A cross-cultural study on color preference in three Asian cities: Comparison between Tokyo, Taipei and Tianjin¹

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In this comparative study on color preference in Tokyo, Taipei and Tianjin, subjects were asked to choose from a color chart the three colors they liked most and the three they liked least, in addition to stating the reasons for their choices. The statistically significant differences obtained for both hues and tones and the results of analysis by Dual Scaling indicated that each area has unique color preference tendencies. However, a high preference for white was common to all three areas, along with preferences for some other colors. These results, together with those of the author's previous comparative study in Japan and Korea, thus demonstrate a common strong preference for white in four neighboring Asian areas. The reasons given for the choices suggested that associative images of colors based on environmental and cultural aspects may be one of the important factors that influence color preference.

Key words: colors, cross-culture, color preferences, Asian color preferences, Dual Scaling.

Preference—'Liking'/'Disliking' is a basic human trait which regulates everyday behavior. There are numerous studies that have attempted to clarify the structure of preference and to isolate the factors which influence one's preference or taste. While there are various research areas concerning the topic, this paper focuses on the preference for color.

Surveys on color preference go back to the very beginning of psychological experiments. Some studies have been carried out on the preference for colors associated with particular objects. Many, however, have

investigated the affective value of color, not in combination, but separately so as to evaluate single colors without the influence of other variables.

Several factors are said to be responsible for color preference: age, sex and geographical area of residence. Although there have been numerous studies of age and sex differences in color preference, very few have concentrated on geographical regions, especially from a cross-cultural perspective.

Eysenck's critical experiment (Eysenck, 1941) suggested that there was a general order of preference for fully saturated hues, in the order of blue, red, green, purple, and orange, with yellow ranking last. As this order did not differ between Caucasian and other races, he concluded that there was no cross-cultural difference in the preference for colors.

Choungourian (1968) reported the preference for eight Ostwald hues (red, orange, yellow, yellow green, green, blue green, blue, purple) among 160 American, Lebanese, Iranian and Kuwaiti university students in Beirut. He found that red and blue ranked

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highest in preference value for the American subjects, while those colors ranked lowest for Kuwaitis. On the other hand, blue green was ranked last among the Americans, but was most preferred by both the Iranian and Kuwaiti subjects. Consequently, he concluded that cultural variables were at work in determining color preferences.

The recent factor analysis study by Adams and Osgood (1973) who researched cross-culturally the affective meanings of color concepts by the SD method found the similarities in feeling about colors among 23 cultural groups. The most highly evaluated color was blue; green and white ranked 2nd; red and yellow placed 3rd. Gray and black were quite low in evaluation points.

Saito (1981) demonstrated the cross-cultural differences and similarities in color preference among nine cultural groups. The groups were Americans, Germans, Danes, Australians, Papua New Guineans, South Africans, Japanese-Americans living in the U.S., foreigners living in Japan and Japanese. Four hundred subjects were asked to choose the colors that they liked and disliked among 65 colored chips. As a result, vivid blue was the only color that was commonly preferred highly by all groups. Other color preferences were found to be different among the groups, leading Saito to conclude that cultural variables are indeed involved in color preference.

One very significant finding in this study was the distinct Japanese preference for white. Twenty-five percent of the Japanese subjects selected white as their 1st, 2nd, or 3rd choice, whereas such a preference could not be observed in other countries. This high preference for white in Japan has been subsequently confirmed by Saito (1981; Saito, Tomita, & Kogo, 1991a; Saito, Tomita, & Yamashita, 1991b) and other researchers. In order to investigate whether or not this tendency is unique to Japan or may be observed in other Asian countries, Saito (1992) repli-

cated the above study in Korea in 1988 and then compared the findings with a Japanese control group. As a result, a preference for white was observed in Korea as well as in Japan. It was suggested that the geographical and cultural proximity of Japan and Korea was the reason for the similarity.

The above comparative study showed that a strong preference for white was common to both the Japanese and Koreans subjects. If as suggested, the preference for white is based on similarities in cultural background brought about by geographical proximity, then such a tendency should also be seen among other Asian countries where there has been a long history of cultural exchange. In order to demonstrate that such environmental aspects as cultural similarity and geographical proximity are important factors affecting the preference for white, the above study was extended to two other Asian areas—Taipei and Tianjin. The main purpose of this study is to compare the general color preference tendencies in these three Asian areas, with emphasis on the preference for white, to investigate whether or not cultural variables are involved in color preference.

Method

Subjects

The total number of subjects was 474. Each sample population contained almost an equal number of subjects. The subjects in Tokyo (88 male/72 female) were 160 university students. The average age was 19.6 years. The 156 subjects in Taipei (102 male/54 female) were mostly university students, whose average age was 24.1 years. The 158 subjects (69 male/89 female) were also mostly university students (average age; 22.8 years) living in Tianjin. The surveys were carried out from June to October, 1991.

Stimulus

The stimulus was a 'color chart' with 77

Table 1
Munsell notations and color names of each color in the chart

No.	Munsell notation	color name	No.	Munsell notation	color name
01	4.0R 8.5/3.5	pale pink	41	4.3R4.3/13.5	vivid red
02	5.0YR 9.0/3	pale beige	42	4.0YR 6.5/14	vivid orange
03	5.0Y 9.0/3	pale yellow	43	5.0YR 8.0/13.5	vivid yellow
04	4.0GY 9.0/3	pale yellow green	44	4.0GY 7.0/12	vivid yellow green
05	4.0G 8.5/2	pale green	45	4.0G 5.5/10.5	vivid green
06	5.0BG 8.0/2	pale greenish sky	46	10.0BG 4.0/10	vivid blue green
07	5.0PB 8.0/2	pale sky	47	3.0PB 3.5/13	vivid blue
08	5.0P 8.0/2	pale lavender	48	9.0PB 3.5/13	vivid violet
09	6.0RP 8.0/2	pale lilac	49	6.0P 3.5/12.5	vivid purple
10	6.0RP 8.0/2	pale purplish pink	50	6.0RP 4.0/13.5	vivid red purple
11	4.0R 6.5/3	grayish pink (ltg2)	51	4.0R 3.5/12	deep red
12	5.0YR 7.0/2	beige	52	4.0YR 5.0/11.5	deep orange
13	5.0Y 7.0/2	grayish yellow	53	5.0Y 6.0/10	olive yellow (dp8)
14	4.0GY 7.0/2	grayish yellow green	54	4.0GY 5.5/10	deep yellow green
15	4.0G 6.5/2	light grayish green	55	4.0G 4.5/9.5	deep green
16	5.0BG 6.0/2	light grayish blue (ltg16)	56	10.0BG 3.0/9	deep blue green
17	3.0PB 6.0/3	light grayish blue (ltg18)	57	3.0PB 2.4/11	deep blue
18	9.0PB 6.0/3	light grayish violet	58	9.0PB 2.4/11	deep violet
19	6.0P 6.0/3	light grayish purple	59	6.0P 2.4/11	deep purple
20	6.0RP 6.0/3	grayish pink (ltg24)	60	6.0RP 3.0/12	deep red purple
21	4.0R 5.0/7.5	dull red	61	4.0R 2.4/6	dark red
22	5.0YR 6.5/6	dull orange	62	8.0YR 3.5/6	dark yellowish brown
23	5.0Y 6.5/6	olive yellow (d8)	63	5.0Y 4.0/5.5	olive
24	4.0GY 6.5/6	dull yellow green	64	4.0GY 3.5/5	olive green
25	4.0G 5.5/6	dull green	65	4.0G 3.0/5	dark green
26	5.0BG 4.5/6	dull greenish blue	66	5.0BG 2.0/5.5	dark greenish blue
27	3.0PB 4.0/7	dull blue	67	3.0PB 1.8/6	dark blue
28	9.0PB 4.0/7	dull violet	68	9.0PB 1.8/6	dark violet
29	6.0P 4.0/7	dull purple	69	6.0P 1.8/6	dark purple
30	6.0RP 4.5/7	dull red purple	70	6.0RP 2.0/6	dark red purple
31	4.0R 7.5/8	pink	71	n 9.5	white
32	4.0YR 8.0/8	light orange	72	n 7.5	light gray
33	5.0Y 9.0/7	light yellow	73	n 5.5	medium gray
34	4.0GY 8.5/7	light yellow green	74	n 3.5	dark gray
35	4.0G 8.0/6.5	light green	75	n 1.0	black
36	5.0BG 7.0/7	light greenish blue			
37	3.0PB 6.5/8	light blue	76		silver
38	9.0PB 6.5/8	light violet	77		gold
39	6.0P 6.5/8	light purple			
40	6.0RP 7.0/8	purplish pink			

colored chips: 70 chromatic colors, 5 achromatic colors, and silver and gold. Munsell notations and systematic color names of the employed colors are displayed in Table 1. The colors were arranged on a neutral gray cardboard panel 29.7 × 41.8 cm in size. Each colored chip was 3.5 × 2.0 cm. These colors were chosen from the Practical Color Co-ordinate System (PCCS).³ The colors were arranged horizontally by tone (seven tones: pale, light-grayish, dull, light, vivid, deep, dark) and vertically by hue (10 hues: R, YR, Y, GY, G, BG, B, PB, P, RP). The achromatic colors were white, light gray, medium gray, dark gray and black. Gold and silver were included as metallic colors.

Procedures

While looking at the color chart, the subjects were asked to select their three most

highly preferred colors and three least preferred colors in order of preference and non-preference, respectively, and to state the reasons for their choices. In most of the cases, the questionnaires were carried out face-to-face. The color chart was observed under either fluorescent light or daylight from northern windows.

Results

General Order of Preference

Table 2 and Table 3 display the general orders of preference and non-preference for colors in each area according to how frequently each color was selected as liked or disliked. As indicated in Table 2, white as well as vivid blue, vivid green, light violet, light blue, was commonly preferred in all three areas. Pale tone colors (such as pale sky, pale green, pale greenish sky) were pre-

³ Developed by Japan Color Research Institute.

Table 2
Order of preference (like)

city ranking	Tokyo (N=160)	(%)	Taipei (N=156)	(%)	Tianjin (N=158)	(%)
1st	vivid blue	33.1	vivid blue	23.1	vivid green/vivid blue	34.2
2nd	white	17.5	white	19.2		34.2
3rd	vivid red	10.6	light violet	12.8	white	29.7
4th						
5th	vivid green/pale sky	10.0	vivid violet/pale lavender	12.2	vivid violet/black	17.1
		10.0		12.2		17.1
6th	deep blue	9.4			vivid red	14.6
7th				10.9		
8th	pale green/light violet/ pale greenish sky	8.8 8.8	pale sky/light blue/black	10.9	light blue	10.1
9th		8.8		10.9		
			vivid green	10.3		
10th	light green/light blue/ vivid blue green/ vivid purple/silver	8.1 ×5	light purple	9.0	light green/light violet/ vivid yellow	9.5 9.5 9.5

Note. In Table 2 to Table 5, relative frequency was calculated as $\frac{\text{frequency of selection}}{N}$. Vivid blue, for example, was ranked first, second, or third in preference by 53 of 160 subjects in Tokyo.

Table 3
Order of non-preference (dislike)

city ranking	Tokyo (N=160)	(%)	Taipei (N=156)	(%)	Tianjin (N=158)	(%)
1st	olive	24.4	olive	27.6	dark gray	23.4
2nd	gold	16.9	gold	23.7		
3rd	dark red	11.3	dark gray	22.4	olive/gold	22.8
4th	dark gray/ grayish pink (ltg24)	10.0 10.0	dark red	19.9	black	19.0
5th			dark blue	17.3	silver	13.9
6th	grayish pink (ltg2)	9.4	dark greenish blue/ dark yellowish brown	13.5 13.5	dark blue	13.3
7th	medium gray	8.8			olive green/ dark greenish blue/ dark red purple	10.8 10.8 10.8
8th	dark yellowish brown	8.1	silver	12.2		
9th	dark blue/ grayish yellow green/ vivid purple/beige	7.5 ×4	dark red purple	10.3		
10th			olive green	7.7	dark yellowish brown	10.1

ferred in Tokyo. As shown in Table 2 and Table 3, vivid purple ranked as both popular and unpopular among the people in Tokyo (like:8.1%, dislike:7.5%). Purplish colors (like light violet, vivid violet, pale lavender, light purple) were highly preferred in Taipei. A particular preference for vivid green was observed in Tianjin. Although white ranked 3rd in Tianjin and 2nd in the other two areas, the relative frequency of selection was the highest among the subjects in Tianjin (Tianjin:29.7%, Taipei:19.2%, Tokyo:17.5%). In Tianjin, the frequency with which the top

three colors (vivid green, vivid blue and white) were chosen accounted for about one-third of the total frequency.

Table 3 shows the colors which were least preferred. Olive, dark gray, gold and dark yellowish brown were commonly disliked in all three areas. In general, colors of dark tone were unpopular. As seen in Table 2 and Table 3, black was not only popular but also unpopular in Tianjin (like:17.1%, dislike:19.0%). Grayish pink (ltg2), grayish pink (ltg24) and grayish yellow green were particularly unpopular in Tokyo. Silver was

disliked in both Taipei and Tianjin; however, it was a preferred color among the subjects in Tokyo (ranked 10th in preference order).

Table 4 and Table 5 show the general order of color preference by sex. Pale pink (female-like:10.2%, male-like:2.8%, female-dislike:3.4%, male-dislike:8.3%) and purplish pink (female-like:8.0%, male-like:1.4%, female-dislike:3.4%, male-dislike:2.8%) were popular among the female subjects in Tokyo. The colors in B and BG hues such as light blue (female-like:10.2%, male-like:5.6%), vivid blue green (female-like:10.2%, male-like:5.6%) and pale greenish sky (female-like:11.4%, male-like:5.6%) were also preferred more by female subjects. On the other hand, greenish colors were liked by male subjects. Silver was disliked more by men than by women (female-like:8.0%, male-like:8.3%, female-dislike:1.1%, male-dislike:12.5%).

In Taipei, vivid green (female-like:12.7%, male-like:5.6%) and light yellow (female-like:9.8%, male-like:5.6%) were preferred more by women than by men. Moreover, the unpopularity of olive (female-like:2.9%, male-like:3.7%, female-dislike:34.3%, male-dislike:14.8%) was observed much more among women in Taipei. While vivid red (female-like:6.9%, male-like:11.1%, female-dislike:7.8%, male-dislike:5.6%) was preferred more by men (ranked 7th in male preference order), it was ranked 10th in female non-preference order. Vivid yellow (female-like:1.0%, male-like:14.8%) was popular with men in Taipei.

White was especially preferred by the female subjects in Tianjin. On the other hand, this color was both preferred and not preferred among the males (female-like:34.8%, male-like:25.8%, female-dislike:2.9%, male-dislike:13.5%). PB hue and pale tone were popular among females, whereas so-called warm colors in vivid tone such as vivid yellow (female-like:2.9%,

male-like:14.6%, female-dislike:5.8%, male-dislike:1.1%), vivid orange (female-like:5.8%, male-like:16.9%, female-dislike:4.3%, male-dislike:2.2%) and vivid red (female-like:10.1%, male-like:18.0%, female-dislike:4.3%, male-dislike:4.5%) were much more preferred by males. Olive green (female-dislike:17.4%, male-dislike:5.6%) and dark gray (female-dislike:36.2%, male-dislike:13.5%) were unpopular colors for the women in Tianjin. Silver (female-dislike:8.7%, male-dislike:18.0%), dark red (female-dislike:4.3%, male-dislike:11.2%) and medium gray (female-dislike:5.8%, male-dislike:12.4%) were disliked by males in particular.

Comparison of the Relative Frequencies of Color Selection as Grouped by Hue and by Tone

As the stimuli, the color chips on the color chart were arranged systematically by hue and by tone, and a comparison was made between the relative frequencies of selection among hue and tone groups. Figure 1 compares how frequently colors in each hue group were chosen as preferred. The statistically significant differences were examined by the χ^2 test. The popularity of BG ($p<.001$) and B among the subjects in Tokyo was mainly due to the preference for pale greenish sky (ranked 7th in preference order), vivid blue green (10th), pale sky (4th), deep blue (6th) and light blue (10th).

In Taipei, PB ($p<.05$) and P ($p<.05$) were highly preferred. Light violet (placed 3rd in preference ranking), vivid violet (4th), pale lavender (4th), light purple (10th) and deep violet were responsible for this result.

PB was the favorite hue for the subjects in Tianjin as well (vivid violet, light violet, and pale lavender were highly preferred). The hue which distinguished the preference of Tianjin most was G ($p<.001$). The high preferences for vivid green, the most preferred color, light green (8th) and pale green

Table 4
Order of preference by sex (like)

city ranking	Tokyo		Taipei		Tianjin	
	female (N=88)	male (N=72)	female (N=102)	male (N=54)	female (N=69)	male (N=89)
1st	vivid blue	vivid blue	vivid blue	vivid blue	white	vivid blue
2nd	white	white	white	white	vivid green	vivid green
3rd	vivid purple	vivid green	pale sky/	black	vivid violet	white
4th	pale greenish sky/	vivid red/	pale lavender/	light violet/	vivid blue	black
5th	pale sky	light green	vivid green/	vivid yellow	light violet	vivid red
6th	pale pink/	pale green	vivid violet	light blue	black	vivid orange
7th	light blue/	pale lavender/	light violet	pale lavender/	pale lavender/	vivid yellow
8th	vivid blue green	light violet/	light purple	vivid red/	light green	light blue
9th	deep blue	deep blue	9.7	vivid violet	vivid red	10.1
10th	light violet/	pale sky/	light yellow/	gold	pale sky/	vivid violet/
	purplish pink/	black/	light blue		light purple	vivid purple
	vivid red/silver/	silver	8.3			9.0
	×5		8.3			9.0

Table 5
Order of non-preference by sex (dislike)

city ranking	Tokyo		Taipei		Tianjin	
	female (N=88)	male (N=72)	female (N=102)	male (N=54)	female (N=69)	male (N=89)
1st	olive	gold	olive	dark gray	dark gray	gold
2nd	grayish pink24 ^{a)}	olive	gold	dark red	olive	olive
3rd	dark gray	silver/	dark gray	dark blue/	gold	black
4th	dark red/	dark red	dark red	gold	olive green/	silver
5th	grayish pink2 ^{b)}	dark y-brown ^{c)}	dark blue	dark red purple	black	dark gray/
6th	beige/	dark greenish blue/	silver	dark y-brown ^{c)}	dark blue	white
7th	olive yellow-d8/	black	dark y-brown ^{c)}	olive/	dark y-brown ^{c)}	dark blue/
8th	vivid purple/	pale pink/	dark greenish blue	dark greenish blue	dark greenish blue	dark red purple/
9th	deep orange/	medium gray/	olive green	black/	vivid red	medium gray
10th	medium gray/	dark gray/	vivid red	silver	silver	dark red
	gold/	grayish pink2 ^{b)}	8.3			11.2
	olive yellow-dp8		9.1			

Note. ^{a)} grayish pink24=grayish pink (1tg24).

^{b)} grayish pink2=grayish pink (1tg2).

^{c)} dark y-brown=dark yellowish brown.

were responsible for this result.

Among the metallic colors ($p < .05$), silver was especially preferred by the people in Tokyo (10th).

Figure 2 compares how frequently colors in each hue group were chosen as not preferred. The result shows that YR ($p < .001$) and RP were unpopular in Tokyo, mainly because of the non-preference for beige (ranked 9th in non-preference order), grayish pink (1tg 24)(4th), deep orange and dull orange. In Taipei as well as in Tianjin, BG ($p < .05$) and B were slightly more unpopular than in Tokyo because dark blue (5th in Taipei, 6th in Tianjin) and dark greenish blue (6th in Taipei, 7th in Tianjin) were not preferred. R ($p < .01$) and YR ($p < .001$) were seemingly not favored by the people in Tokyo and the people in Taipei.

As indicated in Figure 3, the people in Tokyo and Taipei have quite similar tendencies of preference in regard to tones. Among

the areas which were researched, Tianjin was particularly distinctive for its preference for vivid tones ($p < .001$). For instance, half of the vivid colors, that is, vivid green, vivid blue, vivid red, vivid yellow and vivid violet ranked 10th or higher. Pale tone ($p < .01$) was much more popular in Tokyo and Taipei. To sum up, the subjects in Tokyo preferred pale colors in bluish and greenish hues. The people in Taipei preferred pale and light colors in a purplish hue. Achromatic colors ($p < .001$) were popular in Tianjin and in Taipei: both groups liked both black (4th in Tianjin, 6th in Taipei) and white. Statistically significant differences among the three areas could also be found by the χ^2 test in regard to light-grayish ($p < .01$), dull ($p < .01$), deep ($p < .01$) and dark ($p < .001$) tones.

The relative frequencies of selection of colors as not preferred were compared by tone in Figure 4. Except for the deep tone,

Figure 1. Comparison between the three areas by the relative frequencies of color choices by hue (like).

Figure 2. Comparison between the three areas by the relative frequencies of color choices by hue (dislike).

the differences among the areas were significant for all the tones. Dark tone colors ($p < .001$) were relatively unpopular not only in Taipei but also in Tianjin. The subjects in Tokyo were conspicuous for not preferring the colors in light grayish tone ($p < .001$), namely, grayish pink (ltg2), grayish pink (ltg24), beige and grayish yellow green. On the other hand, the people in Tianjin were distinctive for not preferring the achromatic colors, mainly dark gray and black.

The results of color selection were also analyzed collectively by the χ^2 test to investigate whether or not the general preference by hue and tone differed among the three areas. The outcomes were statistically significant in all the categories (hue-like: $df=22$, $p < .001$, hue-dislike: $df=22$, $p < .001$, tone-like: $df=16$, $p < .001$, tone-dislike: $df=16$, $p < .001$). This means that differences exist in each area in the tendencies of color preferences by hues and tones.

Figure 3. Comparison between the three areas by the relative frequencies of color choices by tone (like).

Mathematical Analysis by Dual Scaling

In order to better understand the color preference tendencies of each area, Dual Scaling⁴ was applied to the results according to hue and tone.

The Optimal weight vectors (weighted) of each solution are displayed in Appendix 1. Each delta partial (the total variance accounted) for solution 1 is: hue(like);64.50%, hue(dislike);75.60%, tone(like);87.91% and tone(dislike);82.49%.

As displayed in Figure 5, hue preference in Tokyo was mainly characterized by the popularity of BG and silver; they were grouped relatively close together to Tokyo. Tianjin is distinctive in preferring G, YR and achromatic colors. Preference for P, PB and GY (popularity of vivid yellow green and deep yellow green were responsible) marked the results in Taipei. Comparing Figure 5 and Figure 6, the preference and non-preference in Tianjin for achromatic colors becomes

Figure 4. Comparison between the three areas by the relative frequencies of color choices by tone (dislike).

⁴ Dual Scaling, developed by Nishisato in 1980, is a multidimensional scaling for analyzing categorical data.

clear. This was because, although white and black were highly preferred, dark gray and black were not preferred at the same time.

As shown in Figure 7, the preference in Tianjin for vivid tone as well as achromatic colors was quite distinctive. The tendency of Taipei for not preferring the colors in dark tone was apparent in Figure 8. The people in Tokyo seemed to be comparatively character-

ized by the non-preference for the colors in light-grayish, vivid, pale and light tones.

Discussion and Conclusion

Cross-Cultural Differences and Cross-Cultural Correspondences

The results of this study showed differences in color preference tendencies among

Figure 5. Scatter diagram. Results of analysis of color preference (like) by Dual Scaling according to hue.

Figure 7. Scatter diagram. Results of analysis of color preference (like) by Dual Scaling according to tone.

Figure 6. Scatter diagram. Results of analysis of color preference (dislike) by Dual Scaling according to hue.

Figure 8. Scatter diagram. Results of analysis of color preference (dislike) by Dual Scaling according to tone.

three areas when comparisons were carried out according to hue and tone. However, there were also some similarities in color preference, besides the preference for white. Vivid blue, vivid green, light violet, light blue were commonly preferred highly among the three groups. Vivid blue was also preferred highly in all the countries and groups where surveys have been carried out before (Saito, 1981, 1990). As a result, one might conclude like Birren (1950) that blue is a universal favorite.

Table 6 and Table 7 show the main reasons given for the selection of the colors commonly ranked 1st to 10th in all three areas. In the present study, most of the subjects associated the image of vivid blue with the color of the sky and sea, and with spacious images. The people in Tokyo preferred the color also because it was refreshing, beautiful, bright, transparent and so on. For the people in Taipei, the associative images of vivid blue were light, spacious, lively, free, refreshing and elegant. For the people in Tianjin, it suggested both spaciousness and open-mindedness. They also thought the color was deep, quiet and pleasant.

The distinctive preference in Tianjin for the G hue, as mentioned before, was seen in their high preference for vivid green. For the subjects in Tianjin, vivid green meant the symbol and power of life. The image of this color was also lively, refreshing, natural and pleasant. Vivid colors were favored by the people in Tianjin in general because the colors looked lively, passionate and powerful. Purplish colors (like light violet, vivid violet, pale lavender, light purple) were highly preferred in Taipei. The stated reasons for the choice were that these colors were peaceful, gentle, elegant, refined, noble and romantic. Pale tone colors were preferred in Taipei and Tokyo. For the people in Taipei, they looked beautiful, soft, noble, calm and pleasant. Tokyo subjects liked the pale tone colors

because they were gentle, beautiful, pretty and refreshing.

Olive, dark gray, gold and dark yellowish brown were commonly not preferred in all three areas. Generally, dark tone colors were unpopular because they seemed dirty, dark, heavy and muddy. Some subjects in Tianjin stated that they disliked olive because it reminded them of the mud after a big flood. This indicates the involvement of an environmental factor in the subjects' attitudes toward a certain color. Grayish colors like grayish pink(ltg2), grayish pink (ltg24) and grayish yellow green were particularly unpopular in Tokyo, because they looked ambiguous, unclear, dirty and somber. Gold and silver were not preferred in Taipei and in Tianjin: They represent the colors of mourning or death since they are used in a wreath which is offered to the dead. These color choices therefore reflected the culture and social customs of these areas. Other reasons for the choices were because these colors had the images of being vulgar, cheap, flashy, shiny and stimulative. In particular, the subjects felt gold implied a sense of vanity or falsehood. Some said that the flashy and showy images of metallic colors had negative implications for the people in Tianjin and in Taipei and therefore were not accepted in their areas. On the other hand, the subjects in Tokyo felt the colors were popular because of their loud, glittering nature. (Silver/Tokyo-like:8.1%, dislike:6.3%, Taipei-like:1.3%, dislike:12.2%, Tianjin-like:1.9%, dislike:13.9%, Gold/Tokyo-like:4.4%, dislike:16.9%, Taipei-like:4.5%, dislike:23.7%, Tianjin-like:3.8%, dislike:22.8%)

Black produced strong feelings both of like and dislike (Tokyo-like:5.6%, dislike:6.3%, Taipei-like:10.9%, dislike:6.4%, Tianjin-like:17.1%, dislike:19.0%). The positive images for the subjects in Tokyo were clearness, tightness and sharpness. Reminiscence of death was a negative image

Table 6
Main reasons for selection of colors commonly ranked 1st to 10th (like)

city color	TOKYO	TAIPEI	TIANJIN
white	clean(7), pure(4), harmonious(4), refreshing(3), beautiful(2), clear(2), gentle(1), sunshine(1), natural(1), etc.	chastity(7), clean(3), beautiful(3), light(2), pure(1), elegant(1), infinity(1), pleasant(1), stable(1), etc.	chastity(23), pure(6), elegant(5), clean(4), pure-white(4), beautiful(2), light(2), unique(2), harmonious(2), sacred(2), etc.
vivid blue	refreshing(9), beautiful(8), bright(8), blue(6), transparent(5), clear(3), sky(3), sea(3), stable(2), cool(2), light(1), etc.	light(7), spacious(4), lively(4), free(4), refreshing(3), clear(2), elegant(2), clean(2), bright(2), peace(1), etc.	clear sky(16), sacred(13), sea(9), deep(9), quiet(7), pleasant(6), broad mind(4), pure(4), nature(4), light(3), etc.
vivid green	woods(3), refreshing(3), beautiful(3), fresh(3), green(2), calm(1), light(1), gentle to the eyes(1), etc.	pleasant(3), refreshing(3), bright(2), nature(1), woods(1), healthy(1), clean(1), lively(1), gentle to the eyes(1), etc.	symbol and power of life(29), spring(6), nature(6), hope(5), pleasant(5), woods(4), refreshing(4), light(2), quiet(2), etc.
light violet	beautiful(4), neutral-neither blue nor purple(3), refreshing(1), cool(1), soft(1), delicate(1), calm(1), clear(1), etc.	peaceful and gentle(7), elegant and noble(4), romantic(2), mild(2), beautiful(1), cool(1), dignified(1), generous(1), etc.	elegant and noble(5), peaceful and quiet(4), soft(3), calm(2), light(2), beautiful(1), harmonious(1), etc.
light blue	beautiful(3), sky(2), light(1), gentle(1), refreshing(1), etc.	soft(2), gentle(2), straight(1), spacious(1), sky(1), clean(1), light(1), pleasant(1).	sky(8), peaceful and calm(5), spacious(3), sea(3), harmonious(2), elegant(1), light(1), pleasant(1), broad mind(1), etc.

Note. The number in () represents the frequency each reason was given.

Table 7
Main reasons for selection of colors commonly ranked 1st to 10th (dislike)

city color	TOKYO	TAIPEI	TIANJIN
olive	dirty(14), muddy(9), dark(3), unclear(3), withered(2), heavy(1), gloomy(1), impure(1), reminiscence of war(1), sober(1), etc.	dirty(15), unpleasant(4), muddy(3), dark(2), heavy(2), ugly(1), gloomy(1), unstable(1), inconspicuous(1), unappetizing(1), etc.	vulgar and indecent(7), dirty(6), dark(5), poor(3), confused(3), stinky water(3), lifeless(3), gloomy(3), evil(2), etc.
dark gray	dark(4), heavy(3), weird(1), unclear(1), sober(1), hopeless(1), sad(1), cold(1), etc.	dirty(6), dark(6), gloomy(3), hopeless(1), unclear(1), lifeless(1), cold(1), confused(1), color of rat(1), etc.	dark(15), oppressive(4), futureless(3), unpleasant(3), misfortune(2), hopeless(2), degenerate(2), gloomy(2), sad(2), etc.
gold	gaudy and loud(9), shiny and stimulating(4), cheap and flashy(3), upstart(3), proud(2), unharmonious(1), etc.	cheap and flashy(12), shiny and stimulating(6), gaudy and loud(3), bad taste(2), upstart(1), dusty(1), bogus(1), etc.	shiny and stimulating(9), color of death(5), cheap and flashy(5), vanity(4), vulgar(3), falsehood(3), lust of power(3), gaudy(2), etc.
dark-yellowish-brown	dirty(3), muddy(3), withered(1), sober(1), somber(1), old(1), etc.	dirty(3), dark and heavy(3), muddy(2), sober(1), lifeless(1), ugly(1), somber(1), etc.	unpleasant(4), dirty(3), dark(3), muddy color after flood(2), lifeless(2), oppressive(2), etc.

Note. The number in () represents the frequency each reason was given.

along with darkness and heaviness. For the people in Taipei, black was accepted because it had proper dignity with nobleness, whereas it was disapproved for its images of anxiety, fear and sin. Subjects in Tianjin liked the color because it had the images of being solemn, rich, calm, noble and mysterious. However black was associated also with the negative images of fear and despair, along with the image of death. Other images which the color evoked among the subjects in Tianjin were darkness, oppressiveness and indecency.

Preference for White

One of the objects of this study was to investigate whether or not a strong preference for white was common to Asian areas which are in close proximity to Tokyo both geographically and culturally. The findings showed that the people in Taipei and Tianjin preferred white to an even greater degree than the one in Tokyo. The results of the present study and the previous study in Korea (Saito, 1992) therefore have shown four neighboring Asian areas having a strong common preference for white. Geographical and cultural proximity can be considered a possible factor.

The preference for white in China has long been noted in studies beginning with those by Chou and Chen (1935) and Shen (1937). The former study used nine color words and the latter employed six saturated Bradley colors. Chou and Chen (1935) postulated two possible explanations for this preference: association influence and tradition influence.

As the most frequently used color word in Chinese literature was the character for white, they thought that the subjects' preference was based on familiarity, i.e., frequency of association. The second possibility (tradition influence) was that their preference derived from the color of their national flag. They explained that although the dominant

color in the flag was red, the symbol of the twelve stars in the flag was white and blue (N.B. The colors of the flag were not the same as the present ones). Shen, however, strongly questioned Chou and Chen's explanations, especially the one concerning tradition influence, because white and blue each occupied no more than one-tenth of the total area of the flag. He therefore offered an explanation which combined Chou and Chen's concept of association frequency with language influence. For example, he noted that the Chinese character for white is not only associated with pureness but also everything open, clear and unselfish, while grayness (gray was the least preferred color in their study) is a symbol for everything negative, disappointing, discouraging or pessimistic.

In these past two decades, white has been found consistently quite popular among Japanese people in light of the report by the Japan Color Research Institute (1992) and other related studies by the author (1981; Saito et al., 1991a; Saito et al., 1991b). In the present study, the author further extended the study of preference for white by researching the subjects' stated reasons for their choices. In Tokyo, for instance, white was mostly preferred because of its associative image of being clean, pure, harmonious, refreshing, beautiful, clear, gentle and natural. The most frequently stated reason in Taipei was association with chastity or purity. Beauty and tidiness were second. Another interesting image mentioned was infinity. In Tianjin, the reasons for the choice were mainly association with chastity or purity. They also liked white because it is elegant, clean, beautiful and "pure white". It is also a symbol of sacredness for them. A few subjects stated that white was the source of every color so that it was substantial and unique. These associative images stated above are assumed to be responsible for the

strong preference for white.⁵

However, it should be noted that in Tianjin and to a slight degree in Taipei white was sometimes disliked, especially by male subjects (Tianjin-like:29.7%, dislike:8.9%, Taipei-like:19.2%, dislike:3.8%, Tokyo-like:17.5%, dislike:0.6%). The color was disapproved in Tianjin because of its lifelessness, emptiness, loneliness and reminiscence of death. People in Taipei disliked it also because it was lifeless. In short, white was sometimes rejected in Chinese cultural spheres because of its association with the image of death. This tendency was not found among the subjects in Tokyo in the present survey.

In conclusion, the following results were obtained in the present study. Firstly, cross-cultural differences were found in the preference for both hues and tones. Each area had an unique tendency in color preference: While the subjects in Tokyo were characterized by their preference for BG and silver, the people in Taipei had a remarkable preference for PB and P hues. On the other hand, the people in Tianjin were outstanding for

their preference for the G hue and vivid tone colors. Secondly, a strong preference for white was observed not only in Tokyo but also, to an even greater degree, in all Asian areas where the survey has been carried out so far. One of the reasons for this common preference in these neighboring areas was believed to be geographical and cultural proximity. Moreover, some cross-cultural agreements were found in regard to some single colors as well. Vivid blue, vivid green, light violet and light blue were preferred highly in common. Meanwhile, olive, dark gray, gold and dark yellowish brown were commonly unpopular. Lastly, the associative images of colors were suggested to be responsible for color preference. These associative images sometimes reflected cultural and environmental aspects in each area. Therefore, one could consider that geographical, environmental, and cultural aspects are important factors which regulate color preference. Further psychological and anthropological studies are necessary to clarify the components of the preference for color more extensively.

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- ⁵ Another possible explanation of the preference for white in Japan: Literature on ancient Japanese religion and mythology states that ancient people believed in the power of the Sun. This belief still can be seen in Japanese Shintoism. The Sun Goddess is called *Amaterasu-omikami*. As white represented the color of the Sun or sunshine, people accepted it as a sacred color. This is shown by Shinto priests wearing holy white costumes and also holding a sacred wand called a *gohei* with white strips of paper, a purifying implement, while he prays. Such evidence which implies white is a sacred color can still be seen throughout the country. There are examples especially among folk beliefs of even white objects or animals becoming objects of worship at times. In this way, white had special meaning for people who revered the sun. For those people, the color quite naturally came to be favored and admired.
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Appendix

Optimal weight vectors (weighted) of each solution

hue (like)						hue (dislike)					
rows	solution 1	solution 2	columns	solution 1	solution 2	rows	solution 1	solution 2	columns	solution 1	solution 2
Tokyo	-.2703	-.0859	R	-.1300	.0507	Tokyo	-.2508	-.0999	R	.2669	-.0832
Taipei	.0355	-.2206	YR	-.2110	-.1182	Taipei	.0274	-.1767	YR	.3293	-.0250
Tianjin	.2387	-.1308	Y	-.0400	-.1159	Tianjin	-.2810	-.0733	Y	-.0585	-.0063
			GY	-.0276	-.1938				GY	-.0352	-.1882
			G	-.2175	-.2792				G	-.1176	-.0446
			BG	-.4811	-.1585				BG	-.0481	-.2744
			B	-.1287	-.0349				B	-.1434	-.1641
			PB	-.1304	-.1976				PB	-.1634	-.2502
			P	-.0032	-.3016				P	-.0711	-.1974
			RP	-.2363	-.0627				RP	.1643	-.0961
			achromatic	-.2925	-.0666				achromatic	-.3686	-.0561
			silver+gold	-.3684	.1539				silver+gold	-.1662	.1038
tone (like)						tone (dislike)					
rows	solution 1	solution 2	columns	solution 1	solution 2	rows	solution 1	solution 2	columns	solution 1	solution 2
Tokyo	.2100	-.1206	pale	.2226	-.0383	Tokyo	.3692	.0357	pale	.4447	-.0588
Taipei	.1900	.1302	lightgrayish	-.5509	-.0532	Taipei	-.1197	-.1684	lightgrayish	.3146	-.2061
Tianjin	-.3904	-.0064	dull	.4870	.0670	Tianjin	-.2558	-.1300	dull	.2432	-.0768
			light	-.0156	.1110				light	.6625	-.0131
			vivid	-.2365	-.0852				vivid	.2665	-.0335
			deep	.3306	.0563				deep	-.0957	-.0422
			dark	.5900	-.1191				dark	-.1506	-.1085
			achromatic	-.2798	.1080				achromatic	-.3168	-.1966
			silver+gold	.2197	-.3333				silver+gold	-.1936	-.0301