

COMPARATIVE STUDY OF IMAGES ASSOCIATED WITH JAPANESE AND ENGLISH COLOR TERMS

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ABSTRACT

Impressions for color terms both in Japanese and their translations into English were examined. University students participated in this research. The results showed some difference in impression of color terms among groups.

Keywords: Color terms, Image, Impression, Semantic differential technique

1. INTRODUCTION

1.1. Overview of the Study

There are many words for rating color in Japanese as well as English. A comparative study of the images associated with these color terms was attempted here by selecting terms that are considered to be typical. For example, the word “aka” in Japanese is almost equivalent to the English word “red”, but strictly speaking, Japanese people may feel differently about this color than Europeans and Americans. Moreover, Japanese people normally use the English word “red” instead of the Japanese word but almost always pronounce and write it as “reddo”. In this case, one can compare 3 terms: the Japanese “aka”, English “red” and the Japanized “reddo”. However, Japanese people usually substitute “reddo” for the English “red”, thus as the actual issue, it may be appropriate to compare the Japanese term with its corresponding English expression written in katakana letters. Consequently, this study compared the katakana wording of English terms considered to correspond to the vocabulary expressing Japanese colors (hereafter referred to as color terms).

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Incidentally, the SD technique has come to be widely used for the purpose of rating impressions. It has come to be recognized as an excellent technique for rating sense, perception, impression, etc. especially in various fields of psychology. The SD technique is essentially a method wherein adjective pairs that have completely bipolar meanings (for example, good - bad) are used, and respondents are asked where they position the subject between these two adjectives. However, a problem in this bipolar scale technique is whether the respective adjective pairs are completely opposite in meaning. Consequently, a unipolar scale technique was used by the authors in a series of studies including the present study, wherein adjectives were used one by one and the scale had 7 levels from 1 to 7, with level 7 expressing "extremely applicable".

In various studies until now, the meanings of these terms were grasped by the SD technique scale using adjectives, and the meanings inherent to these words were studied from various aspects. Similarly, differences between Japanese and English color terms were also studied from various aspects.

Based on these various earlier studies, the aim of the present study is to clarify the common points and differences existing between the images associated with Japanese and English color terms considered to correspond.

1.2. Status of Related Preceding Studies and Objectives of the Present Study

If we study the various research carried out until now with regards to this issue, first of all, Ban & Ban (2004) did a survey on Japanese and English color terms with 30 university students as survey participants, and measured their mental images created by a unipolar SD technique using 25 adjectives for 16 words for 8 colors, such as "aka", "reddo" (red), etc. They report that from the resulting mean values of the image ratings, they found that men and women displayed almost the same tendencies.

Referring to the *English Image Dictionary* (Sanseido), *English Conceptual IMAGE Dictionary* (Asahi Press), etc., Ban (2005) studied Japanese and corresponding English words expressing colors, investigating the mental images that are generally associated with aka/red, kiroyellow, midori/green, ao/blue, momoiro/pink, shiro/white, and kuro/black. As a result, she found that there are common images related to color terms in Japanese and English, and also unique images in Japanese and English. In addition, daidaiiro/orange was added to the previous 7 colors - 14 words, bringing the English Japanese color terms to 8 colors - 16 words. The English words were changed to their katakana spelling and junior high school and university students as survey participants wrote descriptions of their associated images by the free descriptive method. The results revealed the tendency that the total number of associations for Japanese kanji written terms is greater than those for English terms spelled by katakana. Next, when the level of good feeling towards each color term was rated, it was found that in junior high school, female students generally like English (katakana) terms. In the case of university students, the women showed a slightly stronger liking for katakana spelling than the men, except for "ao" (blue), "shiro" (white), "kuro", and katakana "black". A difference between males and females was also found in that both junior high school and university females generally like katakana terms more than the males.

Minagawa and Ban (2009a) carried out SD technique ratings for corresponding Japanese and English color terms (e.g. 'aka', 'reddo', etc.) on male and female university and junior high school study participants, using Japanese and English color terms (8 colors, 16 words) and adjectives (25 terms) which were the same as in Ban and Ban (2004). They sought correlation coefficients between Japanese and English color term ratings. They found a high correlation in all cases. On the other hand, they found from the result of simultaneously executed factor analysis that there were cases with considerable difference in the factor structure between corresponding Japanese and English color terms.

Minagawa & Ban (2009b) studied the magnitudes of differences between male and female university students with regards to their images of Japanese and English color terms. They used the same 8 colors and 16 terms as Ban & Ban (2004) and Minagawa & Ban (2009b). They also used the same adjectives (25 terms) for rating. While studying the magnitude of standard deviation of the ratings between Japanese and English color terms, they found that there was no significant overall difference between Japanese and English color term ratings by male university students, but found a significant difference for female university students. Especially in the case of female university students, the study clearly revealed a conspicuously large standard deviation for each of the Japanese color terms.

Yokozawa, Abe, Komami, Kojima, Endo, Minagawa & Ban (2009) used the same combinations of color terms as Minagawa & Ban (2009a and 2009b) and studied the magnitudes of subjective differences for Japanese and English color terms with 31 male and 101 female university students participating in the survey. For colors, in addition to the previous 8 colors and 16 terms, they also added kin/goldo (for gold) and gin/silva (for silver) bringing it a total of 10 colors, 20 terms.

From the overall result, the men and women both felt large differences in relation to 'daidaiiro' and 'orange'. Also, especially for the difference between momoiro and pinku (pink), the women had a greater impression of their difference compared to the men. Moreover, when they verified the magnitude of difference between men and women using one-factor analysis on variance of color pairings, they found a significant difference in 10 color term combinations for both the men and women ($p < .01$). Multiple comparison using the Bonferroni method for the men showed the following:

"daidaiiro/orange" > "kiiro/yellow" ($p < .01$)
"daidaiiro/orange" > "ao/blue" ($p < .05$)
"daidaiiro/orange" > "midori/green" ($p < .05$)
"daidaiiro/orange" > "shiro/whito" (white) ($p < .05$)
"daidaiiro/orange" > "kin/goldo" (gold) ($p < .01$)
"daidaiiro/orange" > "gin/silva" (silver) ($p < .01$)

Moreover, the same multiple comparisons using the Bonferroni method for the women showed:

"daidaiiro/orange" > "aka/reddo" (red) ($p < .01$)
"daidaiiro/orange" > "kiiro/yellow" ($p < .01$)
"daidaiiro/orange" > "ao/blue" ($p < .01$)
"daidaiiro/orange" > "midori/green" ($p < .01$)
"daidaiiro/orange" > "shiro/whito" (white) ($p < .01$)
"daidaiiro/orange" > "kuro/blacku" (black) ($p < .01$)
"daidaiiro/orange" > "gin/silva" (silver) ($p < .01$)
"Momoiro/pinku" (pink) > "ao/blue" ($p < .01$), "Momoiro/pinku" (pink) > "kuro/blacku" (black) ($p < .01$)

Summarizing this series of previous research, it was found that there are differences between the mental images related to Japanese and English color terms considered to correspond, and the magnitude of these differences varied depending on the Japanese and English colors that are combined and also varied with participants in the survey. In addition, the data of the survey participants clearly indicated a gender difference. The factor analysis result also revealed a considerable difference in the factor structure between corresponding color terms.

However, no correlation was found in each and every adjective while rating the individual adjectives related to the Japanese and English color terms. As a result, this point can still be said to be vague.

Therefore, based on the results of this series of preceding research, it was decided to especially focus this study on the degrees of correlations for associated images between each of the Japanese and English color terms in the scales for the 25 adjectives, and whether they are significant, and also simultaneously carry out a principal component analysis for investigation.

2. SURVEY METHOD

Survey subjects (survey participants):

1st to 4th year students of a university in T prefecture: 23 men, 13 women; total 36 participants

4 female 3rd year students of a university in I prefecture

Thus there was a considerable number of women participants in the survey.

Survey period: July 7 – 27, 2004

Survey Technique: Teachers in charge of lectures in these universities were requested to distribute the questionnaires during their lecture period and ask the attending students to fill them in to be collected during the same lecture. It required 45 minutes.

Format of the questionnaire: “How much are these 25 adjectives applicable to the following Japanese and English words that express color? Please evaluate the scale of applicability in 7 levels. Consider ‘Most applicable’ as 7, and ‘Not applicable at all’ as 1. The results will not be disclosed to anyone. Please only mark male or female. Do not write your name or student ID number.”

Survey Terms:

8 Colors, 16 Words:

“Aka, reddo (red), daidaiiro, orange, kiuro, yellow, midori, green, ao, blue, momoiro, pinku (pink), shiro, white (white), kuro, blacku (black)”

The same combinations of previous studies were used, in order to compare the results.

Impression Rating Adjectives

The following 25 terms were chosen based on Haga (1988). The same terms were used in order to compare with previous studies.

“Stable, hard, closing in, noisy, feminine, happy, hot, shallow, light, weak, harsh, dry, small, bright, new, distinct, young, fast, dull, healthy, tense, smooth, beautiful, intellectual, good”

3. Results

Principal Component Analysis

Principal components were analyzed using the mean reaction value for each color, and the relative positions using the first and second principal components out of that were plotted on two-dimensional coordinate axes. Results are shown below in Fig. 1 and Fig. 2. In both figures, the vertical axis indicates the first principal component and the horizontal axis indicates the second principal component.

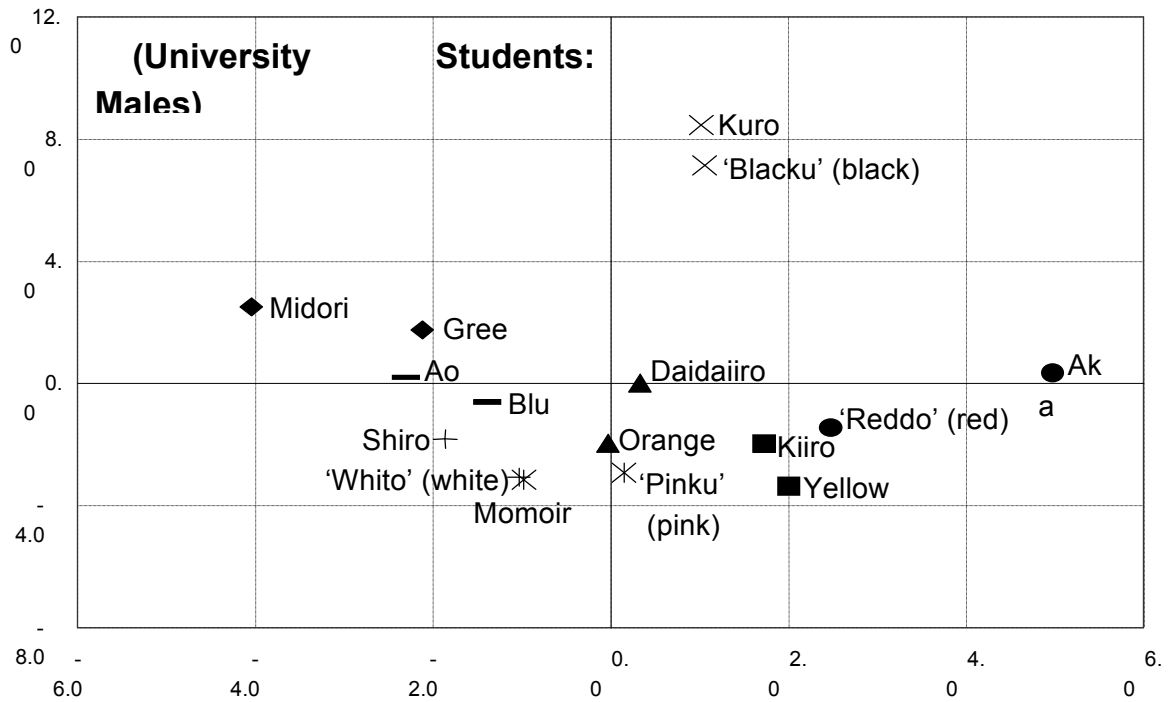


Figure 1: Positioning based on Principal Component Analysis - Male university students

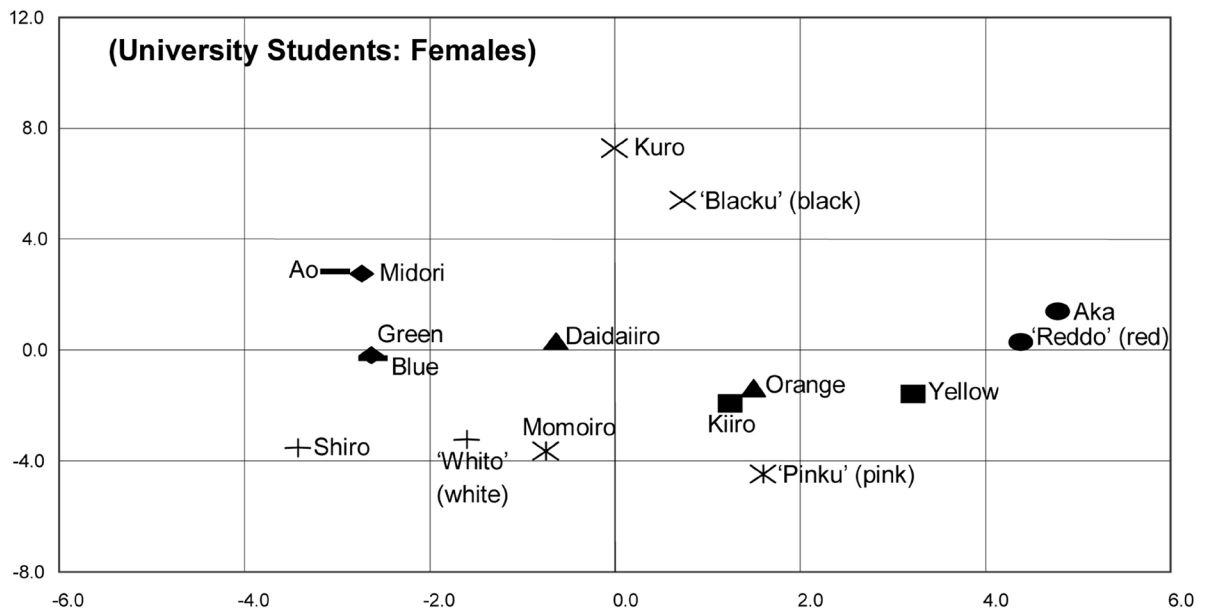


Figure 2: Positioning based on Principal Component Analysis - Female university students

Correlations and Significant Differences for Each Adjective of Japanese/English Color Terms

The results of color related mental image ratings by the students were totaled separately for men and women for each Japanese/English color term pair, and the correlation coefficient for each adjective was calculated on the basis of each rating value to obtain the significant difference. The results are given below in Table 1 and Table 2.

Table 1: Color-wise correlation coefficients of adjective ratings related to color for male university students

Male University Students	Aka / Reddo (red)	Daidaiiro / Orange	Kiuro / Yellow	Midori / Green	Ao / Blue	Momoiro / Pinku (pink)	Shiro / White (white)	Kuro / Blacku (black)
Stable	.288	.182	.596**	.386	.447*	.456*	.674**	.640**
Hard	.590**	-.264	.455*	.624**	.396	.548**	.455*	.373
Closing in	.277	.305	.696**	.601**	.711**	.636**	.377	.483*
Noisy	-.040	.028	.292	.623**	.691**	.598**	.527*	.467*
Feminine	.065	.384	.148	.093	.599**	.501*	.571**	.587**
Happy	.168	.568**	.418*	.6906**	.638**	.424*	.852**	.546**
Hot	.146	.239	.149	.509*	.207	.576**	.375	.602**
Shallow	-.477	-.037	.105	.389	.310	.072	.608**	.559**
Light	.559**	.483*	.127	-.061	.264	.265	.620**	.436*
Weak	.263	-.249	.361	.157	.549**	.406	.208	.638**
Harsh	.263	.423*	.348	.389	-.051	.014	.730**	.661**
Dry	.020	.651**	.279	.211	.507*	.485*	.346	.597**
Small	-.144	.343	.291	.715**	.579**	.274	.241	.310
Bright	.340	.235	.315	.225	.550**	.417*	.625**	.621**
New	.43*	.522*	.271	.504*	.518*	.250	.868**	.474*
Distinct	.165	.179	.594**	.617**	.519*	.478*	.715**	.811**
Young	-.012	.424*	.432**	.615**	.353	.067	.594**	.743**
Fast	.849**	-.090	.198	.316	.432*	.735**	.770**	.304
Dull	.332	-.344	-.078	.168	.671**	.582**	.663**	.576**
Healthy	.311	.253	.761**	.280	.459*	.438*	.590**	.668**
Tense	.203	-.069	.423*	.381	.431*	.527*	.534**	.752**
Smooth	.413	.768**	.216	.411	.285	-.137	.399	.411
Beautiful	.246	.691**	.228	.402	.681**	.129	.662**	.825**
Intellectual	.606**	.602**	.496*	.266	.406	.484*	.520*	.770**
Good	.034	.348	.553**	.402	.397	.706**	.469*	.651**

*p<.05 **p<.01

Table 2 Color-wise correlation coefficients of adjective ratings related to color for female university students

Female University Students	Aka / Reddo (red)	Daidaiiro / Orange	Kiuro / Yellow	Midori / Green	Ao / Blue	Momoiro / Pinku (pink)	Shiro / Whito (white)	Kuro / Blacku (black)
Stable	.415	.384	.525*	.061	.295	.549*	.384	.617**
Hard	.129	.723**	.592*	.427	.481	-.276	.278	.344
Closing in	.503*	.312	.643**	.343	.592*	-.260	.600*	.526*
Noisy	.646**	.195	.663**	.059	.700**	.244	.475	.412
Feminine	.516*	.551*	.234	.343	.671**	-.220	.410	.576*
Happy	.835**	.720**	.555*	.381	.751**	.856**	.279	.767**
Hot	.591*	.226	.340	-.027	-.015	.035	.285	.446
Shallow	.528*	.268	.619**	.002	.069	.570*	.520*	.737**
Light	.723**	.681**	.833**	-.063	.506*	.336	.603*	.552*
Weak	.583*	.428	.644**	.269	.087	.345	.003	.257
Harsh	.666**	.396	.787**	-.243	.056	.573*	.517*	.689**
Dry	.711**	.406	.593*	-.157	.747**	.535*	.618**	.809**
Small	.552*	.076	.146	.559*	.316	.134	.199	.393
Bright	.610**	.326	.656**	.282	.490*	.483*	.427	-.164
New	.503*	-.268	.345	.288	.316	.345	.616**	.197
Distinct	.451	-.205	.177	.456	.524*	-.178	.553*	.647**
Young	.789**	.268	.758**	.495*	.552*	.061	.518*	.450
Fast	.789**	.509*	.755**	.384	-.021	.272	.680**	.616**
Dull	.570*	-.459	.618**	.127	.216	.297	.672**	.418
Healthy	.912**	.682**	.855**	.818**	.661**	.489*	.474	.650**
Tense	.574*	.229	.775**	.638**	.567*	.236	.341	.801**
Smooth	.754**	.256	.738**	.317	.508*	.225	.434	.827**
Beautiful	.830**	.383	.394	.572*	.444	.578*	.219	.731**
Intellectual	.715**	.297	.433	.366	.561*	.174	.164	.521*
Good	.875**	.467	.416	.552*	.592*	.252	.148	.674**

*p<.05 **p<.01

3. CONSIDERATION

When looking at paired color terms, the principal component analysis of color names in Japanese and color names in English in the case of male university students revealed a great difference in the respective second principal component of the Japanese/English terms for the midori/green, aka/reddo (red) and momoiro/pinku (pink) combinations, whereas difference was instead observed in the first principal component for kuro/blacku (black), kiiro/yellow and daidaiiro/orange. In case of female university students there was a great difference in the second principal components for daidaiiro/orange, kiiro/yellow, momoiro/pinku (pink) and shiro/whito (white), whereas difference was observed in the first principal component for kuro/blacku (black) and aka/reddo (red). These differences indicate that there are qualitative differences between males and females in the mental images associate with color terms.

The correlation between mental images differed with each adjective, and the results showed considerable differences between male and female university students (Table 1, Table 2). Analysis by color reveals that there is a smaller correlation between aka and reddo (red), and kiiro and yellow for men than for women, indicating the mental images held by men and women were different. On the other hand, an overall smaller correlation was seen between daidaiiro and orange, momoiro and pinku (pink), shiro and whito (white) for women, indicating that women have a different view of these colors than men.

If we observe the individual data in Table 1 and Table 2 and compare, for instance, shiro/whito (white), a strong significant correlation is observed in the men for “beautiful”, “intellectual” and “good” adjectives, whereas these correlations are low for the women.

When analyzed for each adjective, these results seem to support the presence of considerable differences between males and females.

Thus, although there is an overall basic correlation between the mental images of color terms in Japanese and English, detailed analysis finds considerable differences between these images. And, especially considering only the correlation coefficients between the mental images based on the 25 adjectives, one can say there are greater differences in Japanese and English color pairs as well as between male and females. Accordingly, it can be surmised that while English color terms that are considered to correspond to Japanese terms are becoming established as adopted foreign words, deviations are arising from the original Japanese color terms considered to correspond, and their mental images.

Although there are various concepts about the factors that have led to these differences, one of the issues that is being considered is how the survey participants came to form their mental images related to the color. That is, the issue is whether the participants came to form their color image through the medium of the actual color or whether they formed images of these colors through the means of concrete objects in the external world. If we consider the fact that forming color related mental images is difficult if not through colors of concrete objects, then in a certain sense there will be a natural difference in mental images related to colors depending on the development stage or gender of the participants and on the various circumstances in the society.

There was a small number of the participants in the current survey, and the participants were from only two universities. These factors are also believed to have influenced the results. Further study may be necessary with more participants and participating schools, and surveys that include individual interviews

to find out how and for what reasons their impressions change for each adjective. It may also be necessary to study the results of the multivariate analysis technique in more detail, and broaden the study for finding the significance of the factors and each principal component.

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