IMPRESSION OF SIGNBOARD IN CONSIDERING LANDSCAPE

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ABSTRACT

Recently, regulations governing outdoor advertisements have been enacted in Kyoto, and elsewhere, based on landscape and cityscape planning considerations. Commonly, such regulations are based on desires to preserve historical townscapes and permit development of more attractive cities. In this study, we aim to clarify conditions by which signboards can be made to harmonize with their surrounding landscape from the viewpoint of color, while maintaining a sufficient level of "impression" in locations where we normally live. The experiment was conducted using a personal computer monitor on which colored signboards were displayed against various backgrounds. The results are suggested that coloring patterns in which white is used as the background or lettering color are highly evaluated for "harmony", and coloring patterns of black or chromatic color background × white lettering are likely to remain in the viewer's "impression".

Keywords: *impression, harmony, conspicuity, signboard, landscape*

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1. INTRODUCTION

The Landscape Act was enacted in 2004, and local governments became possible an individual outdoor advertisement policy. Recently, regulations governing outdoor advertisements have been enacted in Kyoto [1], Tokyo [2], Yokohama's Minato Mirai area [3], Kanazawa City, Ishikawa Prefecture [4], and elsewhere, based on landscape and cityscape planning considerations. Nonaka [5] clarified the actual situation of landscape planning by local governments. Doumoto et al. [6] clarified the actual situation of color standard in official landscape plan. Commonly, such regulations are based on desires to preserve historical townscapes and permit development of more attractive cities. In this study, we will clarify conditions by which signboards can be made to harmonize with their surrounding landscape from the viewpoint of color, while maintaining a sufficient level "impression" in locations where we normally live.

2. EXPERIMENT

Our findings are based on an experiment that was conducted using a personal computer (PC) monitor in a darkroom on which colored signboards were displayed against various backgrounds, and from which test subjects made subjective evaluations of the "impression" and other factors related to the signboards.

In this experiment, in order to prevent the object coloration from being influenced by light contamination, all external lights in the darkroom were turned off and the color temperature of the monitor was set to 6500 K (white). In addition, the angle at which test subjects viewed the object image was set to 20° horizontal and 15° vertical, which is the normal viewing angle of a pedestrian, and the distance between the test subject and monitor was set to 120 cm in order to ensure that the object was fully visible. The test subjects were eight males in their twenties with normal color vision.

Experimental images were synthesized using the free and open source GNU Image Manipulation Program (GIMP). Tables 1 and 2 show the color codes and coloring patterns, respectively that were used in this experiment. The following color combinations were presented: white background color × colored lettering (excluding white), colored background (excluding white) × white lettering, and chromatic background color (excluding brown) × chromatic lettering color (excluding brown).

Figure 1 shows the signboard patterns used in this experiment. Figure 2 shows the example of experimental images. The background images were set to three conditions of "residential area", "road area", and "downtown area". Test subjects were asked to make subjective evaluations using the seven-stage (-3 to 3) semantic differential (SD) method in which eight word pairs

(calm/restless, conspicuous/inconspicuous, colorful/quiet, harmonious/unharmonious, comfortable/uncomfortable, clean/messy, impressive/unimpressive, easy to see/hard to see) were employed.

The following procedure was used in the experiment:

The subject is given 3 minutes to adapt to the brightness of the monitor in the darkroom.

(1) The subject observes randomly presented evaluation images.

(2) The subject provides subjective evaluation judgments via oral response.

(3) Steps (1) to (2) are repeated for 24 patterns.

(4) Steps (1) to (3) are repeated in the order “residential area”, “road area”, and “downtown area”.

Table 1: Color codes

color	color codes
W(White)	ffffff
Bl(Black)	2f3130
R(Red)	e03c4a
G(Green)	23a54d
B(Blue)	017eec
Y(Yellow)	ffd900
Br(Brown)	963e30

Table 2: Coloring patterns

[Background color × Lettering color]	[W × Bl]	[Bl × W]	[R × G]	[G × R]	[B × R]	[Y × R]
	[W × R]	[R × W]	[R × B]	[G × B]	[B × G]	[Y × G]
	[W × G]	[G × W]	[R × Y]	[G × Y]	[B × Y]	[Y × B]
	[W × B]	[B × W]				
	[W × Y]	[Y × W]				
	[W × Br]	[Br × W]				

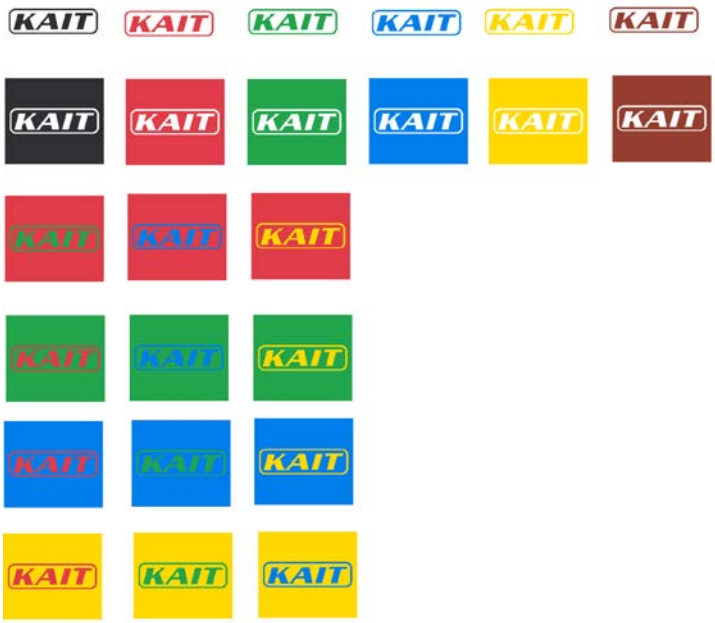


Figure 1: Signboard patterns

(a) Residential area (b) Road area (c) Downtown area

Figure 2: Example of experimental images

3. RESULTS

Among the results obtained via subjective evaluation were two excerpts, “harmony”, which is considered to be most relevant to the aim of this study, and “impression”, which is thought to be important for signboard functionality. In order to ensure that the coloring harmonized with the landscape while maintaining “conspicuity”, regardless of background image, we decided to select coloring patterns that resulted in the highest total evaluations scores for “harmony” and “impression”.

Figure 3 shows the relationship between “harmony” and “impression” in the residential area, and Fig. 4 shows the coloring patterns for which the evaluation scores for “harmony” in the same area were 0 or more. These figures show that the evaluation scores of the coloring patterns G × W, G × R, and Bl × W were high in the residential area. Furthermore, we found that the chromatic color combinations were difficult to harmonize, even though they were evaluated highly in the “impression” score range.

Figure 5 shows the relationship between “harmony” and “impression” in the road area, while Fig. 6 shows the coloring patterns for which the evaluation scores for “harmony” in the same area were 0 or more. As can be seen in these figures, the road area evaluation scores for the coloring patterns W × B, B × W, W × Br, Br × W, G × Y, and B × Y were high. It can also be seen that the road area evaluation scores for blue patterns were high, in addition to white and green coloring patterns that were evaluated highly in the residential area.

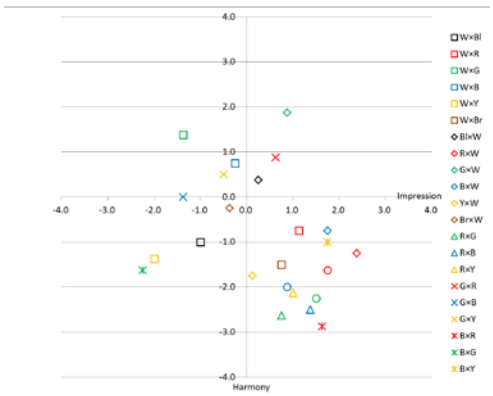
However, the Bl × W scores show a significant difference between the “harmony” and “impression” scores. Since the signboard is positioned close to the tree shadows, it is thought that the black background became difficult to see and did not make a strong “impression” on the test subjects. In addition, it is thought that the black background combined with the tree shadow to produce a high “harmony” score.

Figure 7 shows the relationship between “harmony” and “impression” in the downtown area, and Fig. 8 shows the coloring patterns for which the evaluation scores of “harmony” in the same area were 0 or more. Together, these figures show that the coloring pattern evaluation scores of Br × W, W × Br, W × G, G × W, B × W, Bl × W, and W × R are high in the downtown area. Furthermore, Fig. 7 shows that the evaluation scores of black or chromatic color background × white lettering, or white background × chromatic color letter are high in the downtown area.

Figure 9 shows the coloring patterns for which the evaluation scores of “harmony” and “impression” were 0 or more in each area along with the sum of the evaluation scores of “harmony” and “impression”. As can be seen in this figure, the total score of the coloring pattern G × W is the highest score in the residential area, B × W is the highest score in the road area, and Bl × W is the highest score in the downtown area. These results indicate that these coloring patterns are harmonious with the landscape and made a strong “impression” on viewers.

In the residential area, it is thought that the G × W score is high because numerous plants were shown in the background image. In addition, it is thought that green is a suitable color for a quiet residential area sign because it has a calming effect on viewers. The coloring pattern B × W is used commonly for traffic signs, and it is a coloring pattern that has very high visibility. Therefore, it is thought that the evaluation score was high in the road area. In the downtown

area, it is thought that the score of Bl × W is high because the building in the background image was black and the image showed a dark alley.



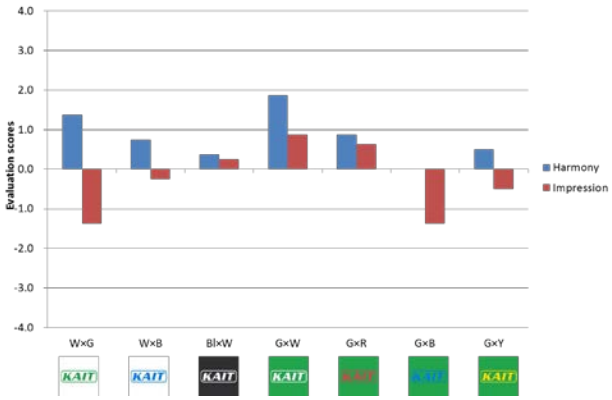
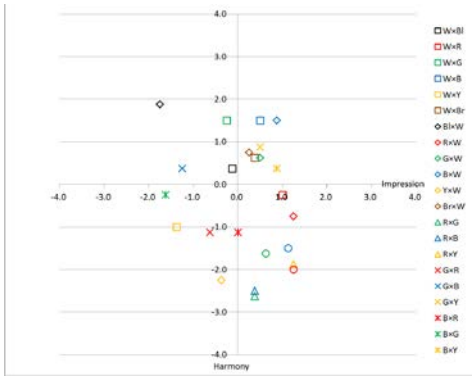


Figure 3: Relationship between “harmony” and “impression” in the residential area (Left)

Figure 4: Coloring patterns for which the evaluation scores of “harmony” in the residential area were 0 or more (Right)



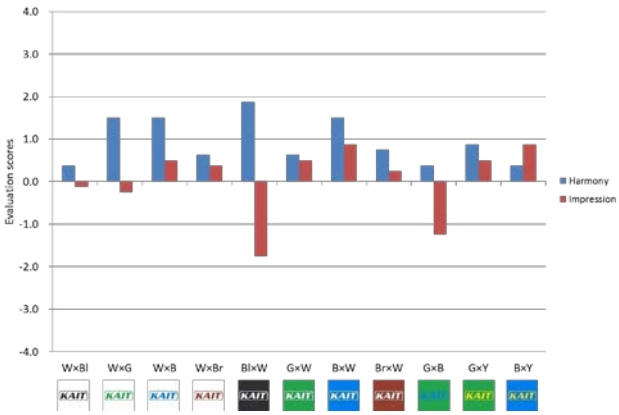
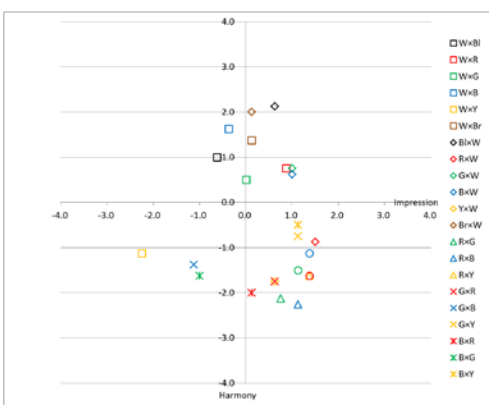


Figure 5: Relationship between “harmony” and “impression” in the road area (Left)

Figure 6: Coloring patterns for which the evaluation scores of “harmony” in the road area were 0 or more (Right)



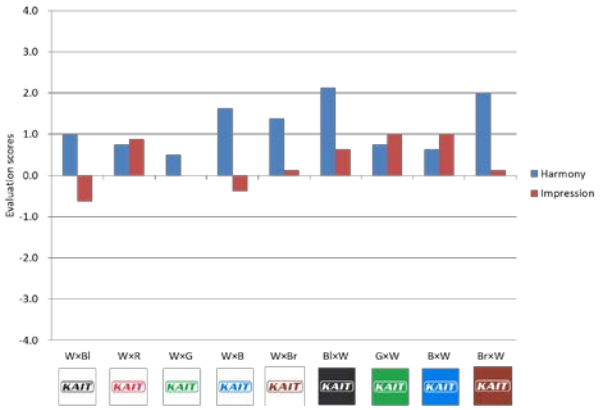


Figure 7: Relationship between "harmony" and "impression" in the downtown area (Left)

Figure 8: Coloring patterns for which the evaluation scores of "harmony" in the downtown area were 0 or more (Right)

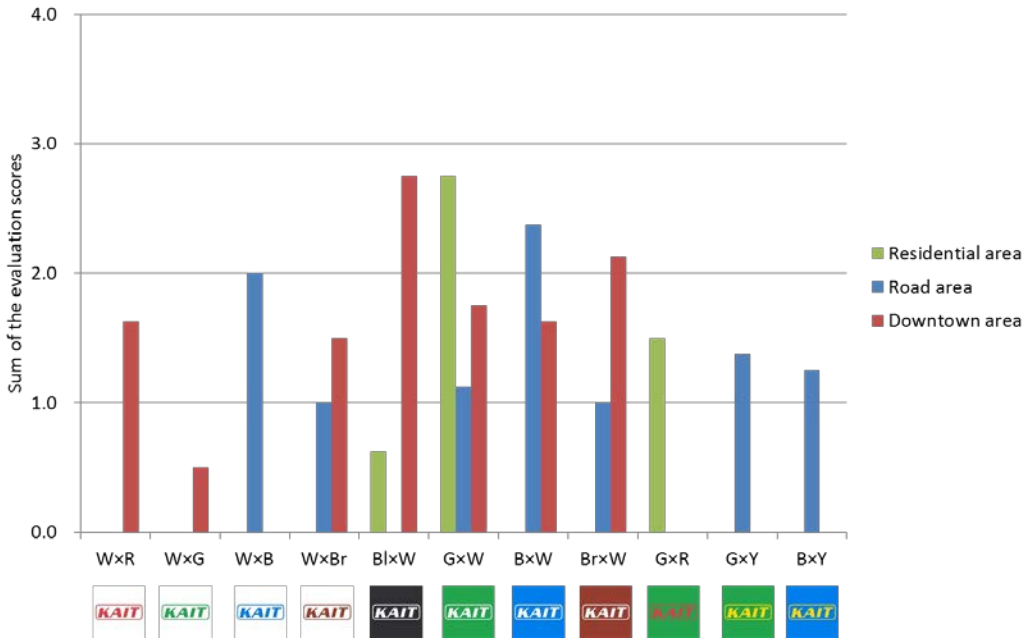


Figure 9: Coloring patterns for which the evaluation scores of "harmony" and "impression" in were 0 or more in each area, and the sum of the evaluation scores of "harmony" and "impression"

Next, the differences in the evaluation between W × G and G × W in the residential area were investigated. Interestingly, when the background color and lettering colors were switched, the "impression" scores differed significantly. In an attempt to understand this, the luminance contrasts between the background color and the lettering color in the images displayed on the PC monitor were measured. From these results, we found that W × G has a luminance contrast of 0.5, whereas G × W has a luminance contrast of 2.3. This indicates that the lettering became

easier to read because the luminance contrast increases when white (whose luminance is high) is used for the lettering. It is also considered likely that coloring patterns of "black or chromatic background color × white lettering" are likely to remain in the viewer's "impression".

Here, the correlations between "impression" and "conspicuity" were investigated. The correlation coefficients were 0.7 in the residential area, 0.9 in the road area, and 0.9 in the downtown area. These results show that there is a strong positive correlation between "impression" and "conspicuity".

4. CONCLUSION

In this study, a visual experiment was conducted to clarify how the coloring patterns of signboard harmonized with the landscape while maintaining "impression". The results are summarized as follows:

(1) Coloring patterns in which white is used as the background or lettering color are highly evaluated for "harmony".

(2) Coloring patterns of black or chromatic color background × white lettering are likely to remain in the viewer's "impression".

(3) Coloring patterns G × W in the residential area, B × W in the road area, and Bl × W in the downtown area are harmonious with the landscape and are likely to remain in the viewer's "impression".

As a future work, we need to consider so that it can be applied to more background situations behind a signboard.

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