



## **A research on the validity of expression method of sonic environment by using Japanese onomatopoeias**

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### **ABSTRACT**

The method that expresses a person's surroundings by onomatopoeias on a graphics like comics enables us to realize the sonic, visual, or thermal environment not by physical value but by easy words. Such onomatopoeias may be useful for people who are not specialists of physics to report the problems of their surroundings properly. In the present research, three experiments are carried out. First, an experiment verifying that Japanese onomatopoeias that are provided from dictionary can evoke the common feelings to environment among people. The results show that sonic, visual, and thermal environment can be expressed commonly by onomatopoeias. In the second experiment, subjects are instructed to write down the real environment by onomatopoeias on the picture of the place, and evaluate the impression. In the third experiment, other subjects are instructed to evaluate the impression of the place presented by a picture with onomatopoeias in the experimental room. Comparison of the results of two experiments reveals that the proper impression of sonic environment can be evoked by onomatopoeias even in the experimental room. It is suggested that a picture with sonic onomatopoeias can transfer the visual and sonic impression properly to the person who is not there.

Keywords: Sonic environment, Onomatopoeias, Expression method

I-INCE Classification of Subjects Numbers: 56.3, 63.2

### **1. INTRODUCTION**

The method that expresses a person's surroundings by onomatopoeias on a graphics like comics enables us to realize the sonic, visual, or thermal environment not by physical value but by easy words. Such onomatopoeias may be useful for people who are not specialists of physics to report the problems of their surroundings properly. In the present research, three experiments are carried out for the purpose.

### **2. EXPERIMENT 1**

#### **2.1 Aims of experiment 1**

First of all, an experiment that tried to reveal the existence of onomatopoeias that are commonly recognized as the expression of environment or feelings among people was carried out.

#### **2.2 Method**

Four hundred and fourteen onomatopoeias that are sampled from Japanese onomatopoeia dictionary (1) are tested by forty subjects, and sixty onomatopoeias are selected as word stimuli that express a person's environment. In addition, other a hundred and thirty nine onomatopoeias are chosen from the dictionary as word stimuli that express some comfortable or uncomfortable feelings.

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Using these 199 word stimuli, ninety two subjects are participated in the experiment 1. Subjects are instructed to classify these onomatopoeias into 4 categories that is the expression of "comfortable feeling", "uncomfortable feeling", "both of comfortable and uncomfortable feeling", and "impossible to classify".

### 2.3 Results

Results show that 31 onomatopoeias evoke common feelings among people. Five of them are concerned with sonic environment, and they all express uncomfortable feelings (Figure 1). It suggests that onomatopoeias that commonly express sonic environment and some comfortable or uncomfortable feelings exist among many people.

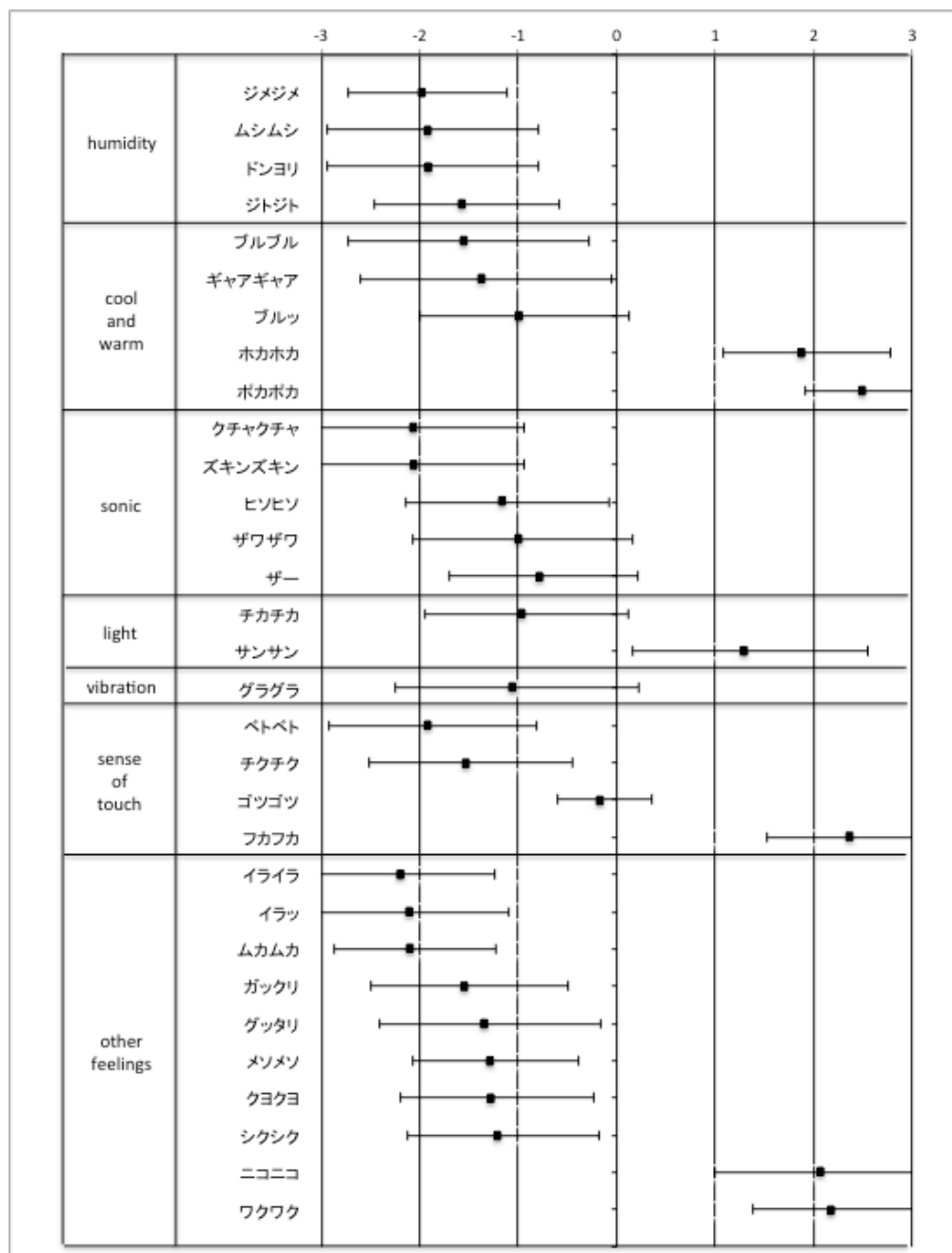


Figure 1: Results of experiment 1. Horizontal axis shows comfort.

### 3. EXPERIMENT 2

#### 3.1 Aims of experiment 2

The aims of experiment 2 are to apply the onomatopoeias to express the real environment, to reveal how they behave, and to show how they are concerned with evaluation of the real place.

#### 3.2 Method

In the experiment, subjects are instructed to write down the real environment by onomatopoeias on the picture of the place, and evaluate the impression by 7 step scales. Ten subjects (male = 6, female = 4) participated in the experiment, and fifteen places in Tokyo city are selected as targets for evaluation. All subjects experienced the 15 places (Figure 2). First, subjects are instructed to write onomatopoeias that express the environment of the place on pictures that are prepared in advance (Figure 3). Secondly, they are instructed to evaluate their environment by seven step scales. The scales are concerned with the evaluation of environment, that is like "brightness", "noisy feelings", "warm feelings", and so on.

1	17.9 °C 34.0 %	71.4 dB 12460.5 lx	2	18.2 °C 38.5 %	75.5 dB 1905.0 lx	3	17.5 °C 33.5 %	70.5 dB 4715.0 lx	4	18.3 °C 34.5 %	64.3 dB 3890.5 lx	5	20.7 °C 28.0 %	75.6 dB 537.5 lx
commercial facilities		inside of commercial facilities		under highway		passage way		pathway under railway						
6	21.8 °C 29.5 %	67.9 dB 5490.0 lx	7	19.6 °C 32.5 %	53.4 dB 5625.0 lx	8	18.7 °C 35.0 %	57.6 dB 7340.0 lx	9	20.9 °C 35.0 %	74.6 dB 3675.0 lx	10	20.1 °C 29.0 %	69.5 dB 1960.0 lx
crossing		shrine		in a park 1		street under railway track		shopping street						
11	20.1 °C 32.0 %	65.2 dB 17950.0 lx	12	19.0 °C 32.0 %	70.2 dB 15055.0 lx	13	19.6 °C 34.0 %	52.7 dB 13610.0 lx	14	16.7 °C 39.5 %	59.8 dB 1168.5 lx	15	16.6 °C 54.0 %	57.2 dB 943.0 lx
near food factory		factory near railway		windy river side		in a park 2		in a park with birds						

Figure 2: Outline of environments of 15 target places.



Figure 3: Example of onomatopoeias written on the graphics

### 3.3 Results

Two hundred and thirty four onomatopoeias are obtained from the experiment. The onomatopoeias that express sonic environment are seen most frequently among the several kinds of environment like light, thermal, and air environment. They are seen in all of the 15 places. Results of evaluation of the real place will be shown in the next chapter comparing with the results in the experimental room.

## 4. EXPERIMENT 3

### 4.1 Aims of experiment 3

In the experiment 3, it is verified whether the graphics with onomatopoeias can transmit the atmosphere of the real places or not.

### 4.2 Method

Ten subjects (male = 2, female = 8) are participated in the experiment. They are all different from the subjects who got in the experiment 2. They are instructed to evaluate the environment that are presented by graphics stimuli in seven step scales. The scales are the same as the scales that were used in the experiment 2. Graphics stimuli are consist of two types. Only the graphics of the place are the first type of stimuli, and the graphics of the place with onomatopoeias that are obtained in the experiment 2 are the second. Subjects experienced both types of stimuli of 15 places.

### 4.3 Results

Results show that brightness is almost the same between the "real evaluation" (the results of experiment 2) and "evaluation in the experimental room" (the results of experiment 3) (Figure 4). On the other hand, they show that noisy feeling from graphics with onomatopoeias is similar to the evaluation results at real place, but the results of evaluation by only graphics differ from them (Figure 5). Evaluations of other environment show no significant relation between real and experimental.

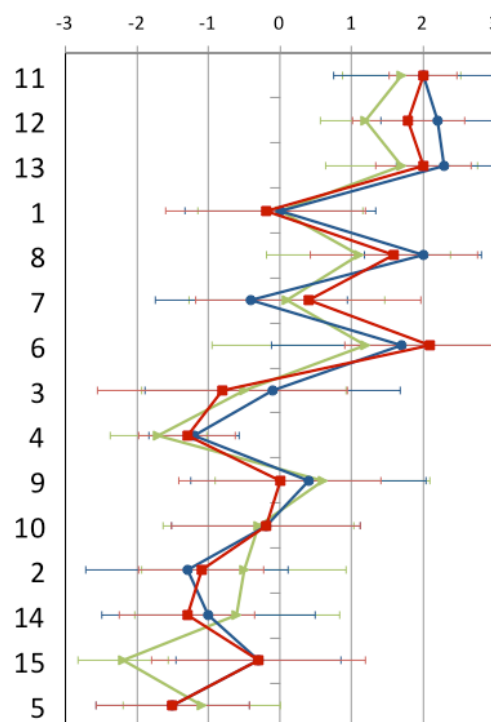


Figure 4: Results of brightness. Horizontal axis shows brightness. Green line shows "real places", Blue line shows "only graphics", and Red line shows "graphics with onomatopoeias".



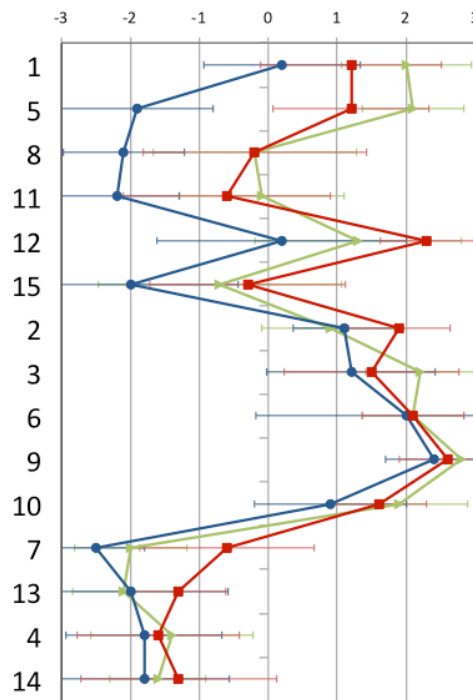


Figure 5: Results of noisy feeling. Horizontal axis shows noisy feeling. Green line shows "real places", Blue line shows "only graphics", and Red line shows "graphics with onomatopoeias".

## 5. DISCUSSIONS

The results of experiment 1 suggests the existence of onomatopoeias that express sonic environment and its comfort. The second experiment shows that such onomatopoeias are obtained very much from real places. And it is revealed that graphics with onomatopoeias concerned with sonic environment can transmit the atmosphere of real sonic environment, from the results of experiment 2 and 3. These results show the validity of the information transfer method by using onomatopoeias on the graphics. They can transmit the atmosphere of sonic environment from real field to the person anywhere else.

## 6. CONCLUSIONS

There exists some onomatopoeias concerned with sonic environment that have common feelings among people, and picture with sonic onomatopoeias can transfer the visual and sonic impression properly to the person who is not there. It is expected that applying this method to detection of problem or good point of sonic environment by general people.

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## REFERENCES

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