

# A Study of Human's Relax Affection in Different Natural Landscape Photos - Evidences from Neuroscience

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## Abstract:

This study aims to explore human's relax affection reflection in different natural landscape. There are 43 adults participated in this study (Mean  $\pm$  S.D. = 33.4  $\pm$  8.4 years old; male=22, female=21). All participants were volunteers and signing the volunteer consents. In this study, the participants were asked to watch different landscape photos with wearing the brain wave cap to collect their neuroscience data. There were four photo materials in this study. Photo A demonstrated the landscape of sea and land. Photo B demonstrated the whole view of sea. Photo C is focused on trees in the land and photo D is focused on the grassland. The participants perused these photos for 1 minute randomly and took 5 minutes break when perused different photos. In this study, we collected and analyzed 43 participants' neuroscience data when they perused all these photos. The results showed that the participants who watched photo B got higher amplitude of brain wave in relax emotion than watching photo A, C and D. Besides, the participants who watched photo D got higher amplitude of brain wave in relax emotion than watching photo C. The further implication will be showed in the presentation.

## Keywords:

Affection, Landscape, Neuroscience, Relax

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## 1. Introduction

In this decade, the technology and revolutionary knowledge grew up faster and faster, but people felt more pressure than before. For knowing well the influences about environments and people's affections, in 2018, some researchers explored the effect of tourism promotional film on visiting intention. They used architecture film and some reports to provide the influences of environments on people's affections [1,2]. In their research, they found that the film cannot excessive relax since it would reduce the attraction from tourist [1,2]. If the human-made architecture could not induce people's relax, how about the natural environments? Recently, the house is more convenience than before for people to live, but more and more people felt high

pressure and unhappy, people found that is very important to get near to the natural environment to relax [3]. Therefore, it is necessary to investigate the influences of natural landscape film on people's affections. Since the previous studies mentioned that people felt higher pressures now than before, in this study, we focused on people's "relaxation" affections.

But, the big question here is that how can we make sure the participants feel relax? And, how can we compare the different relax degrees when the participants read different natural landscape films.

In past studies, a lot of researchers detected human's affections by using self-report questionnaires or interview, however, these kind of methodology could not reflect people's affections accurately sometimes [4,5]. For solving these problems, this study adopted neuroscience methodology to detect the people's affections when they read the different natural landscape film. The neuroscience methodology could detect human's affections by analyzing their brain wave performances [6]. The data from neuroscience could be analyze and compared with each other by using statistical analysis.

Based on the results from previous study and the limitation of the neuroscience technology, the definition of the participants' relax affection will be defined as the higher alpha frequency band of brain wave and the higher scores of the "meditation index" which will be shown in the neuroscience technology.

## 2. Materials and Methods

### 2.1. Participants

This study was conducted at the south (Tainan, Kaohsiung and Pingtung) of Taiwan. Forty-three adults participated in this study (Mean  $\pm$  S.D. = 33.4  $\pm$  8.4 years old; male=22, female=21) participated in this study. All participants were asked to complete the experimental task by wearing the brainwave cap to collect the neuroscience data. All participants were confirmed to be mentally healthy without a history of neurological or psychiatric disorders, and all gave voluntary consent to participate in the neuroscience experiments. This study conformed to The Code of Ethics of the World Medical Association and was approved by the ethics committee of National Kaohsiung Normal University.

### 2.2. Procedure and Instrument

The participants were asked to look at a white paper for 1 minute to collect the blank brain wave with neutral affection. For inducing the participants' emotions, this study adopted four kinds of photos which involved in four kind of natural landscape. Photo A demonstrated the landscape of sea and land. Photo B demonstrated the whole view of sea. Photo C is focused on trees in the land and photo D is focused on the grassland.





**Figure 1.** (A) the landscape of sea and land; (B) the whole view of sea; (C) the trees in the land; (D) the grassland.

All participants in this study need to look at all photos for one minute randomly and take 5 minutes break. In the beginning, the participants need to look at a blank photo (white paper) in the computer screen for one minute to collect their baseline of brain wave. Four photos were shown in the computer screen randomly. Each photo was shown for one minutes, and the participants could take 5 minutes break to decrease the effects of the affection memory remain. The participants were asked to wear the neuroscience technology in whole experimental processing to collect their affections.

### 2.3. Data Collection

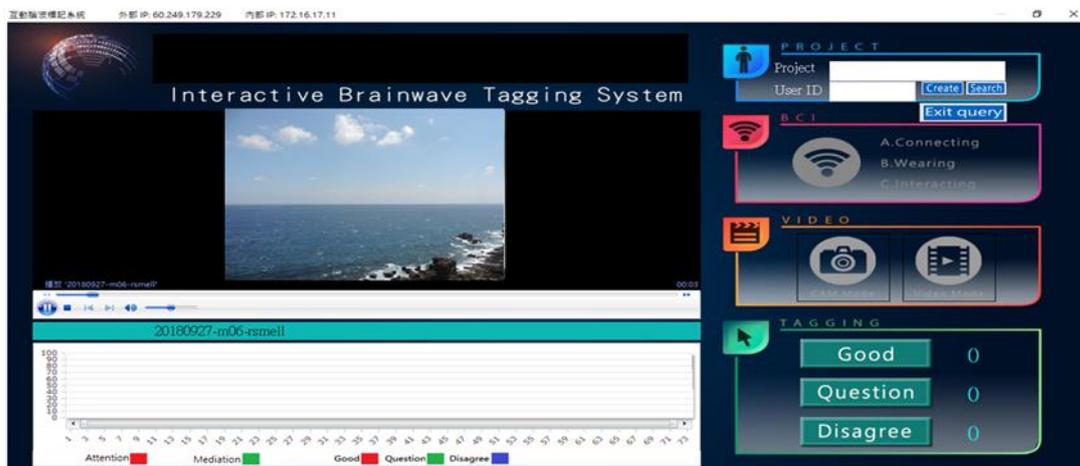
This study adopted the neuroscience technology (see in Figure 2) to collect the data of the participants' affective reactions.



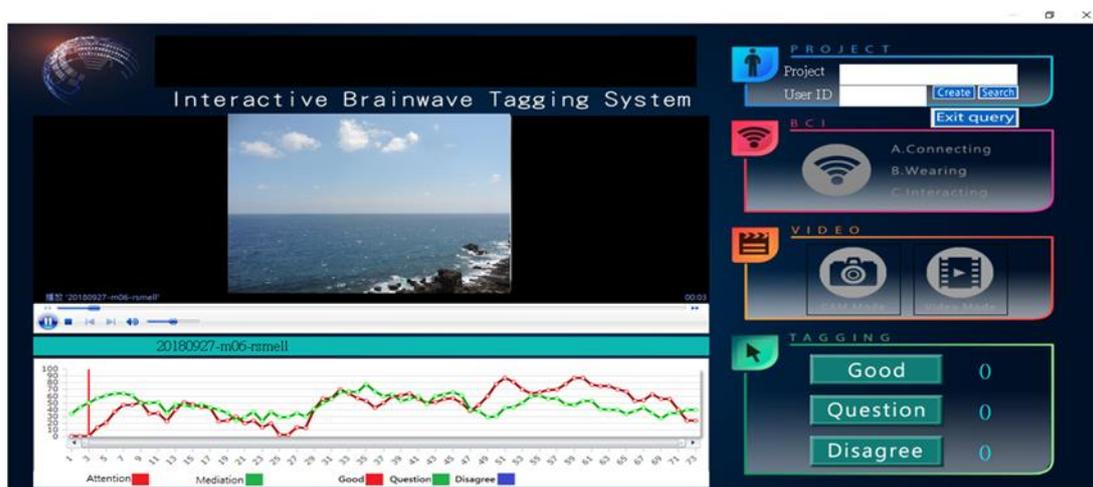
**Figure 2.** (a) the neuroscience technology (b) the simulation example of the participants' experiment situation (The pictures (a) and (b) were provided from Sheng Hong Precision Technology Co.).

This study adopted the EEG signal combinations reflection system which was developed by Sheng Hong Precision Technology Co. Ltd (Figure 3). In this system, the raw neuroscience signals will be collected 512 data per second. The raw data can be translated into three kinds of cognitive reactions which included in pressure, attention and meditation, and also can be translated into 8 FFT frequency bands of neuroscience data which included in delta wave (1-4 Hz), theta wave (4-7 Hz), alpha wave (8-14 Hz), beta wave (15-30 Hz), low gamma wave (30-50 Hz) and high gamma wave (> 50 Hz) [6,7]. Figure 4 showed that we also recorded the participants' performances to double check their emotion reflections.

All of the participants' raw neuroscience signals data were collected while they were participating in the experiments. Then, these data would be translated in statistical data through the neuroscience technology system automatically.



*Figure 3. The simulation example of EEG data collection.*



*Figure 4. The simulation example of EEG data collection and the participants' reflection.*

## 2.4. Data Analysis

In this study, the neuroscience data from experiments were been compared by paired T test. Each neuroscience data from experiments would be calculated in the formula (1):

$$\text{Net neuroscience data} = (\text{neuroscience data from experiments}) - (\text{blank neuroscience data}) \quad (1)$$

In this study, the statistical analysis was been analyzed by SPSS 22.0 software and the main analysis method is paired T test.

## 3. Result and Discussion

This study adopted natural landscape photos to induce the participants' relax affection after looking at the different photos. Photo A demonstrated the landscape of sea and land. Photo B demonstrated the whole view of sea. Photo C is focused on trees in the land and photo D is focused on the grassland. In this study, we compared

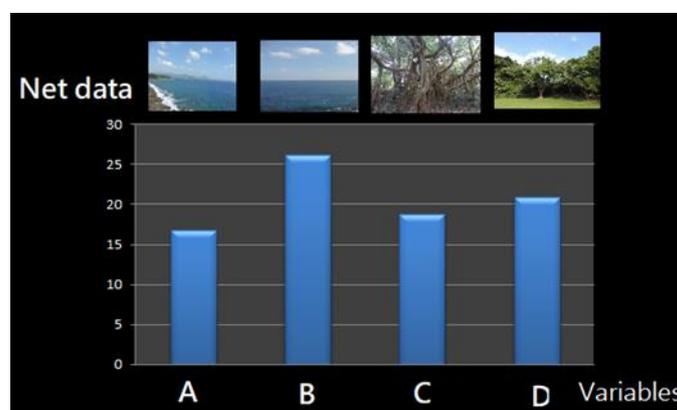
each 2 variables by using paired T test (Table 1). In Table 1, the variable “Net A” means the net neuroscience data when the participants looked at the photo A. The identifications about “Net B”, “Net C” and “Net D” are the same meanings. Besides, in Table 1, the higher scores of neuroscience data indicated that the participants showed more relax affections.

**Table 1.** The paired T test analysis of each 2 variables of neuroscience data (N=43).

Pair	Source	Mean	S. D.	t	p
1	Net A	16.82	8.74	-3.69**	.001
	Net B	26.15	17.42		
2	Net A	16.82	8.74	-2.42*	.020
	Net C	18.83	7.66		
3	Net A	16.82	8.74	-3.61**	.001
	Net D	20.98	9.28		
4	Net B	26.15	17.42	3.37*	.002
	Net C	18.83	7.66		
5	Net B	26.15	17.42	2.39*	.022
	Net D	20.98	9.28		
6	Net C	18.83	7.66	-2.42*	.020
	Net D	20.98	9.28		

Note: \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

The results from Table 1 show that the neuroscience data in Net B are all significantly higher than Net A, Net C and Net D. It means the participants performed the most relax affections in looking at photo B than others. Follow the data analysis, we can find that there are significant differences between “photo B and photo C”, “photo B and photo D”, and “photo C and photo D”. The comparison of the four variables is shown in Figure 5.



**Figure 5.** The comparison of the four variables.

Figure 5 demonstrated the participants’ neuroscience data reflections in looking at different landscape photos. The higher the scores of neuroscience data, the more relax affection reflection which people performed. To sum up, in Figure 5, the results show that the participants performed highest relax affections in looking at photo B, and then is photo D, photo C and photo A.

Through the interview, most participants felt that photo B could reflect the peace emotion, and let people feel relax. Then, the second one is photo D. Many participants mentioned that the extensive wild could induce their relax affections, and they can image the relax feeling if they have chance to sleep in the land. Then, the third one is photo C. Most participants do not like the twisted trees. They mentioned that the

twisted trees made them feel annoyed. To be amazed, the fourth one is photo A. Many past researches mentioned that “to close to the sea could help people feel relax”, but this results did not be found in this study [6,7]. Through the interview data, the possible reasons were been statements: 1) the land in the left of the photo creates a disorderly and confused feeling. 2) For some participants, the spray let them feel dangerous, especially for the participants who cannot swim. This finding is very surprising. In general, most people thought the natural sea environment could help people feel relax, but the stress in deep mind often be ignored since less researches explore the tight differences about the landscape of sea.

Mike George (2017) published a book “You can relax and avoid stress”. He mentioned that sometimes the people could not aware the stress in their mind in daily life [6,7,8]. Mike George indicated that the deep unrelaxation triggered when people sense their meaninglessness in the universe [8,9,10]. In other words, the natural landscape maybe show in all of our daily life, but we do not know well what kind of natural landscape could help us more relax and which one will increase our stress. We think this study could provide some implication in this issue [10,11].

#### **4. Conclusions**

The purpose of this study is to explore human’s relax affection reflection in different natural landscape. Forty-three volunteer adults participated in this study (Mean  $\pm$  S.D. = 33.4  $\pm$  8.4 years old; male=22, female=21). The participants were asked to watch four different kinds of landscape photos and be collected their brain wave data. The results show that the participants performed highest relax affections in looking at photo B (the whole view of sea), and then is photo D (the grassland), photo C (twisted trees) and photo A (the landscape of sea and land). The interview data show that all participants felt the whole view of sea could let them feel relax, but the landscape with both sea and land let them felt disorderly and confused, and the spray let some participants who cannot swim felt dangerous. Besides, the grassland made the participants feel relax, but the twisted trees made them feel annoyed.

The main implication of this study is to suggest the practicer to focus on the tiny differences in the natural environment. To make use of natural environment well could help the participants feel better and learn more, but the unsuitable natural environment might induce the participants’ negative affections. The practicer need to know well about the nature environments filed to develop the suitable activities.

#### **Conflicts of Interest**

The authors declare that there is no conflict of interest regarding the publication of this article.

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