Photchong chanting and in group with non-exposed to the Photchong chanting, all with healthy participants. To make next research more perfect, researchers have recommendation following: (a) should have a study in group of patients; hypertension, cancer, brain diseases etc., (b) should have a study in pray the Photchong chanting and listening to the Photchong chanting to find the differences in brain function between these two methods, (c) should have a study in group with exposed to the Photchong chanting for long time like every day in one week and group with exposed to the Photchong chanting one time only to find the differences in brain function between these two methods, (d) should have a study in listening to pray the Photchong chanting in different time such as before sleep, wake up, after work to find the differences in brain function and to know the appropriate time to listen to the Photchong chanting, and (e) should have a study in listening to the Photchong chanting concerning to brain function in children to observe the outcome on concentration, memory and sleep in children.

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