Binumarien Color Categories[1]

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This paper has two aims. The first is to describe an ethnographically new system of color classification, Binumarien, a non-Austronesian or Papuan language of the Eastern Central Highlands of New Guinea[2]. In this connection we are particularly interested in relating our data to the Berlin and Kay (1969) theory of the universality of basic color terms. If one takes seriously the criticisms of possible English bilingual interference in the experimental studies, and questionable rules of inference in the interpretation of the nonexperimental studies (Hickerson 1971), then the theory is clearly in need of more and better data. The second aim is to explore the nature and extent of individual variation. Our concerns here are first with ethnographic and typological adequacy, that is, the use of more than one or a few informants' responses in the formulation of statements about the Binumarien system and about the cross-cultural classification of Binumarien; and second, with the structure and significance of whatever variation emerges.

The general results are (1) the discovery of a system, which in the scheme of Berlin and Kay may be classified as Stage IIIb, a type which is not exemplified in their sample of experimentally studied languages[3]; and (2) the discovery of significant individual variation at both the lexical and cognitive levels, i.e., color words and color categories respectively.

The patterning of the lexical variation in Binumarien consists of the universal usage of a small set of terms together with rampant synonomy, that is, there are many ways to say RED, YELLOW, etc. Synchronically this variation appears random; it is not correlated with any known variables such as context, age, sex, or family connection. Diachronically, it may reflect the order of emergence of color categories. With regard to the cognitive variation, an analysis of individual protocols reveals that there are actually two color systems in Binumarien—one which characterizes all of the older adults and another which characterizes most of the younger adults. The structure of this variation is cumulative and lends support to the evolutionary aspect of the Berlin and Kay theory. A further breakdown of the protocols suggests one plausible sequence of steps in the evolution of systems which are more advanced in the Berlin and Kay sense.

Methods

Partly by design and partly due to the exigencies of the field situation, our methods differ somewhat from those described in Berlin and Kay. The major differences include the following:

1. The sample size was 46 (rather than one as it apparently was in nineteen of the twenty languages in the Berlin and Kay sample).

2. None of the informants, or any Binumariens for that matter, were bilingual in English although some were bilingual and multilingual in other Papuan languages. All of the color terms, however, are Binumarien according to our informants and according to two linguists who have lived in the area and worked on Binumarien for some twelve years[4]. We were truly fortunate in being able to draw upon their knowledge in the formulation of eliciting frames and upon their conversational experience as a source of information independent of informants' responses to Munsell color chips. Binumarien adult males also speak Neo-Melanesian or Pidgin but it is doubtful that this has affected their native system of color classification. A separate study (Hage and Hawkes, n.d.) showed that informants knew only as many and most commonly fewer categories in Pidgin than in Binumarien and that the mapping of color categories in Pidgin was a simple projection of the equivalent category in Binumarien.

3. Color terms were elicited by pointing to individual chips, rather than by obtaining lists, in order to get the most exhaustive set possible.

4. Ranges were mapped by pointing to chips rather than by drawing boundaries on an acetate overlay, a task for which Binumariens had little aptitude.

5. Superordinate-subordinate relations between categories were determined by how they mapped rather than by asking the standard question, "Is *X* a kind of *Y*?" ("Is scarlet a kind of red?," etc.). This question appeared to make little or no sense to Binumariens.

We now outline the basic characteristics of the Binumarien color classification, describe further the procedure, and present the data. In the conclusion we go over the cross-cultural classification of Binumarien and offer some interpretations of the lexical and cognitive variation.

CHARACTERISTICS OF BINUMARIEN COLOR CLASSIFICATION

1. Color in Binumarien is a covert category (Berlin, Breedlove, and Raven 1968). Color categories constitute a recognized but unlabelled set immediately included under the superordinate category, *aḳara,* which also includes the attributes of design, patterning and marking, and now writing. *Aḳara* and all the stems included under it take the ending *-rirafa* ("be hit with" or "covered with"). The concept of color and patterning is of the order of a figure superimposed on a plain or neutral ground.

2. Binumarien contains a large number of color terms but a limited number of color categories. Focally defined, the color categories are WHITE, BLACK, RED, YELLOW, GREEN, and BLUE. In comparison with English, these categories have rather broad ranges of the sort depicted in Berlin and Kay for simple or primitive systems (see Tables 2 and 3). Additional focal categories and fine discriminations within these categories (e.g., kinds of RED) are not linguistically encoded in any simple way as color terms.

3. Only two of these categories, BLACK and RED, have abstract labels.

All other designations are metaphorical or object-derived. For all practical purposes there is one term for WHITE. All other categories, including BLACK and RED, have alternative lexical labels.

4. The most significant individual cognitive differences concern the referential and taxonomic structure of the GREEN, BLUE, and BLACK categories.

5. Secondary, symbolic meanings are minimal.

PROCEDURE

The sample consisted of 46 informants, 20 males and 26 females, ranging from approximately six to 65 years of age. The stimulus was the same set of 329 Munsell chips described in the Berlin and Kay study—320 chips of varying hue at eight levels of brightness and a series of nine neutral chips (white through grey and black). Three trials were given. On Trial 1, the chips were presented individually and in quasi-random order and the informant was asked to name each chip with the instruction, *maa aḳara na auqu raa fee* ("Call the name of this *aḳara*"). Then two additional trials were given, at least one week apart, at which each term elicited from the total sample was presented to the informant, who was asked if he knew the term and if so, if it functioned as a general color word, that is, could it be used to describe all kinds of objects: *Oosana oosana ainainara* ( ) *maridano fee*? ("Are there all kinds of (red) things?"). If the answer was in the affirmative, the informant was asked to indicate the range and focus of the category.

The ranges were determined as follows. At Trial 2, one of the ethnographers pointed to an area on the board and asked, (*taatuqeearirafa*) *maridano fee? yaa fee?* ("Are there (red) ones here?" "Where?"). The ethnographer continued to move the pointer across rows or down columns, pausing at each chip with the question, *taatuqeearirafee*? ("Is it red?") until the informant responded *sia* ("No"). Then the question *moo maridano fee*? ("Are there any others?") was asked as a final check. At Trial 3, the informant was given the pointer and asked to show all the chips which were exemplars of the category. In all cases, the informant moved the pointer up and down columns or across rows, touching every chip he considered to be an exemplar. When he indicated that all the chips had been covered, the check question *moo maridano fee*? was asked again. On both trials the focus of the category was elicited with the question *moodaa* (*taatuqeearirana*) *wana yaafee*? ("Where is the one that is true red?")

The ethnographer doing the eliciting called the responses to the other ethnographer, who recorded them on data sheets containing a grid-like representation of the Munsell color chart. The foci were written out, and for the ranges, ticks were made in the cells representing the designated chips. There was one data sheet for each category for each informant for each trial. On returning from the field, the information on the data sheets was transferred to IBM cards and a program was written which produced matrices of the kind shown in Tables 2 and 3.

The procedure described above was used for obtaining the ranges since

it appeared that many informants were not adept at or comfortable with using a pencil on an acetate overlay. Drawing in the ranges also seemed to inhibit some informants from showing the full range of a category.

Taxonomic relations between categories were determined by how they mapped rather than by the usual procedure of asking the question "Is *X* a kind of *Y*?" In the early stages of the research, this question elicited responses from the same informant which were contradictory and not in accord with his actual mapping. In fact our impression was that this question was novel, confusing, and not understood, so that the informant each time merely made a response which he hoped would satisfy us.

RESULTS

Color Terms

Thirty-seven terms were elicited from the total sample of informants on Trial 1. Twenty-two of these may be classed as color terms in that they are not restricted to a narrow range of objects, such as skin color only, and in that individual informants agreed on both Trials 2 and 3 that they functioned as general color words as opposed to object names only, ("purple yam only," "tree moss only," etc). Some check on actual *versus* stated usage at the collective level was available: terms marked with an asterisk, which includes all but three of those classed as color terms and excludes all but three of those not so classed, are those which the two resident linguists, over a period of more than ten years, have heard Binumariens use in conversations which had reference to general color properties. The terms are given together with their focal glosses (for color words) and object meanings.

COLOR TERMS

*	1. *eeḳara*	—WHITE (white cockatoo)
	2. *asuru*	—WHITE (cloud)
*	3. *rundua*	—BLACK
*	4. *asuḳuna*	—BLACK (night, darkness)
*	5. *ḳudima*	—BLACK (ashes)
*	6. *taatuqee*	—RED
*	7. *faieena*	—RED (plant used for string bag dye)
*	8. *fidiḳa*	—RED (blood)
*	9. *umisa*	—RED (castor bean plant; dye used for arrows and faces)
*	10. *aaḳi*	—YELLOW (plant used for string bag dye)
*	11. *eeaḳu*	—YELLOW (ripe banana)
*	12. *tumana*	—YELLOW (yellow pandanus)
*	13. *saḳuma*	—YELLOW (plant used for dying men's things)
*	14. *uaana*	—YELLOW (kind of bird)
	15. *dafaarisa*	—YELLOW (orchid fiber, used for arrows, esp. in war)
*	16. *saqaramane*	—GREEN ("tree leaf")
*	17. *andanda*	—GREEN (cultivated greens)
*	18. *pusana*	—GREEN (plant)

*19. *difeefee* —BLUE (plant used for dyeing men's things)
*20. *sasaḳona* —BLUE (plant used for dye)
21. *munana* —BLUE (smoke from fire)
*22. *dirindaasi* —BLUE, GREEN, BLACK (plant used for string bag dye)

OTHER ELICITED TERMS

23. *ataama* —skin color
24. *suaana* —skin color
25. *ḳafeeda* —unhealthy plant condition
*26. *aadara* —particular kind of pig color
27. *panoona* —plant used for string bag dye
28. *mipooi* —purple yam
29. *suatoto* —tree moss
*30. *maḳeetona* —plant used in garden magic
31. *tamaaqa* —plant used for dye
32. *onamu* —light cloud
33. *tamaana* —plant
34. *aweesa* —shiny
*35. *idauru* —glowing ember
36. *tunoomara* —dark cloud
37. *maḳeetona* —plant

The following observations may be made on the list of color terms:

1. The categories glossed as WHITE, RED, and YELLOW appear to be complete synonyms as far as range and focus and any other features of meaning that could be determined (surface, texture, etc.). The same is true for each informant for the BLACK categories 3, 4, and 5. Term 22 is highly variable with the foci about equally in BLACK, GREEN, and BLUE and with the ranges covering all three or only two or one of these areas. The categories glossed as focal GREEN and BLUE most commonly range over both of these hues.

2. Of the twenty metaphorical or object-derived terms, twelve refer to plants or plant parts or properties. One of these, *saqaramane,* means tree leaf. The remaining eleven refer to specific plants (or in the case of *andanda* a specific group of plants) used as dye (most commonly), food, or decoration. Two terms refer to animals and five to diverse physical phenomena. In the animal group, the white cockatoo is used for food and decoration and in the physical group, ashes are used for decoration in warfare. Two-thirds of the objects used in the designation of color have well defined cultural uses.[5] Object-derived terms for each informant in each category mapped the same regardless of the actual color of the particular object. For example, if an informant's focally BLACK category ranged over BLACK and also GREEN and BLUE this range characterized the abstract term *rundua* and also the metaphorical terms *ḳudima* ("ashes") and *asuḳuna* ("night," "darkness").[6]

3. Two terms, *eeḳara* and *taatuqee,* have special children's forms, *eetata* and *taataee.* Some data on the acquisition of color categories were provided by the following experiment.[7] Fourteen children, aged three and one-half to five

years (which constituted all of the available children of this age range in Binumarien) were given a pile of chips containing exemplars of the basic Binumarien categories: *eeḳara* (WHITE), *taataqee* (RED), *rundua* (BLACK), and *aaḳi* (YELLOW), and the most common GREEN category *saqaramane,* with three chips from each hued category and two from each hueless category, the chips in each group varying in brightness. On three trials separated by at least three days, the child was asked to give the ethnographer all of the chips, the chips being returned to the child's pile, after the response to each name.[8] The criterion for possession of a category was correct responses to a name on all three trials. The results are shown in Table 1.

Table 1 shows that if a child knows one category it is RED, if he knows two categories they are RED and BLACK or RED and GREEN, etc. The results show that *taatuquee* (RED) is probably the first category which

TABLE 1

Children's Acquisition of Color Categories

	Number of Categories					
	0	1	2	3	4	5
Categories	(2)	RED (7)	RED+BLACK (2) RED+GREEN (1)	RED+BLACK +WHITE (1) RED+GREEN +YELLOW (1)	(0)	(0)

children learn with no single subsequent order of acquisition. The results also suggest that color categories are learned rather late since not even the five year olds know all of the basic categories.

4. Like many other Highland New Guinea societies, Binumariens have a vivid appreciation of color and color contrast, most conspicuously in the sphere of personal adornment on festive occasions. Rich and definite symbolic meanings, however, are minimal in Binumarien. The major secondary meanings are confined to the opposition between RED and BLACK (*taatuqee* and *rundua*), which respectively signify physical beauty and good character and their opposites.

Foci and Ranges

The terms *eeḳara* (WHITE), *rundua* (BLACK), and *taatuqee* (RED) are universal in Binumarien. *Aaḳi* (YELLOW) was elicted from all but a single informant, who had another word for YELLOW. The foci of these categories given on two trials and the ranges, defined as the union of an informants responses on two trials, are shown in Table 2.

Although there is some variation with regard to focal definitions, the majority of the choices are within rather narrowly circumscribed areas. The

rather broad ranges for all categories are in accordance with those depicted in Berlin and Kay for primitive systems. Thus *eeķara* includes WHITE and many of the palest shades, *taatuqee* includes RED and RED-PURPLE and

TABLE 2

Foci and Ranges of Binumarien Basic Color Categories

FOCI OF EEKARA

BRIGHTNESS																					HUE																				
			5R		10R		5YR		10YR		5Y		10Y		5GY		10GY		5G		10G		5BG		10BG		5B		10B		5PB		10PB		5P		10P		5PR		10PR
78	9	13	03	01	01			01																				01				01							01
	8																																						
	7																																						
	6																																						
	5																																						
	4																																						
	3																																						
	2																																						
	1																																						

RANGE OF EEKARA

BRIGHTNESS																					HUE																				
			5R		10R		5YR		10YR		5Y		10Y		5GY		10GY		5G		10G		5BG		10BG		5B		10B		5PB		10PB		5P		10P		5PR		10PR
46	9	46	46	46	46	46	46	46	46	19	12	12	12	11	13	39	39	39	39	39	39	39	39	40	40	40	41	42	43	45	46	46	46	46	46	46	46	46	46	46	46
45	8	04	04	04	04	04	04	01															03	03	03	03	03	03	03	04	19	19	19	19	06	05	05	05	05	05
41	7																													01	09	09	09	09	01	01	01	01	01	01
38	6																														02	02	02	02	01					
21	5																																						
09	4																																						
05	3																																						
	2																																						
	1																																						

FOCI OF RUNOUA

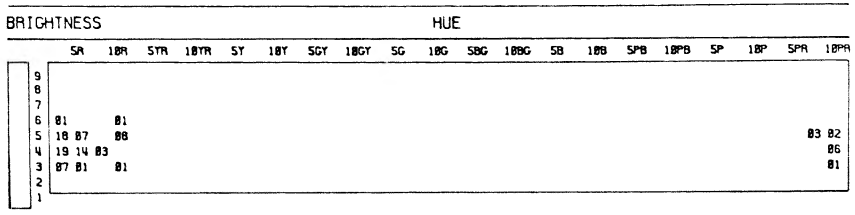
BRIGHTNESS																					HUE																				
			5R		10R		5YR		10YR		5Y		10Y		5GY		10GY		5G		10G		5BG		10BG		5B		10B		5PB		10PB		5P		10P		5PR		10PR
	9																																						
	8																																						
	7																																						
	6																									01													
01	5																	01																						
	4																											01												
01	3																		01						01																
05	2								01	01	01			01	01					01					01	01		01	01	01											
69	1																																						

RANGE OF RUNOUA

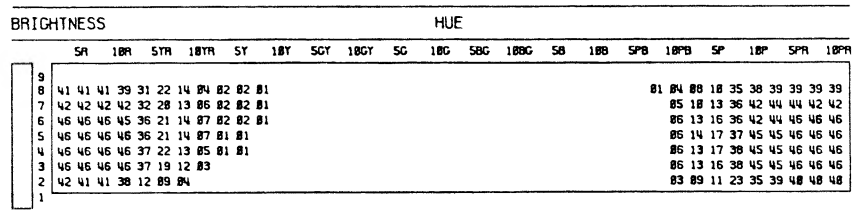
BRIGHTNESS																					HUE																				
			5R		10R		5YR		10YR		5Y		10Y		5GY		10GY		5G		10G		5BG		10BG		5B		10B		5PB		10PB		5P		10P		5PR		10PR
	9														01	02	02	02	02	02	02	02	02	02	02	02	02	01	01												
06	8									01	01	02	02	02	05	16	21	32	33	34	34	34	34	35	35	35	35	35	35	35	35	10	05	05	03						
12	7									01	01	01	02	03	07	19	22	32	34	34	34	34	35	35	35	35	35	35	35	35	34	14	06	05	04						
17	6									01	01	01	03	03	11	20	22	33	34	34	34	35	35	35	35	35	35	35	35	35	35	21	09	03	03						
33	5								01	02	02	02	04	06	11	20	23	33	34	34	34	34	35	35	35	35	35	35	35	35	35	22	09	05	03						
43	4							02	02	04	05	06	08	09	16	24	30	34	34	34	34	35	35	35	35	35	35	35	35	35	35	27	13	06	05	01					
45	3				01	03	07	07	09	17	18	18	19	22	25	32	34	37	37	37	38	38	38	38	38	38	38	38	38	38	38	33	16	08	06	04	02	01	01	01	
46	2	11	11	12	18	39	40	43	45	45	45	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	35	32	27	26	16	14	14	14	14
46	1																																						

TABLE 2 *Continued*

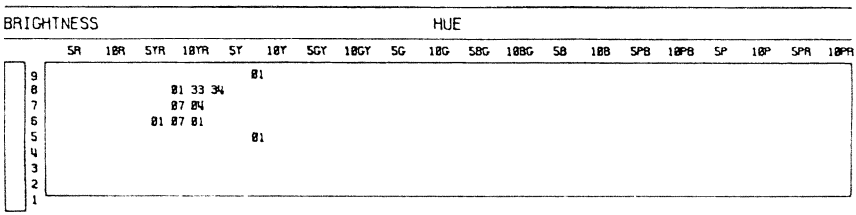
FOCI OF TAATUQEE



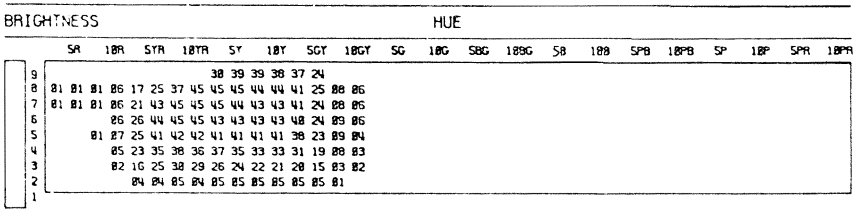
RANGE OF TAATUQEE



FOCI OF AAKI



RANGE OF AAKI



for most informants some PINKS, and *aaki* includes YELLOW and for most informants ORANGE. There are essentially two contrasting definitions of *rundua* in Binumarien: for some informants it includes BLACK, the darker

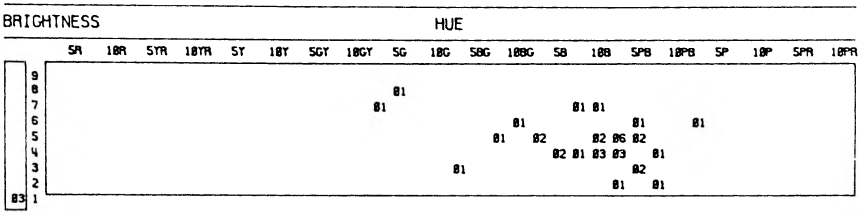
greys and a segment of the darkest shades of the hued areas, while for others it includes those areas and also GREEN and BLUE.

GREEN and BLUE are not universal in Binumarien. The ranges and

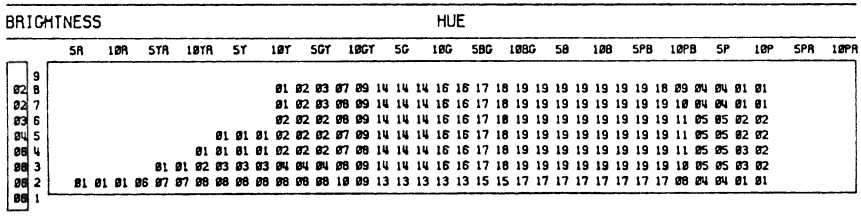
TABLE 3

Foci and Ranges of Binumarien BLUE and GREEN Categories

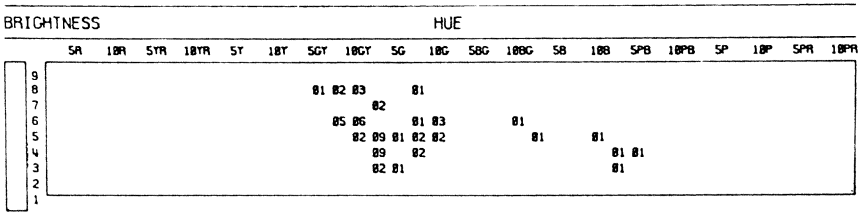
FOCI OF DIFEEFEE



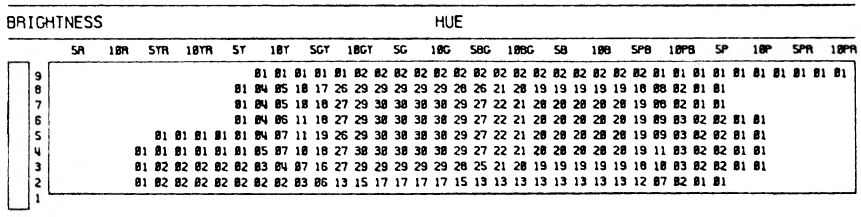
RANGE OF DIFEEFEE



FOCI OF SAQARAKANE



RANGE OF SAQARAKANE



collectively predominant foci for the most commonly used terms for these categories are shown in Table 3. As the Table shows, focal GREEN and focal BLUE very commonly range over both of these hues.

The Distribution of Color Terms

The distribution of color terms and color categories across informants is shown in Table 4, on which two observations may be made.

TABLE 4

Distribution of Color Terms Across Informants

Inf.	Color Terms																					*	1	2	3	4
	WHITE		BLACK			RED				YELLOW						GREEN			BLUE							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22				
1	+		+	+	+	+	+	+	+	+												+	10	50	F	1
2	+		+	+	+	+	+	+	+	+		+	+						+	+		+	14	50	M	1
3	+		+	+	+	+	+	+	+	+			+						+			+	12	50	F	1
4	+		+	+	+	+	+	+	+	+		+							+			+	12	65	F	1
5	+		+	+	+	+	+	+		+			+						+			+	11	45	F	1
6	+		+		+	+				+												+	6	10	F	1
7	+		+			+			+	+	+											+	7	10	F	1
8	+		+			+				+													4	9	F	1
9	+		+			+	+			+												+	6	10	F	1
10	+		+	+		+				+													5	9	F	1
11	+		+		+	+		+		+													6	10	M	1
12	+		+			+				+												+	5	6	M	1
13	+		+	+		+				+									+			+	7	40	M	1
14	+		+	+	+	+	+	+	+	+	+	+	+			+			+	+		+	16	40	F	1
15	+		+	+	+	+	+	+		+	+	+	+						+			+	13	25	F	1
16	+		+	+	+	+	+	+	+	+	+	+	+			+			+		+	+	16	60	M	1
17	+		+	+	+	+	+		+	+	+	+	+			+			+			+	14	55	M	1
18	+		+	+	+	+	+	+		+	+	+							+			+	12	40	F	1
19	+		+	+	+	+	+	+	+	+						+			+			+	12	30	F	1
20	+		+	+		+	+			+	+	+	+			+			+			+	12	65	M	1
21	+		+	+	+	+	+		+	+	+	+	+	+		+			+			+	15	50	M	1
22	+		+	+		+	+		+	+	+					+						+	10	50	F	1
23	+		+	+		+	+	+	+	+						+						+	10	20	F	1
24	+		+	+	+	+	+		+	+		+				+			+			+	12	15	F	1
25	+		+			+	+	+	+	+	+	+	+			+				+		+	13	13	M	1
26	+		+			+	+			+	+					+							7	12	F	1
27	+		+	+	+	+	+	+		+						+						+	10	13	F	1
28	+		+	+	+	+		+	+	+	+					+						+	11	12	F	1
29	+		+			+				+						+						+	6	12	M	1
30	+		+			+					+					+							5	12	F	1
31	+		+		+	+	+	+		+	+					+						+	10	12	F	1
32	+		+			+				+						+							5	9	M	1
33	+		+			+				+						+							5	8	F	1
34	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+					+	17	20	F	1*
35	+		+		+	+	+	+	+	+	+					+						+	11	15	F	1*
36	+		+	+	+	+	+	+	+	+	+	+				+			+	+		+	15	30	F	2
37	+		+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+			+	18	25	M	2
38	+		+	+	+	+	+	+	+	+	+	+				+			+	+		+	15	22	M	2
39	+		+	+		+	+			+									+			+	8	30	M	2
40	+		+	+	+	+				+						+						+	8	30	M	2
41	+		+	+	+	+	+	+	+	+	+					+						+	12	30	M	2
42	+		+			+	+	+		+						+							7	8	M	2
43	+		+	+	+	+		+		+	+					+						+	10	14	M	3
44	+		+	+	+	+		+	+	+	+					+			+				11	9	F	*
45	+		+			+				+						+							5	11	M	1?
46	+		+		+	+	+	+		+						+							8	14	M	1?
Totals	46	1	46	29	28	46	30	26	21	45	22	15	12	3	1	30	2	1	19	5	1	35				

1. Column 1 shows the number of color terms and columns 2 and 3 the estimated age and the sex of each informant. The number of terms is not correlated with sex or age (excluding children), nor in the case of alternative labelling are there recognizable patterns of complementarity as-

sociated with these or any other known variables, such as family and kinship connections, which were recorded for each informant.

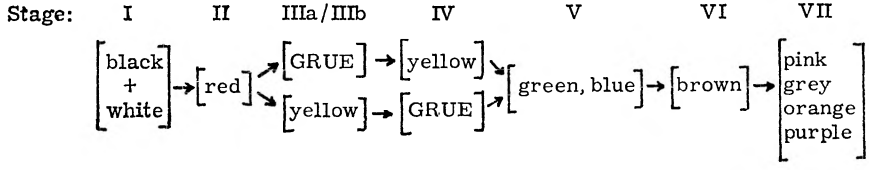
2. Column 4 classifies informants according to the number of contrastive, i.e., mutually exclusive, color categories they possess where the categories are defined in terms of their ranges. Since there are no subordinate-superordinate relations for the WHITE, RED, and YELLOW categories analogous to English cream, scarlet, and ochre, this classification concerns an individual's definitions of BLUE, GREEN, and BLACK. In this classification, categories covering the GREEN and/or BLUE hues are not counted if they are included within the range of BLACK, which covers GREEN, BLUE, and BLACK, i.e., a large BLACK which covers BLACK and most of the cool dark hues. And a category which covers the GREEN hues only or the BLUE hues only is not counted if it is covered by another category which includes both GREEN and BLUE. In this scheme, if two categories have the same range but differ in focus they are regarded as the same category. Thus if focal GREEN covers GREEN and BLUE and focal BLUE covers BLUE and GREEN, they are both BLUE-GREEN or in Berlin's term GRUE (see below). Similarly, if focal BLUE covers BLUE, GREEN, and BLACK, and focal BLACK covers BLACK, GREEN, and BLUE they are both BLACK or the "dark-cool" category (see below). Allowance is made in this classification for some minimal overlapping, e.g., BLACK and BLUE-GREEN (or GRUE) are regarded as contrastive if their intersection on the Munsell chart is not empty but includes a row or two.

By this classification there are essentially two color systems in Binumarien: system 1 (informants 1-35) which consists of the categories BLACK (or dark-cool), WHITE, RED, and YELLOW and system 2 (informants 36-42) which consists of the categories BLACK, WHITE, RED, YELLOW, and BLUE-GREEN (or GRUE). This classification is clearly related to age: the second system is possessed mainly by the younger adults. Of the remaining four informants, No. 43 has BLACK, WHITE, RED, YELLOW, GREEN, and BLUE; No. 44 has added PURPLE to BLUE-GREEN; and Nos. 45 and 46 were unclassifiable (it was impossible to say whether BLUE-GREEN contrasted with or was contained in BLACK).

CONCLUSIONS

The Classification of Binumarien

According to the revised Berlin and Kay theory (Berlin and Berlin 1975: 83) basic color terms are eleven in number and evolve in the following partial order:



In the revised theory, the initial contrast, WHITE *versus* BLACK, is between

the light-warm and the dark-cool colors. "At Stage I, the warm-light category, encompassing the universal foci of *white, red, yellow, brown, orange, purple,* and *pink* is lexically opposed to a category comprised of the cool-dark foci, *black, green,* and *blue.* High brightness *greys* are included in the warm-light category, low brightness *greys* in the cool-dark" (Berlin and Berlin 1975: 84). At this stage the foci are "fluid" and "unstable." GRUE ranges over GREEN and BLUE with the focus variable interculturally and intraculturally.

Basic color terms are (1) salient, i.e., universally shared and referentially stable across informants and across trials; (2) not narrowly restricted in application; (3) monolexemic; and (4) not a subordinate of another term (Berlin and Kay 1969: 6). Binumarien may be evaluated as follows:

1. Four terms, *eekara* (WHITE), *rundua* (BLACK), *taatuqee* (RED), and *aaki* (YELLOW) are universal in the population (ignoring the fact that a single child lacked *aaki*). Actually, no measure of referential stability has been advanced; the best we can say is that by the Hage and Hawkes eyeball test, these categories are relatively stable. The occasional BLUE, GREEN, and other cool-dark foci of *rundua* can, according to the revised theory, be interpreted as a residue of the floating BLACK focus on Stage I.

2. These four terms are among those which informants said functioned as general color words and which have actually been heard by independent observers to so function.

3. With two exceptions, *saqaramane* and *eeaku,* all of the color terms are monolexemic. In this connection, it occurs to us that the criterion of monolexemicity should perhaps be qualified in some way. For example, if it were the case in Binumarien that the GRUE term *saqaramane* ("tree leaf") were universally shared, "referentially stable," not narrowly restricted in application, and not a subordinate or another term, or in other words if it had the same taxonomic and functional status as other basic color terms, it would seem somewhat arbitrary to reject it as a basic term.

4. *Eekara, taatuqee,* and *aaki* never map as subordinates of other categories. With two exceptions, informants 34 and 35, neither does *rundua.* These two informants restrict *rundua* to BLACK and a segment of the darkest shades in row 2 which makes it a subordinate of a larger dark-cool category.

All things considered, Binumarien is a StageIIIb system.

Cognitive Variation in Binumarien

While for cross-cultural purposes Binumarien is a IIIb system, there is a small but significant group of individuals (informants 36-42 in Table 4) with a more advanced classification, i.e., one which consists of WHITE, BLACK, RED, YELLOW, and GRUE, which exemplifies the next evolutionary step, a Stage IV system.

An examination of individual protocols reveals not only the existence of these two systems, together with the inference that Binumarien as a whole is moving toward a more advanced system but also one plausible sequence of steps in the transition from one stage to the next. Among the adult informants, one group (informants 2-5) has a stable GRUE focus (i.e., on

two trials), but no bounded GRUE, i.e., the GRUE category matches the large, cool-dark or BLACK category in range. (Informant 1 lacks even a GRUE focus). A second group (informants 13-23) has a bounded GRUE, which is a subordinate of the large BLACK category. A third group, those who have in effect a IV system (informants 36-41) has a bounded GRUE which contrasts with a restricted or "shrunken" BLACK. To generalize, this classification suggests a process whereby a category begins with the recognition of its focus and then a delineation of its boundaries; the attainment of a more advanced system results from a redefinition of the taxonomic relations between old categories rather than the simple and sudden introducttion of a new category.

Lexical Variation in Binumarien

The practice of alternative labelling for the same referential categories has been reported for botanical and zoological domains (Heider 1969; Bulmer 1957), and also for color (Rivers 1901). In the Binumarian case, this practice cannot be accounted for by dialect or lingustic differences. It may be that extensive monitoring of actual usage would reveal some patterns of complementarity similar to those found by Monberg (1971) for Tikopia and Bulmer (1969) for Karam color terms. Available evidence, including vigorous denials of such patterning by informants, makes this doubtful. It is likely that the apparent synonomy is real. Synchronically, it may be a principle of Binumarian cognition that in some domains there are definite categories of things which have equivalent names, a principle which may be disconcerting or surprising to the ethnographer but self-evident to the Binumariens. Diachronically, it may be that the numbers of synonyms in each catgory are indicative of a trend towards increasing fixity of usage corresponding to the antiquity of the particular categories. In Binumarien there are two terms for WHITE, three for BLACK (excluding terms 19 and 22 which are more often mapped as GRUE), four for RED, six for YELLOW, and six for GRUE, a progression which matches the Berlin and Kay sequence perfectly except for the difference of one term for WHITE and BLACK.

NOTES

1. We are most grateful to Sisia, a man of many parts and great knowledge, for his patience, interest, and mediational efforts and to Des and Jenny Oatridge for their linguistic and ethnographic assistance, and to Brent Berlin, Paul Kay, and Terrence Hays for their comments on an earlier version of this paper. We also wish to thank Nelson Woodbury for the computer processing of the data. This research was supported by a Faculty Research Grant from the University of Utah and by a National Institute of Mental Health Predoctoral Grant.

2. Wurm (1964) classifies Binumarien as a member of the Eastern Family of the East New Guinea Highlands Stock of the East New Guinea Highlands (Micro-) Phylum.

3. Stages I and VI are also not exemplified in their experimental sample of twenty languages.

4. The Oatridges.

5. The terms can also be classified on the basis of their reference to object versus luminous sources (Conklin 1973). This distinction however does not affect the application of the terms.

6. Bulmer (1968) has noted the same kind of thing in Karam.
7. This experiment was resorted to when it was suspected that many young children were not able to reveal the true state of their knowledge by responses to a Munsell color chart.
8. This task was preceded by a perceptual grouping task in which the child was asked to match individual chips from his pile to those selected by the ethnographer. With the exception of two children on one trial each, this task was performed correctly and with apparent ease.

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