

1 Color terms

1.1 Some quotes

Gleason 1960

Gleason, H. A. (1961). *Introduction to descriptive linguistics*. New York: Holt, Rinehart and Winston, p. 4:

There is a continuous gradation of color from one end of the spectrum to the other. Yet an American describing it will list the hues as red, orange, yellow, green, blue, purple, or something of the kind. There is nothing inherent either in the spectrum or the human perception of it which would compel its division in this way.

Nida 1959

Nida, Eugene A. (1959). *Principles of translation as exemplified by Bible translating*. In Reuben A. Brower (ed.), *On translation*. Cambridge: Harvard University Press, p. 13:

The segmentation of experience by speech symbols is essentially arbitrary. The different sets of words for color in various languages are perhaps the best ready evidence for such essential arbitrariness. For example, in a high percentage of African languages, there are only three “color words,” corresponding to our *white*, *black*, and *red*, which nevertheless divide up the entire spectrum. In the Tarahumara language of Mexico, there are five basic color words, and here “blue” and “green” are subsumed under a single term.

1.2 Lenneberg & Roberts 1956

Comparing color terms in English and Zuni

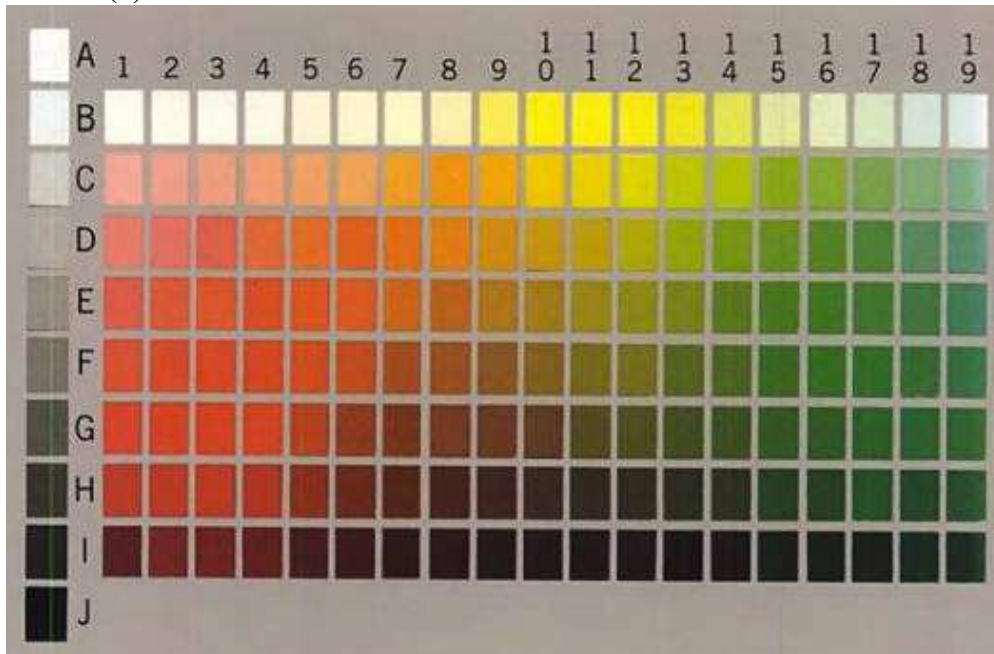
Lenneberg & Roberts (1956): Had people name colors on a grid of color tiles, looking for evidence of linguistic relativity.

Results (p. 30)

A comparison of the responses of monolingual Zunis with the responses of English speakers reveals that with only one striking exception most of the color-categories

of one language have an equivalent category in the other. The exception, however, is interesting. In English yellow and orange are very sharply defined, separate categories whereas in Zuni (as spoken by monolinguals) there is only one category encompassing both orange and yellow. Even more interesting is the following comparison of the overall structure of the entire color space in the two languages.

Color tiles (1)



Color tiles (2)



1.3 Berlin & Kay 1969

Looking at color terms in many languages

Berlin & Kay (1969): The idea of extreme linguistic relativity—especially to the extent that such an idea is supported by the arbitrariness of color terms—seems suspicious in light of the fact that translations of color terms between languages is too easy. Set out to do a larger study, doing more or less the same experiment as Lenneberg & Roberts (1956) on more languages:

Arabic (Lebanon)	Hungarian (Hungary)	Swahili (East Africa)
Bulgarian (Bulgaria)	Ibibo (Nigeria)	Tagalog (Philippines)
Catalan (Spain)	Indonesian (Indonesia)	Thai (Thailand)
Cantonese (China)	Japanese (Japan)	Tzeltal (Southern Mexico)
Mandarin (China)	Korean (Korea)	Urdu (India)
English (US)	Pomo (California)	Vietnamese (Vietnam)
Hebrew (Israel)	Spanish (Mexico)	

Color term experiment

- Determined “basic color terms” for the speaker’s language
- Gave each speaker a grid covered with color tiles and asked them to mark:
 - focus of color (most basic example)
 - boundaries of color term (what could under any circumstances count)

Results: Inventory

Looking at the basic color terms, Berlin & Kay (1969) found that there was a total universal inventory of eleven basic color categories, from which the eleven or fewer basic color terms of any given language are always drawn.

white	black
red	green
yellow	blue
brown	purple
pink	orange
gray	

Results: Occurring types

#	wh	bk	rd	gn	yl	bu	br	pk	pr	or	gr
2	+	+	–	–	–	–	–	–	–	–	–
3	+	+	+	–	–	–	–	–	–	–	–
4	+	+	+	+	–	–	–	–	–	–	–
4	+	+	+	–	+	–	–	–	–	–	–
5	+	+	+	+	+	–	–	–	–	–	–
6	+	+	+	+	+	+	–	–	–	–	–
7	+	+	+	+	+	+	+	–	–	–	–
8	+	+	+	+	+	+	+	+	–	–	–
8	+	+	+	+	+	+	+	–	+	–	–
8	+	+	+	+	+	+	+	–	–	+	–
8	+	+	+	+	+	+	+	–	–	–	+
9	+	+	+	+	+	+	+	+	+	–	–
9	+	+	+	+	+	+	+	+	–	+	–
9	+	+	+	+	+	+	+	+	–	–	+
9	+	+	+	+	+	+	+	–	+	+	–
9	+	+	+	+	+	+	+	–	+	–	+
9	+	+	+	+	+	+	+	–	–	+	+
10	+	+	+	+	+	+	+	+	+	+	–
10	+	+	+	+	+	+	+	+	+	–	+
10	+	+	+	+	+	+	+	+	–	+	+
10	+	+	+	+	+	+	+	–	+	+	+
11	+	+	+	+	+	+	+	+	+	+	+

Results: Implicational universals

Surprisingly, if a language encodes fewer than eleven categories, there are strict limitations on which categories it may encode:

- All languages contain terms for **white** and **black**.

- If a language contains then it contains a term for

3	red
4	either green or yellow (not both)
5	both green and yellow
6	blue
7	brown
8 or more	colors chosen from {purple, pink, orange, gray}

- For eleven colors, only 22 (1%) out of the $2^{11} = 2048$ possible sets occur.

Results: Hierarchy

white < red < green < blue < brown < purple
 black yellow pink
 orange
 gray

Color *foci* were reliable, crosslinguistically, across informants, across trials.
 Color *boundaries* were extremely *unreliable*.

Three colors: Tiv

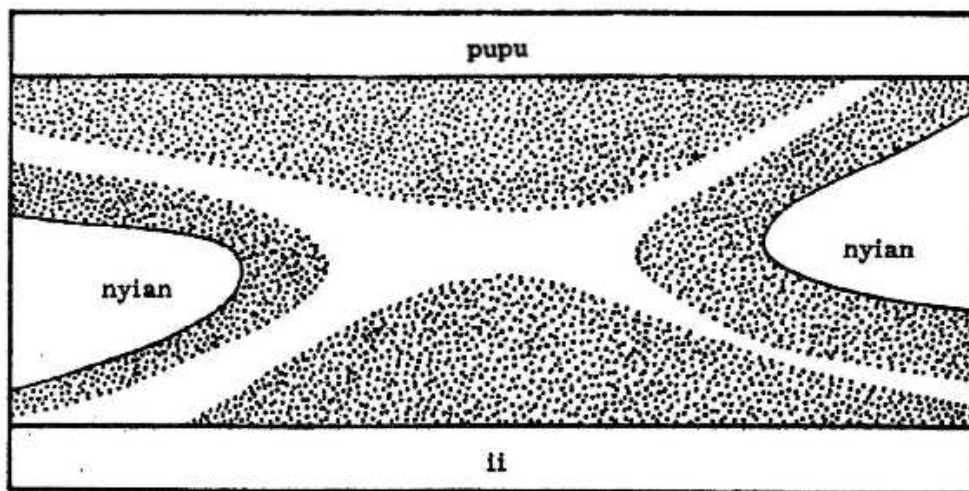


FIGURE 12. INFERRED COLOR CATEGORIES FOR TIV, REPRESENTING STAGE II

Four colors: Ibibio

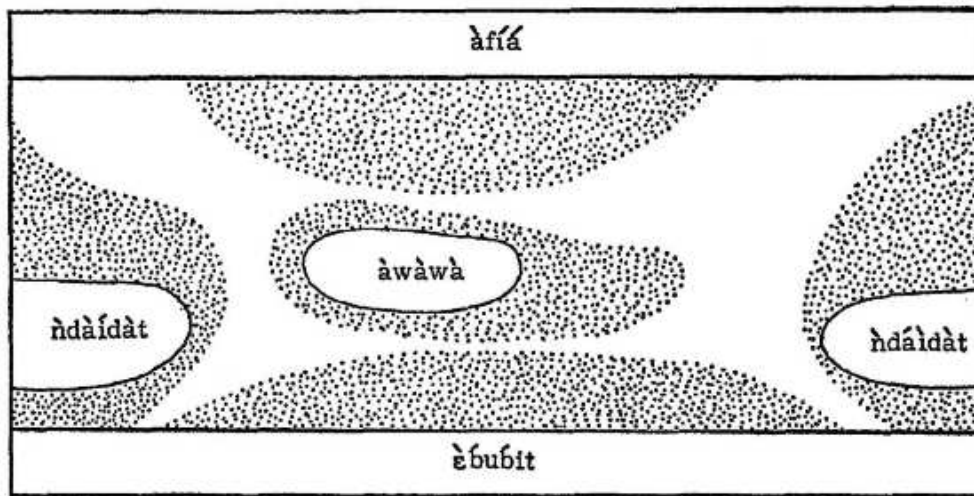


FIGURE 13A. INFERRED COLOR CATEGORIES FOR IBIBIO, REPRESENTING STAGE IIIa

1.4 Basic color term

Identifying basic color terms

- **Monolexic** (non-compositional). Its meaning is not predictable from the meaning of its parts. Not basic: *blueish, lemon-colored, salmon-colored, the color of the rust on the car.*
- **Its signification is not included in that of any other color term.** Not basic: *crimson, scarlet (< red).*
- **Its application is not restricted to a narrow class of objects.** Not basic: *blond.*
- **Psychologically salient.** Appears early in lists of colors, has stable reference across speakers and occasions of use, appears in the idiolect of each speaker.

Identifying basic color terms

- If something is doubtful (hasn't yet been eliminated):
 - **Same distribution as uncontroversial basic terms.** Test: *reddish, greenish, *aquaish.*

- **Shouldn't also be the name of an object.** Not basic: *gold, silver, ash*. (Note: *orange* wasn't doubtful.)
- **Shouldn't be a recent foreign loan-word.**
- **Shouldn't be morphologically complex.** Not basic: *blue-green*.

Evolution

Berlin & Kay (1969) suggest that:

- adding or losing a color term must follow the hierarchy
- no known cases of historical development *losing* a color term exist.
- X could be taken temporally as an “evolutionary order.”
- Historical reconstructions suggest that newer terms are further right.

Number of color terms seems to correlate with technological development, degree of isolation, “cultural complexity.” (Probably: where useful.)

Evolution

Magnus (1880)¹ did a study testing perception of color and found no differences: Re: Ovaherero/Damara (South-West Africa, citing a missionary's report):

“Insofar as the color table coincides with the colors of livestock, i.e., of cattle, sheep, and goats, there is no difficulty in naming colors. They cannot name colors which do not pertain to livestock, especially blue and green, although they can distinguish the colors from each other and can name them with foreign words if necessary... [t]here is no meaningful difference in color sense to be found between the somewhat civilized and the entirely uncivilized. The uncivilized can also distinguish the colors, but can not name green and blue and find it very comical that there should be names for these colors.”

Examples

Black, White, Red, Green, Yellow, BlUe, BrOwn.

¹Magnus, Hugo (1880). Untersuchungen über den Farbensinn der Naturvölker. Jena, Fraher.

BW	Jalé (New Guinea) ‘brilliant’ vs. ‘dull.’
BWR	Tiv (Nigeria), Australian aboriginals in Seven Rivers District, Queensland.
BWRG	Ibibo (Nigeria), Hanunóo (Philippines)
BWRY	Ibo (Nigeria), Fitzroy River people (Queensland)
BWRYG	Tzeltal (Mexico), Daza (eastern Nigeria)
BWRYGU	Plains Tamil (South India), Nupe (Nigeria), Mandarin?
BWRYGUO	Nez Perce (Washington), Malayalam (southern India)

Examples: problematic cases for order

- Catalan: status of *black* as a basic color term is not clear.
- Mandarin: conceivable that *gray* is a basic color term, ‘ash’
- Cantonese: has BWRGYU, *pink*, *gray*, but not *brown*. Pink, blue, gray more recent?
- Japanese: Internal reconstruction make *blue* older than *green*.
- Vietnamese: Lacks *blue*, but has BWRGY *pink*, *purple*, *brown*, and *gray*.

Why eleven?

Why this order?

Consider color spaces... Kay & Maffi (1999), Saunders & van Brakel (1997)

2 Vowels

2.1 Crothers 1978

Language sample

Crothers (1978): Studying a large set of languages (209, areally and genetically balanced)

- phonetically, vowel quality is determined in large part by two *formants* (component frequencies) F_1 (“fundamental frequency”) and F_2 .
- can define a vowel space
- Five-vowel systems are the most common

Universals

- All languages have /i a u/.
- All languages with 4 or more vowels have /i/ or /ε/.
- Languages with 5 or more vowels have /ε/. (*1/163). They also generally have /ɔ/. (*9/163)
- Languages with 6 or more vowels have /ɔ/ (*2/108) and also either /i/ or /e/ (generally /i/). (*1/108)
- Languages with 7 or more vowels have /e/ and o/, or /i/ and /ə/. (*4/68)
- Languages with 8 or more vowels have /e/. (*3/40)
- Languages with 9 or more vowels generally have /o/. (*5/22)

Vowels: hierarchy

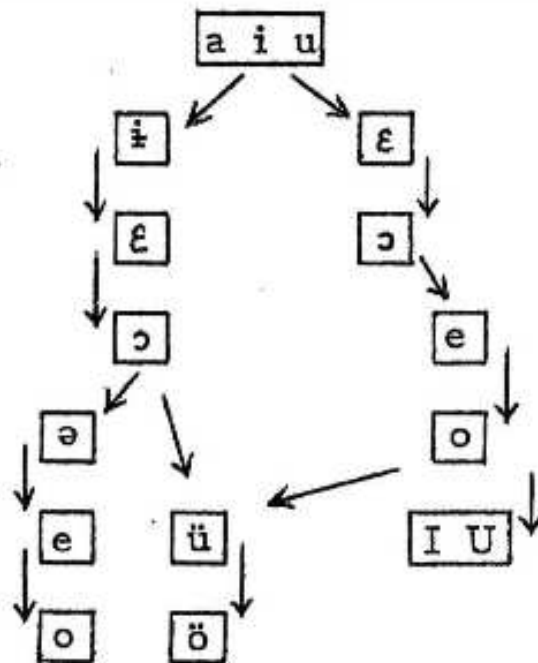


Figure 10

Other universals

- A contrast between five basic vowel qualities is the norm for human language, and in general the most common systems are those that have close to this number of basic vowels.
- The number of height distinctions in a system is typically equal to or greater than the number of backness distinctions. (fairly rough)
- Languages with 2 or more interior vowels always have a high one.
- The number of vowels in a column of interior vowels cannot exceed the number in the front or back columns (low vowels excluded).

Other universals

- The number of height distinctions in front vowels is equal to or greater than the number in back vowels.
- There is a tendency for high and low vowels of a short vowel system to be more central than the corresponding long vowels.
- The number of vowels in a nasal vowel system is equal to or smaller than the number in the oral vowel system. (exceptionless)
- If a nasal vowel system is smaller than the corresponding basic vowel system, it is most often a mid vowel (front, back, or both) that is missing from the nasal system.

2.2 Dispersion

Vowel dispersion

Random selection of vowels from attested distinguished vowels? *No*, at best 10% of the possible combinations are attested systems.

Vowel dispersion.

- Vowels are arranged in the space to cover it and provide maximal perceptual distinctness. (they ‘tend to disperse evenly in the available phonetic space.’)
- Predictions look pretty good, though not perfect.

Why is 3 the minimum? Why is 5 the most popular? Functional explanations...?

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