

# 「The Relationship Between Blinks And Concentration」

Group A

## 1.Introduction

We saw a study on the relationship between brain waves and concentration (reference①), and we were interested in concentration. We also found studies linking concentration to the number of blinks. We then wondered what the relationship was between the various types of concentration and number of blinks. Therefore, we decided to investigate their relationship in an experiment under the definition of the concentration state as a learning state.

## 2.Hypothesis

We set a hypothesis, "Concentration and blinks are correlated". We defined the state of concentration as a state of learning, "rest" as a state of talking (relaxing). We also did two types of tests and compared the number of blinks while learning and at rest. We focused on three types of learning: input, output, and information processing.

## 3.Experiment

### ①Method

We used two types of the tests, then we asked 28 subjects to solve them. Before the tests, the subjects solved another type of the test to get used to the test format. We took videos while they were solving and at rest. We counted the number of blinks based on the videos and compared.

- Test1: A memorizing test for input and output  
Memorize 20 sets of words in 2 minutes. → Answer the corrected words within 2 minutes.
- Test2: A test for information processing  
Solve 6 questions within 2 minutes.

Both tests can be solved by everyone without knowledge.

### ②How to process data

We calculate the number of blinks per second...①and compare the average of ① for each subject between study and rest.

### ③Results

Please see the table at bottom.

### ④ Analysis

From box plot, the number of blinks during input, output and information processing is less than during normal conditions.

input × rest	t (27) = 4.058484, p<.01
output ×rest	t (27) = 5.182718, p<.01
information processing × rest	t (26) =3.428669, p<.01

→There are significant differences.

input × information	t (26) =2.059539,p=0.37844
input × output	t (28) =2.051831, p=0.077859
output × information	t (26) =2.05954, p=0.399124

→There are not significant difference.

## 5.Discussion

The difference in blink frequency between rest and during the test is not coincidence. Blink frequency is thought to be influenced by concentration.

## 6. Conclusion

In concentration, blink frequency tends to be lower.  
These three types of learning have the same tendency.

## 7. Prospects for the future

Using the correlation between blinks and concentration, we want to measure the changes in concentration.

We want to examine the relationship between blinks and concentration in various environments.

We want to develop an AI that determines the level of concentration based on the blinks.

## 8. Reference

• Yamaguchi Prefectural Tokuyama High School. [Visualizing Concentration with AI and EEG] AI to noha de syucyu wo kasikasuru (in Japanese) ...①

• Kyoto University Shimoda Research Institute 【Experimental investigation of the effect of sound environment on intellectual concentration】 otokankyo ga chiteki shuchu ni ataeru eikyuu no jikken kentou (in Japanese) <http://hydro.energy.kyoto-u.ac.jp> ...②

• Matsuda Masami. 2004. "Speed Reading ~easy exercising~."

Nippon Jitsugyo Publishing. (in Japanese) ...③

• Yuu Tanaka (Department of Psychology, Faculty of Liberal Arts, Kawamura College, Nagasaki, Toshima-ku, Tokyo 171-0051) "Arousal level and blink activity" Kakuseisuijun To Syunbokukatsudou (in Japanese)...④

