

CONTENTS OF JAPANESE AND ENGLISH COLOR WORDS

— A Comparative Study —

Sachiko IDE

We sometimes wonder if we are using a foreign word in the same meaning as the native speaker of the language would mean. Dictionaries have been the major means to bridge two different languages. For example, Japanese people check English-Japanese dictionaries to get the concept of an English word and Japanese-English dictionaries to find an English word for an idea they have in mind.

Thus, we find in the dictionaries that *eggplant* in English corresponds to *nasu* in Japanese and vice versa. But, the fact is that the eggplant we find in the United States is different from the *nasu* we find in Japan. They are different in size, shape, etc., even though they belong to the same genus. Therefore, the pictures of an *eggplant* and a *nasu* are different. We find that *green* in English corresponds to *midori* in Japanese and vice versa. But, we notice that the traffic signal for "go" is called *green* in English and *ao* in Japanese while the colors of the signals are the same in both countries. If *green* were equal to *midori*, the traffic signal should be called *midori* instead of *ao* in Japanese.

These examples have indicated how the dictionaries have failed in thoroughly bridging two languages, especially of no related origin like Japanese and English. In order to understand a foreign language, we have to know the true concept of a foreign word which dictionaries have sometimes failed in explaining satisfactorily. Hence, there arises the need to compare the content behind a word of a language with the seemingly corresponding word of another language.

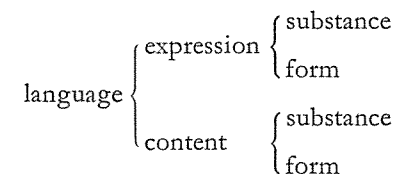
In this paper, let us confine ourselves to the comparison of Japanese

and English color words in relation to their contents; that is, how, for example, *aka* is different from *red*?

COMPARATIVE THEORY

For the purpose of comparison of more than two languages in relation to their contents, it would be the best way to apply the approach of glossematics to linguistic phenomena especially on the basic analysis of language; for, "glossematics allows one to perform an experiment that includes comparison of different languages with the purpose of extracting that which they have in common."¹

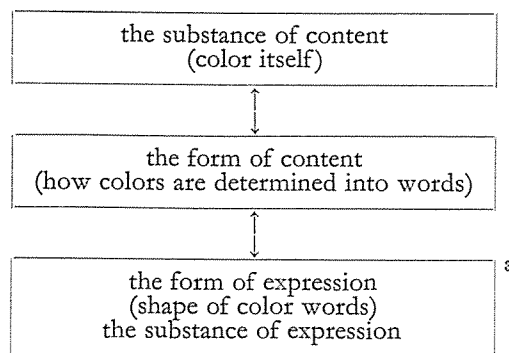
In glossematics, language is considered on two levels: expression and content. Expression and content are respectively considered as consisting of two aspects; that is, substance and form. Thus, language consists of the following scheme:²



The comparison of languages in relation to the contents should be based on the following concept of interrelation of the levels of language:

¹ O. S. Akhmanova, "Can Linguistics Become an Exact Science?" *Exact Methods in Linguistic Research*, O. S. Akhmanova et al. Trans. from Russian by D. G. Hays and D. V. Mohr (Berkeley and Los Angeles: University of California Press, 1963) p. 7. Note: "That which is in common is designated by the Danish term *mening*."

² The substance of expression is the physical notations of language, the form of expression is structures or systems of combination of sounds, the substance of content is physical phenomena, like a color sample, and the form of content is combinations or structures of morphemes. In glossematics, what is important is the forms of expression and content. It should be noted that the comparative theory in terms of these four levels of language, which is to be explained in the following, is *not* the idea of glossematics but the author's own origination making use of glossematic approach to language. The author owes the explanation of this theory to Professor Niels Ege of University of California, Berkeley.



If we are to compare two languages, first we have to check the interrelations of these levels indicated by arrows. The substance of content is the thing which could exist in both languages in common. This is designated by the Danish term *mening*, "purport".⁴ By extracting *mening*, which is shared by the languages in question, we can compare the differences found in the form of content and the form and the substance of expression.⁵

Applying the scheme of language as mentioned above, we can compare Japanese and English color words in relation to their contents. Color is the substance of content which exists in common in Japanese and English. Therefore, by showing the same color samples to the informants of Japanese and English and getting the color name responses on them, we can see in each language respectively how the substance of content is determined by the form of content and how it is expressed in the form and the substance of expression. To show the same color samples to the informants makes it possible to extract "that which they have in common", allowing one to compare the languages in question in relation to the contents of the languages. Japanese and English speaking people recognize a number of colors, and they have their own

³ The substance of expression and the form of expression are put together, because it is not necessary to distinguish these two levels for the purpose of this study of lexicon.

⁴ O. S. Akhmanova, *op. cit.*, p. 7.

⁵ The form of content is determined according to the cultural background of each language.

way of expressing them in color words. Color itself is the purport, the amorphous substance of content, which a language throws its net over and gives form.⁶ Therefore, the problem to be compared is the relation of the form of content and the substance and the form of expression; that is, the relation of the net thrown on colors and color words, which might be called the ranges of color words.

EXPERIMENT

1. Method

This study aims at comparing contents behind Japanese and English color words. If a Japanese and an English informants are shown colors and asked the name of the colors, the responses of color names would show how the informants respectively have thrown nets on colors. These responses would be the best materials for comparison of contents of color words. Therefore, the method of taking data using color samples and informants has been selected for this experiment.

2. Color samples

The author found a set of twenty-four colors called "The Standard of Hue—24 Hue Circle"⁷ produced by Nippon Shikisaisha Co. under the direction of Nippon Shikisai Kenkyūjyo (Japan Institute of Color Research). These colors are all pure colors in the sense that they do not have achromatic colors mixed in them.⁸ They make a color circle of which hues are of equal difference. As the degrees of differences of hues are equal among the colors next to each other, it would be possible to find out clear ranges of colors of color words.

The color samples are 64×90 mm in size. To make the condition consistent they were put on 84×110 mm neutral gray cards, one sample on a card. They were covered with cellophane paper together with the cards in order to protect the color samples from dirty spots or exposure

⁶ O. S. Akhmanova, *op. cit.*, pp. 7-8.

⁷ This is "Japanese Chemical Standard 0503" standardized by Shōkōshō Kōgyō Hyōjun Chōsakai Iro Inkai (Sub-Committee of Colors, Counsel of Industrial Standard Research, Ministry of Commerce and Industry) in 1946.

⁸ The colors in the categories of, for example, pink and brown are not found among them.

in the sun light. They were ordered at random and the order was numbered on the reverse side of each card. This is the order the cards are to be shown.

3. Informants

The informants are twenty-five Japanese males and the same number of Japanese females and also the same numbers of American males and females, totalling one hundred. All of them are over college age people, living in and around Tokyo.⁹ Most of the informants are educated people.

4. Color words

We are interested only in seeing the differences of the ranges behind color words, not various sorts of expressive color words. Therefore, it was thought best to give certain numbers of color words to the informants and ask them the ranges of the colors of the given color words, using the twenty-four color samples. We find, in the leaflet of the explanation of these twenty-four colors,¹⁰ English color names attached to each of the twenty-four color samples. They are named in reference to the color name standard of American ISCC NBS (Inter-Society Color Council, National Bureau of Standards). They are the following six color names: red, orange, yellow, green, blue and purple. The supposedly corresponding Japanese six color words to those English ones are, *aka*, *daidai*, *ki*, *midori*, *ao* and *murasaki*.¹¹ Japanese and English seem to have the same number of most important basic color words.¹² Thus, these six basic color words in both Japanese and English have

⁹ The data was taken in the fall of 1964. Most of American informants were those who were studying at International Christian University in Tokyo. Some of the American informants who had lived in Japan for many years were dropped from the data because they were suspected to have the influence of Japanese culture.

¹⁰ *Meido to Shikisō no Hyōjun*, (Shikisai Shiryō Shirizu No. 2; Nippon Shikisaisha Co. n.d.)

¹¹ These correspondences are based on English-Japanese dictionaries.

¹² The choice of these six basic color words have nothing to do with the spectral colors. They are the three primary colors (in painting); that is, red, yellow, and blue and the other three colors made by the mixtures of two of the three colors: orange (the mixture of red and yellow), green (the mixture of yellow and blue) and purple (the mixture of blue and red).

been chosen for the words to be given to the informants.

5. Field work

In taking the data the following considerations were taken. The informants were interviewed indoors under natural lights in the daytime. Most of the informants were interviewed individually, and in a few cases as a group at most three persons at a time. The directions to the informants had been written down so that the examiner, the author, could explain the directions in the same words every time.

The following is a sample of a sheet of paper handed to each informant.

Jap.	Amr.	M.	F.																						
Name : _____				Age : _____																					
Date : _____				Time : _____								Place : _____													
Profession : _____				From Where : _____																					
b \ a		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
		あ か red																							
		だいだい orange																							
		き yellow																							
		みどり green																							
		あ お blue																							
		むらさき purple																							

The directions told to the informants are: "I am going to show you twenty-four different color cards in this order, (pointing the numbers in a chart on a sheet of paper). You are given six color words; that

^a These numbers are the order of the colors to be shown, arranged at random.

^b These are given color names in Japanese and English.

is, red, orange, yellow, green, blue and purple¹³ (for Japanese informants, *aka*, *daidai*, *ki*, *midori*, *ao* and *murasaki*). Now, which one of these six color categories do these color samples fall in? For example, this is No. 1; if you think this falls in red category (*aka* for Japanese), write a circle (○) in this square, (pointing the square of No. 1 and red). All right? Then, let's start with No. 1 . . .” After going through the twenty-four colors, the next question was asked to the informants: “Now you have chosen (for example) No. 5, No. 9 and No. 19 for red (or *aka*), haven't you? Then, which one of these three colors do you think *the most typical* red color? Choose *one* and write another circle in or outside the other circle like ⊙ . . .” Thus, what we could get from this field work were two kinds of responses: 1) the ranges of the six color words 2) the centers of the ranges of the six color words in both languages.

The informants were never asked about their quality of vision but those who had some defects in their visions were excluded judging from their responses. Therefore, the examiner had interviewed more than one hundred people to get one hundred data.

DATA

1. Ranges of the six couples of color words

Collecting both single and double circle responses in the experiment sheets, we get the data on the ranges of the six given color words. See Table I.

2. Centers of the six couples of color words

Collecting double circle responses in the experiment sheets, we get the data on the centers of the six given color words. See Table II.

¹³ For American informants who knew the Japanese language, it was told to neglect the corresponding Japanese color words. And, just the same was told to Japanese informants who knew English.

Table I: Ranges of the six couples of color words

	A K A	R E D	D I A I	O R A N G E	K I L O W	Y E L L O W	M I D O R I	G R E E N	A O	B L U E	M U R A S A K I	P U R P L E
1 ^a (19) ^b	4.8R	3.6/12.4 ^c	50 ^d	50								
2 (5)	7.6R	4.0/12.2	50	49		1						
3 (9)	9.8R	4.8/12.5	27	24	23	26						
4 (13)	0.7YR	5.6/13.4		1	50	49						
5 (2)	4.5YR	6.5/12.5			50	50	7	5				
6 (21)	8.4YR	7.0/11.4			43	45	42	39				
7 (6)	2.4Y	7.8/11.7			8	11	50	50				
8 (3)	6.8Y	8.2/11.2					2		48	50		
9 (15)	3.1GY	7.6/10.3							50	50		
10 (1)	6.9GY	6.7/ 9.9							50	50		
11 (22)	0.4G	5.4/ 9.8							50	50		
12 (11)	5.0G	4.8/ 9.5							50	49		1
13 (24)	1.4BG	4.5/ 8.8							43	47	7	
14 (14)	7.4BG	4.3/ 8.4							1	2	49	48
15 (7)	4.7B	4.2/ 8.7									50	50
16 (17)	2.8PB	3.9/11.2									40	48
17 (8)	7.2PB	3.2/12.4									16	12
18 (18)	7.9PB	2.6/16.6									4	5
19 (10)	9.3PB	2.4/12.4									2	1
20 (20)	1.9P	2.3/10.4										10
21 (16)	5.2P	2.7/11.1										2
22 (12)	0.3RP	3.1/13.8										34
23 (23)	3.6RP	3.3/12.9	17	13								38
24 (4)	9.6RP	3.4/11.8	31	32								45
												48
												49
												50
												50
												50
												50
												33
												37
												19
												18

^a These numbers represent the hue numbers arranged according to the degree of hues.

^b Numbers in the parentheses are the at random orders in terms of which the color cards were shown to the informants.

^c These are the color designations according to Munsell Notation.

^d These numbers represent the frequencies of the responses.

Table II: Centers of the six couples of color words

	A K A	R E D	D A I D A I	O R A N G E	K I	Y E L L O W	M I D O R I	G R E E N	A O	B L U E	M U R A S A K I	P U R P L E
1 ^a												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												

^a These numbers represent the hue numbers arranged according to the degree of hues. For Munsell Notation of these colors, see Table I.

^b These numbers represent the frequencies of the responses of the typical colors checked with double circles.

Diagram I: Ranges of the six couples of color words

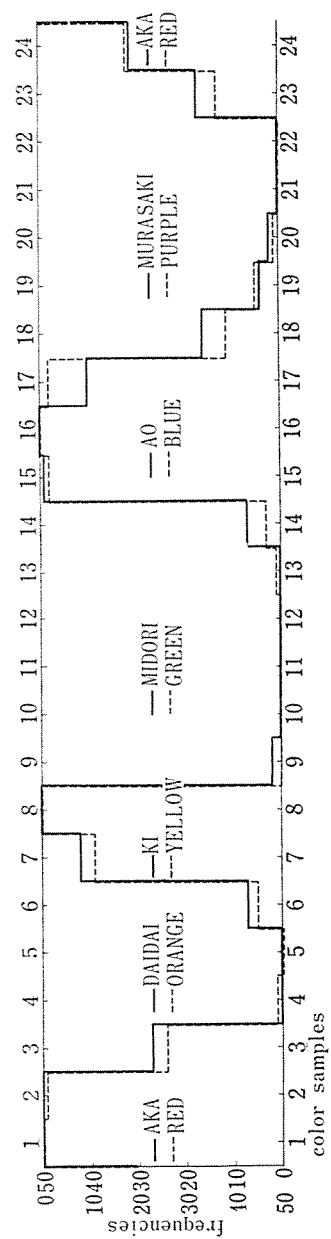
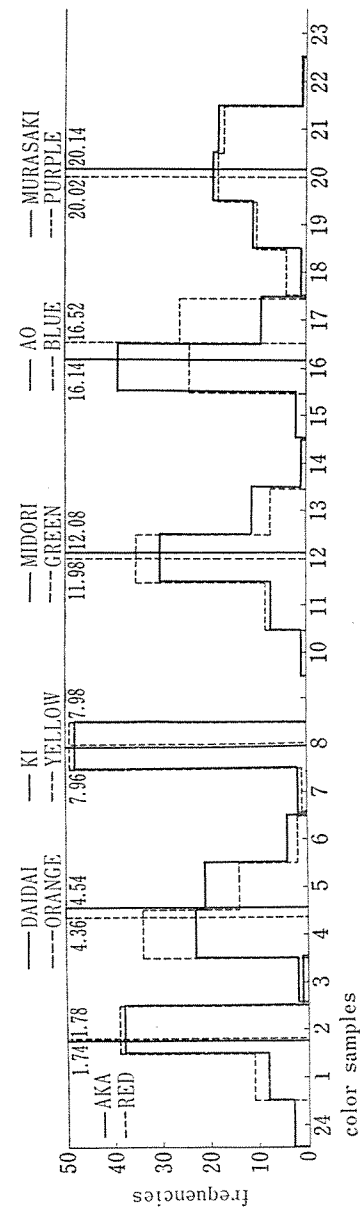


Diagram II: Centers of the six couples of color words



ANALYSES

1. Ranges of the six couples of color words

Table I has made it possible to draw Diagram I on page 10.

The horizontal dimension represents varying hues of color samples. The numbers are the orders of the color samples arranged according to the degree of hues.

The vertical dimension represents the frequencies of the responses. As there were fifty informants in Japanese and English respectively, the maximum frequency is fifty; that is, the frequency fifty means that all of the informants of a language have agreed on the choice of the color category which the color cards fall in.

The vertical dimension has two zero points from both ends of the whole measurement. One end is for *aka* and red, *ki* and yellow and *ao* and blue, and the other is for *daidai* and orange, *midori* and green, and *murasaki* and purple. Thus, the neighboring colors share the full frequencies complementally, showing the borderlines of the ranges of the color words.

Comparing the ranges of the six couples of the color words in Diagram I, we find the followings:

1) What strikes us most of all is the tremendous similarity in the ranges of these six couples of color words of Japanese and English. As we find in the diagram, the borderlines of the ranges of the Japanese color words are roughly overlapping with those of English color words. However, no two ranges of Japanese and English colors completely overlaps. The differences of the ranges are as follows:

- 2) Purple is wider toward red than *murasaki* is toward *aka*.
- 3) *Aka* is wider toward *daidai* than red is toward orange.
- 4) Orange is wider toward yellow than *daidai* is toward *ki*.
- 5) *Ki* is wider toward *midori* than yellow is toward green.
- 6) Green is wider toward blue than *midori* is toward *ao*.

The difference of the borderlines between green and blue and *midori* and *ao* is especially worth noticing because we sometimes have confusion on the concepts of these colors. Even though Japanese has had both *ao*

and *midori* as color words for centuries,¹⁴ *ao* has sometimes covered the range of *midori*. This must be the influence of old Chinese brought into Japanese; *ch'ing* (青) used to mean light green besides blue and black in Chinese. For example, we find in Japanese *ao-take* (青竹: green bamboo) and *ao-ba* (青葉: green leaf). Besides, *ao* means young or unripe just like English green does; for example, we have "*kono ringo wa mada aoi*" (meaning "This apple is still green.") and *ao-ni-sai* (meaning a green-horn). These are the examples of light green colors called *ao* in Japanese. These usages of *ao*, meaning light green, are conventional and usually used in the special context. And, *ao* does not usually mean light green by itself. Japanese people usually distinguish *ao* from *midori* just like English speaking people distinguish blue from green.

We have another example of green color being called *ao*: that is, the traffic signal for safe is called *ao* in Japanese although the color of the signal is the same color¹⁵ as the one in the United States, where they call it green. The color of the traffic signal is the between color of blue and green. Japanese "*ao*" and English "green" for the same color of the traffic signal remind us of the difference of the borderlines of blue and green vs. *ao* and *midori*. What is found in the diagram might well explain the cause of the confusion of *ao* and *midori* in relation to blue and green. We have found that green ranges wider toward blue than *midori* does, and in another word *ao* ranges wider toward *midori* than blue does.

7) Japanese *ao* shares a broad overlapping range with *murasaki*, while English has rather clear cut borderline between blue and purple. It is difficult, however, to state which color is wider toward which way in this case of blue and purple.

2. Centers of the six couples of color words

Table II has made it possible to draw Diagram II on page 10.

The data of Diagram II were brought by asking the informants which

¹⁴ They both appear as color words in *Manyōshū*, one of the oldest anthologies in the fifth, sixth, seventh and eighth centuries.

¹⁵ The stained glass with Cu^{++} (copper 1 cation) is used for the traffic signal. Although the color of the glass might slightly change depending on the condition in the process of making the stained glass, it possesses almost the same color because of the same material.

one is the most typical one of the colors. Therefore, the total frequencies of the responses for one color word should be fifty: the number of the informants in each language.

The horizontal dimension represents the varying hues of color samples. The numbers are the order of the color samples arranged according to the degree of hues. The vertical dimension represents the frequencies of the responses. The vertical two lines in each color category are drawn to show the average points of the centers of Japanese and English color words. The numbers at the tops of those lines show the points in the horizontal dimension.

What we find from the diagram is as follows:

1) The center of *aka* is scattered in the colors from No. 24 to No. 3, while that of red is scattered in only No. 1 and No. 2. This means that *aka* is much vague color than red. And the average of the center of *aka* is much vague color than red. And the average of the center of *aka* is slightly on the left (purplish) side of that of red.

2) The center of orange is centered mostly in No. 4 color while that of *daidai* is scattered mostly in No. 4 and No. 5. The average of the center of *daidai* is much on the right (yellowish) side of that of orange. Therefore, we can assume that *daidai* is more yellowish color than orange. In other words, orange is a more reddish color than *daidai*.

3) The centers of *ki* and yellow seem to be most similar among the six color words. The averages of *ki* and yellow are both almost the center of No. 8 color.

4) The center of *midori* is scattered from No. 10 to No. 14 while that of green is scattered only from No. 11 to No. 13. Both of them, however, are centered mostly in No. 12 color. The average of *midori* is much more on the right (bluish) side of that of green.

5) The difference of the centers of *ao* and blue is the most striking one among the six couples of color words. The center of *ao* is mostly centered in No. 16 color while that of blue is centered in No. 16 and No. 17, (more in No. 17). Thus, the average of *ao* is much more left (greenish) side of that of blue. This means, together with the findings in the previous section on the ranges of the color words, that Japanese *midori* and

ao are very likely to be confused because the centers of these colors are much closer to each other than those of English green and blue. This part of the diagram will clarify one of the causes of the Japanese traffic signal being called *ao* instead of *midori*. *Ao* is a more greenish color than blue.

6) Both *murasaki* and purple are the colors which have the most vague centers among all these colors, because the responses on the centers of the colors are widely scattered. The average of purple is on the left (bluish) side compared with that of *murasaki*. This is because of some English responses in No. 18 which is a very bluish color. The most significant feature in this color is that both purple and *murasaki* have very ambiguous or broad centers.

3. The standard deviation of the responses on the centers of the color words

As we have seen in Diagram II, some colors have high concentrations of responses on the centers of the colors, while some have low concentrations. To have high concentration means that most of the informants agreed on the idea of the typical one of a color: the center of the color. The degrees of the concentrations are better shown in the statistical numbers calculated on the basis of the data. The followings are the standard deviations of the color words.

Standard Deviation of Diagram II

<i>aka</i>	0.59	red	0.41
<i>dadai</i>	0.70	orange	0.56
<i>ki</i>	0.20	yellow	0.14
<i>midori</i>	0.72	green].	0.56
<i>ao</i>	0.45	blue	0.50
<i>murasaki</i>	0.85	purple	0.92

The more the numbers are, the less concentrations the color words have.

What we get from the standard deviation is the difference of the characteristics of the color words. The color of which center is most concentrated is yellow and *ki*, while the one with the least concentration is purple and *murasaki*. Comparing Japanese and English as a whole, we find that, except for two (*ao* and *murasaki*), all of the color words of

Japanese are less concentrated than the corresponding English ones. This means that Japanese color words (except for *ao* and *murasaki*) have vague ideas of colors of color words compared with English. This characteristics of Japanese color words might be one of the reflections of the general features of ambiguous words of Japanese.

It has been the purpose of this study to find out how the corresponding words of two different languages are different in their contents. In this paper we have made an experiment with color words and colors. The data we have got from the experiment, though limited in the number of the informants and the color samples, have made it possible to find out the differences of the contents of the corresponding couples of color words. As we have analyzed, the most marked feature is that we find striking similarity between the contents of Japanese and English basic color words. The more they are similar, the more we are apt to neglect the minor differences and equalize the corresponding words. It is important, therefore, to remind the differences of the contents of corresponding words, for they can never have the same contents as we have seen in the analyses.

This is only an experiment to compare contents using the comparative theory of two unrelated languages. This theory could be applied in other lexical field than color words such as kinship vocabulary and cooking terminology.¹⁶ By applying the theory, we would be able to contribute to better and true understanding of a foreign language. Therefore, one of the significances of this paper lies in that this has opened a way to more precise interpretation of a foreign language.

¹⁶ We find, for example, that English *brother* covers the range of Japanese *ani* and *otōto*; and Japanese *yaku* covers the range of English *to roast*, *to bake*, *to broil*, *to grill*, *to toast* and *to panfry*.