Three estimation types of color scheme preference
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Question: How Many Color Harmony Raws Do We Need?

Answer: More than Three.

ABSTRACT

The author conducted three experiments in which the impressions of color simulated models and images were evaluated by subjects to confirm the estimation types of color scheme preferences to be applied for each of them. In the first experiment, the streetscape models that consisted of five buildings were evaluated, and the results revealed that the impression of harmony correlates greatly with the impressions of similarity and order. The preference was explained by the impressions of harmony and brightness pertaining to the colors employed in these models. In the second experiment, a model representing the interior of a room, which was presented with variations in the wall and floor colors, was evaluated. The color preferences were explained by the weighted average of preferences for the walls and the floor. In the third experiment, a figure that consisted of characters placed in various backgrounds on an LCD screen was evaluated. The preference correlated largely with the brightness difference of colors pertaining to the characters and their background. These results show that we use different methods for color preference estimations. It implies that we should prepare several color harmony theories to apply to individual color designs

1st Raw.

You should use similar colors to get harmony

■ Examples of the image shown in Experiment 1.

rating on SD scales + Factor Analysis

■ Factor loadings of SD scale ratings of Experiment 1

| Scale	Factor 1	Factor 2	Factor 3	Commu-nality
Similarity	0.97	-0.01	-0.02	0.95
Order	0.97	-0.04	0.02	0.94
Unity	0.96	-0.09	0.21	0.96
Organized	0.95	-0.05	0.17	0.94
Regularity	0.94	-0.06	0.05	0.88
Harmony	0.93	0.15	0.26	0.95
Peacefulness	0.81	-0.30	0.38	0.89
Reality of colors	0.68	-0.32	0.46	0.77
Beauty	0.64	0.61	0.23	0.83
Familiarity	0.52	0.57	0.53	0.87
Preference	0.49	0.58	0.48	0.81
Cheerfulness	-0.06	0.97	-0.02	0.94
Brightness	-0.04	0.96	0.10	0.93
Excitement	-0.22	0.85	-0.18	0.80
Warmth	-0.03	0.83	0.10	0.70
Vividness	-0.25	0.79	-0.52	0.95
Unambiguity	-0.07	0.07	-0.95	0.91
Strength	-0.21	-0.08	-0.92	0.90
Factor Contribution(%)	42.40	28.58	17.38	88.36

SImilarity = Order ≒ Harmony

Harmony + Brightness (-Strength) = Beauty · Preference

■ Another study which tells the relationship between

The images in which the color of center building was varied was evaluated
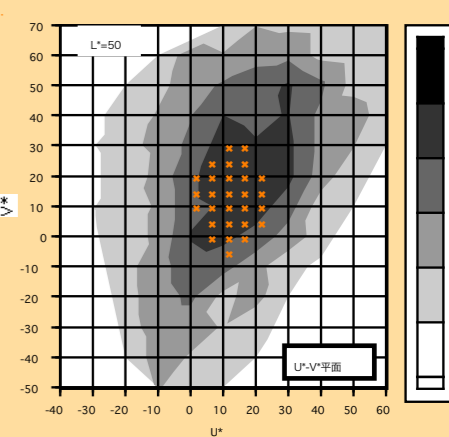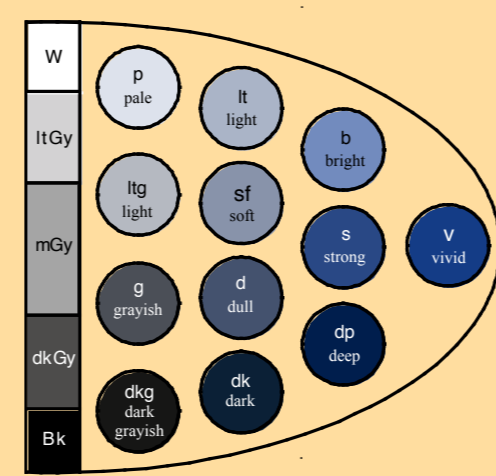
The image using more similar color to the neighbor colors

2nd Raw.

You should use good colors to get harmony
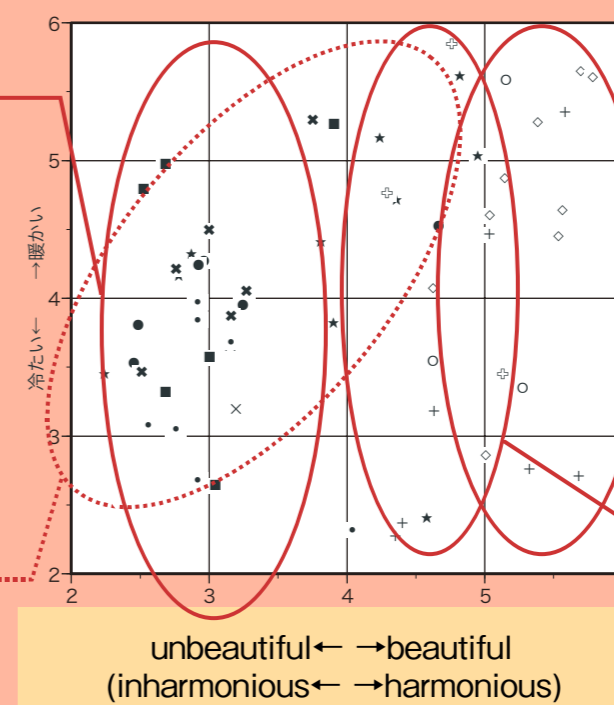

■ Examples of the image shown in Experiment 2

rating on SD scales + Factor Analysis

The tones have been described in accordance with PCCS (Practical Color Coordinate System) proposed by the Japan Color Institute
■ The explanation of tone.

light+light
light+dull
dull+dull

pale+pale

pale+light

pale+dull

unbeautiful ← → beautiful
(inharmonious ← → harmonious)

The rating of beauty (≒harmony) on the condition the wall and floor color are same are: dull < light < pale
↓
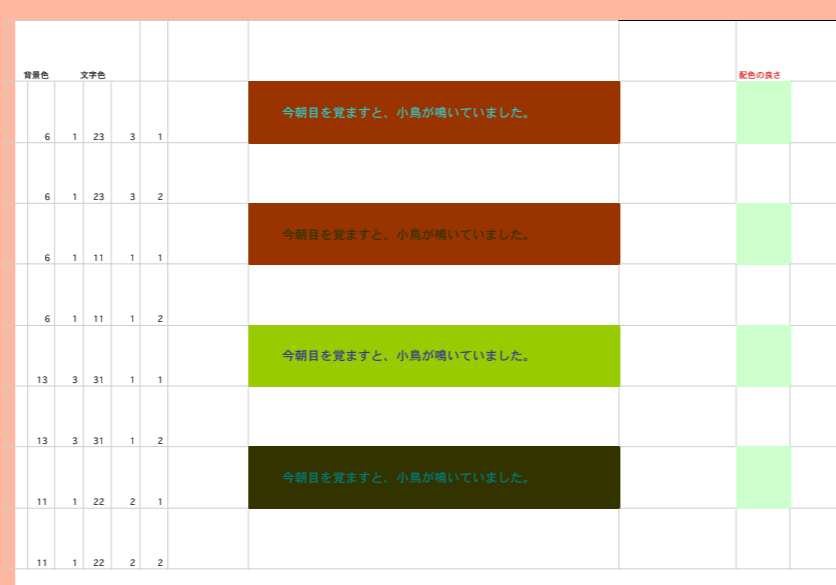The combination of beautiful colors is beautiful (≒harmonious) in this case

◇	:	pale+pale
◇	:	pale+light
◆	:	pale+dull
●	:	light+light
●	:	light+dull
■	:	dull+dull
+	:	pale+N
×	:	light+N
●	:	dull+N
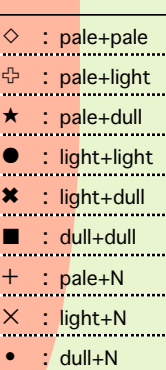
3rd Raw.

You should use colors which are different on brightness each other to get harmony

■ The 40 colors used in Experiment 3.

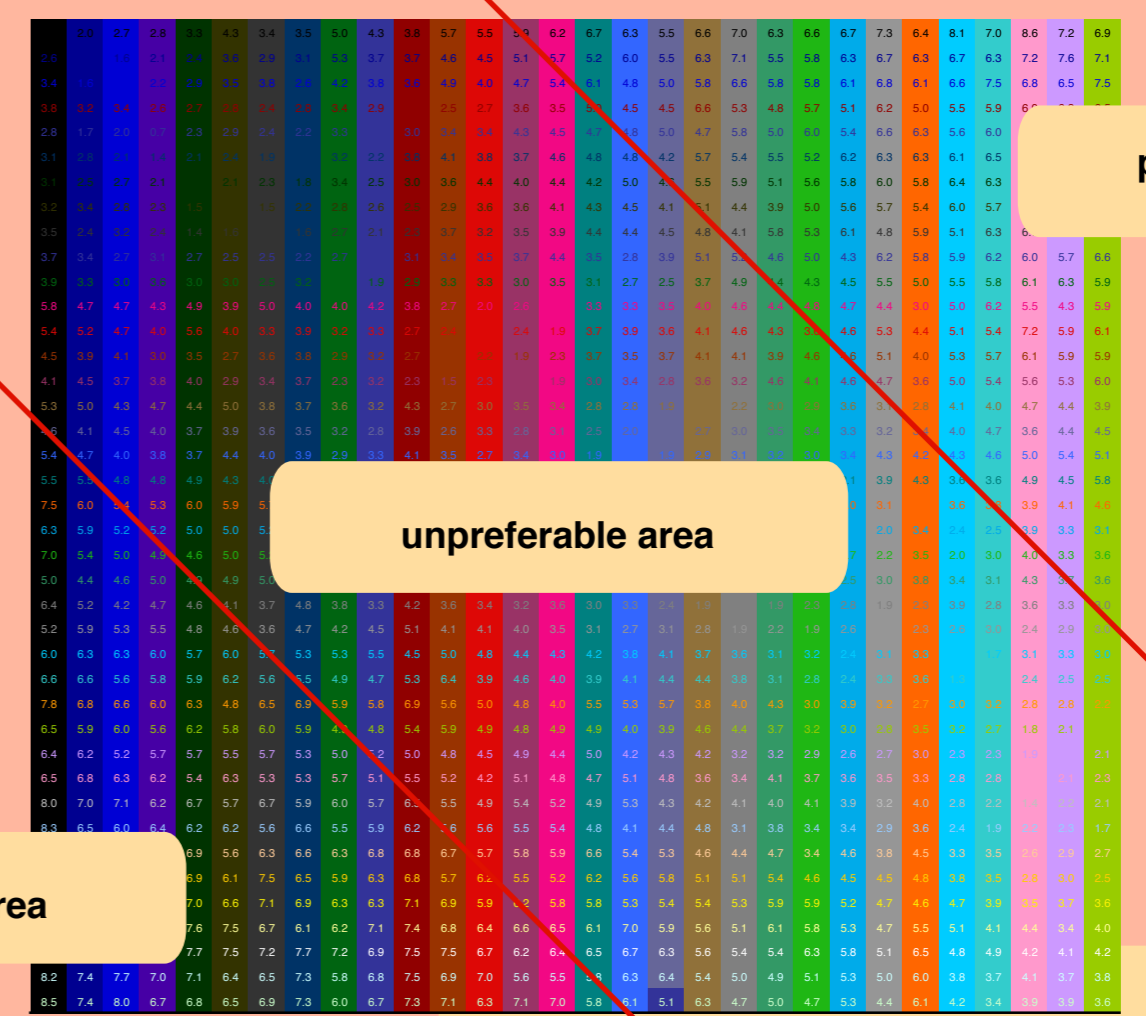■ A part of the sample shown in Experiment 3.

The preferences of the combination of 40 character colors and 40 background colors (1600 samples) were rated

rating on SD scales + Factor Analysis
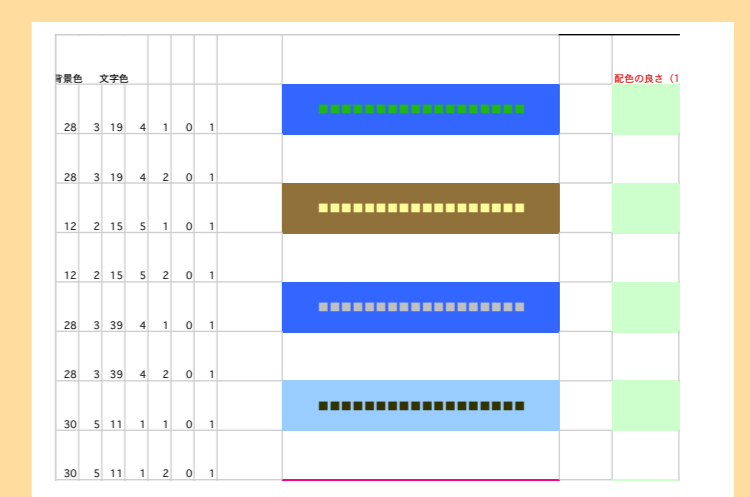

preferable area

unpreferable area

preferable area

■ The preference of characters and the background color matching

The correlation coefficient between the preference value and the Y value difference is 0.671.

■ Another study which tells the relationship between color difference and preference

Different evaluation process is used to get harmony (or beauty, preference) impression depending on the feature of the evaluating subject.

More research is necessary to confirm the condition deciding which evaluation process is used.

The tendency of evaluation is similar to the experiment mentioned above. The correlation coefficient between the preference value and the Y value difference is 0.671.
(The right column shows the symbol using sample is more preferable. The left column is opposite, the character using sample is more preferable)