

PERCEPTION AND COLOR CATEGORIES: A VIEW FROM THE I'WAK

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Berlin and Kay (1969) have postulated 11 basic color categories as the total universal inventory from which categories of any language are drawn, and that color terms are foci specific. They found that there is a differential distribution of these color terms in languages, and that these follow an evolutionary scheme worked into seven stages. Thus Stage I would be represented by two terms, black and white; Stage II represented by three terms, black, white and red, and so on down the line with certain combinations of the 11 color terms present or absent into 22 types of color combinations constituting the different seven stages. This paper illustrates the characteristic organization of categories in the Berlin and Kay Stage II by the color categorization of the I'Wak of Northern Luzon who are limited to the categories, black, white and red – but not in the perspective of color foci but in terms of the opposition between the properties of color. Thus the paper finds it necessary to first deal with the kind of reality the I'wak encounters in relating himself to his environment and his society in order to gain a perspective on the relationship between his color categories and the outlook he has on reality.

Goodenough (1964:39) said that we know a culture when we learn the meanings for which its linguistic form stands, that culture consists in models for perceiving, relating . . . what one has to know in order to operate in a given culture. A native of a given culture, therefore, having acquired and assimilated the language of his group, would have had accumulated a collection of experiences and internalized perceptions that could define the manner by which he would relate to the rest of his society. The sum of the total inventory of his vocabulary, presumably, would be reflective of the information input that he would have had internalized, so that given the range of this vocabulary, it would be possible to arrive at some understanding of the nature of the external realities and the way these are manipulated, that would be valid within the context of his culture and within the realms of the particular field of action to which the native relates himself.

The latter has to be elaborated upon for clarification for although it could be presumed that a culture is generally homogenous, the assimilation of the total culture of a society

varies from individual to individual. It would be a matter of course to encounter individuals who have differentially internalized aspects of a particular culture as, for instance, a male individual would have less integrated comprehension of the craft of weaving where this is the female function; or contrariwise, the male would be more comprehensive in the mechanics of hunting where this is the exclusive function of the male. To bring the issue closer to the problem, even with regard to a single aspect of a culture, no two individuals would have an integrated knowledge to the same degree. This is because of the biological teleology that natural selection is at the level of the individual and not in the level of the group. It is a matter of course therefore that a painter whose domain of experience lies in the manipulation of colors where each nuance would represent a different semantic projection, would have a range of chromatic articulation that would be more expansive than the familiarity of an architect with the color spectrum, and more so over that of a carpenter. The painter would be more articulate in terms of being able to categorize colors along finer lines of

differentiation, in the same manner that a violinist, for instance, would know the precise pitch of a note when he tunes his "E" string. His color discrimination would be so precise as to be able to know the differential effect of a beam of light of a certain wave length falling upon a plane surface having a certain hue. His knowledge of colors would be such that he would be able to verbalize extensively on the subject where an ordinary philistine's repertoire on the intricacies of color would be exhausted in five seconds flat.

The above illustration of the differential internalization of a cultural category is extreme but this is only to bring out the point of the possibility of a precise differentiation of modes of experience with regard to color as against a more broad one; and projected into the level of collectivities — the different ways two societies would segment visual experience.

The color repertoire of contemporary urban societies would presumably have a range that is considerably wider than where the impact of mass media is of much less evidence. The reason for this is that the language of color has been so well developed that its deep structures symbolized by objective realities have been so much manipulated by media in promotional activities. Semantic implications have been attached to different chromatic scales so that responses are almost predictably elicited where an appeal to the effective tastes of the public is made through the medium of these symbols. Where there is a continuum of color spectrum from the reds to the violets, this is segmented and isolated alone or in binary contrasts the better to modulate the range of variation from one affective state to another.

It would be noted, however, that the nomenclature for the various categories of color available to a single culture is as varied as the number of social segments that manipulate colors in their relation to the rest of the society. The coterie of fashion designers would, for instance, have a color

vocabulary that is circumscribed by that professional circle. Thus we have such appellations as "shocking pink," "Nile Green" or a "Franciscan brown," as if there is really something shocking in the color pink that would be more comprehensible than the shock that one would experience with the achromatic grey; or that the affective state that green would elicit by the projection of the idea of the river Nile, would not be affected by the fact that the Nile, more often than not, is muddy. Contrast the idea of Franciscan brown to the categorization of a professional house painter who would be making a choice between "light" or "dark mahogany," or a painter who would be more concerned with a "burnt" or "raw sienna." The inventory of the total sum of the categorizations that a society brings to bear on the concept of color, is, therefore, staggering and reflective of the complex technological specializations where these categories are utilized in terms of principal adaptive mechanisms.

It must be pointed out, however, that it is necessary to distinguish between what the sensory mechanisms actually sense and what are the perceptions actually elicited. The physiological equipment that man has with regard to the sensing of color stimuli is more or less the same for all individuals (cf. Conklin, 1954: 189) although the capacity to perceive and categorize colors is cultural. The whole extent of the color spectrum is, therefore, within the visual range, theoretically, of every individual. The number of segments he would be able to isolate in this continuum would be dependent on the norms internalized. Thus categorizations vary from individual to individual and from society to society. The categorization tends to be centralized about certain foci in more complex societies (cf. Heider, 1971 and 1972).

The spectrum continuum to which the human eye is sensitive ranges from 400 nm to 700 nm in wavelength (nm — nanometer, equal to 1/1,000,000 of a millimeter). The

visual sensations change with the wavelength changes of light from violet, to blue, green, yellow-orange, and then red. It will be noted that the yellow-orange band is very narrow (Clulow, 1972:36). The widest bands are the blue, green and red. What this implies is that the colors that best offers possibilities for perception are blue, green and red, and hence the probability of being categorized more readily.

The second physiological aspect that has to be pointed out is with reference to the morphology of the eye itself that receives the stimuli leading to perception of colors. The retina contains two light sensitive elements, rods and cones, that have different properties. The rods do not allow the sensation of colors and operate only in low illuminations. Thus with the rods only the blacks and whites are received much in the same manner as a black and white photograph is seen. The cones, on the other hand, operate in medium and high levels of illumination and colors are sensed by these elements.

Thirdly, the distribution of the rods and cones make a great difference in the kind of perception. The rods are found more densely distributed about the periphery of the retina, while the cones are concentrated in the center (the yellow spot area) and diminishes in number towards the periphery. To perceive details it is necessary to stare at them using the center or yellow spot of the retina. These physical characteristics have much to do with the way things are perceived in terms of the properties of light (Bouma, 1949:21).

The implications of these characteristics of physiological vision is that it is easier to perceive things in the perspective of varying degrees of lightness and darkness or binary contrast than with color. Color perception requires a considerable concentration of effort because of the differential distribution of the light sensitive elements in the retina of the eye.

Berlin and Kay (1969:2) have postulated eleven basic color categories as the total universal inventory from which categories of any language are drawn, and that color terms are foci specific. This is against the Whorf-Sapir doctrine of the alleged total semantic arbitrariness of the lexical coding of color (cited from Berlin and Kay, op. cit.) They found that there is a differential distribution of these color terms in languages, and that these follow an evolutionary scheme worked into seven stages. Thus Type I would be represented by two terms, black and white; Type II with three terms, black, white and red, and so on down the line with certain combinations of the eleven color terms present or absent into twenty two types of color combinations constituting the different seven stages.

With reference to the differential distribution of the rods and cones in the retina, the Stage I of Berlin and Kay incorporating only two color terms, black and white, seems to be borne out. The Stage II, introducing the color, red, is again borne out in some respects by the particular characteristic of the wave length band occupied by red which is from 620 nm to 700 nm, constituting the widest band in the spectrum (average wave lengths of the six basic colors are: red - 80 nm; green - 70 nm; blue - 50 nm; violet - 50 nm; orange - 30 nm and yellow - 20 nm [Clulow, op. cit.: 13]).

It must be pointed out, however, that the Berlin and Kay stages in color term evolution deal with terminology and not with the physical capacity of the retina to receive stimuli in terms of the different wavelength of light. The correspondence between terminology and perception, therefore, in this case may not have a one to one ratio with respect to specific wave length. The term, red, applies specifically to the range between 620 nm to 700 nm, if one is to be focus specific. If the terminology of Stage II and if the postulate of color foci were correct, then it

would imply that, assuming the correspondence between vocabulary and perception were exact, then what are being perceived are the colors, black, white and red only.

In order, however, to perceive color, the light sensitive cones of the retina must react differentially to the different wavelengths of the spectrum. In 1807 Tomas Young postulated the three color theory, further modified by Hemholtz in 1857. The three color theory assumes that the cones are sensitive in three different regions, one being sensitive to red light, the other to green light and the third to blue light. When light strikes the cones, each area responds according to its sensitivity and the three responses produce the complete *color sensation* (Clow, op. cit.: 56). Any given hue, therefore, can be matched exactly by a mixture of these three sensations. What becomes striking here with reference to the correspondence between terminology and physical perception is that the term, red, does not correspond exactly to the band in the spectrum ranging from 620 nm to 700 nm but to a distinctively proportionate mixture of the sensations of red, green and blue. The term, red, in the Berlin and Kay Stage II, must constitute a category that is culturally and not physically determined, that is, sensations pass through a filtering process that are culturally categorized.

The question then arises as to what the category red consists of. In the light of the three color theory that all the hues can be matched by the three color sensitive areas in the eyes that responds to the colors, red, green and blue, the entire range of the spectrum is actually sensed. But it is also a fact that in the Berlin and Kay Stage II, people categorize only the color, red. It must be assumed that physically everyone can perceive all the possible hues of color in the light of the three color theory, and in the absence of any physical defect. The term, red, therefore, could not possibly correspond to the three color stimuli but to an aspect of all

three to provide the sensation of the category, red.

The impasse can be resolved by looking at the properties of color. The spectrum is a continuous transition from the violets to the reds. The difference between particular wavelength foci constitutes the hue. But aside from hue, color has other properties. From one hue, one can pass to the same hue but with less and less saturation, that is, proceeding to the paler configurations of the hue and then finally to the white. Conversely from the same hue one can pass to other colors in terms of diminishing light or the reduction of brightness, as when one progresses from red to black through the color reddish-brown. There are, therefore, three subjective variables in a particular color sensation (Murray, ed., 1952). The categories in Stage II of Berlin and Kay constituted by the terms, red, black and white, can be understood more if the above subjective variables in color are considered, and not taken in terms of color foci. This is because of the fact that if Berlin and Kay were correct, then people at Stage II development could only perceive black, white and red, which is not compatible with human physiology and the physical characteristics of perception of light. The position cannot account for the fact that people in Stage II could identify the foci blue or green within the category black; nor when two binary contrasts of, say, yellow and red would produce the white and red respectively; while the opposition between yellow and white would produce the categories red and white, respectively. This can be resolved if it is not in terms of foci that the categories are determined but rather in terms of binary contrasts along the determinations of hue, saturation and brilliance operating in varying degrees of interrelations. With this obtaining the category boundaries of Stage II appears to be amorphous and shifting, operating in terms of binary oppositions through the three dimensions of color properties, with only the range of the achromatic colors establishing the absolute boundaries of visual perception.

Considering this, the application of the categories white and black would refer to the saturation and brilliance of hues, with the categories referring to certain wave lengths of hue. Stage II could be better understood in terms of the operations of the three properties of color but not in terms of absolute categories but variable ones and determined by the opposition in a situation. The categorization is organized not in terms of locus of core meanings (Rosch, 1973:112) with reference to hue alone, but is affected by the relationship between relative brilliance and saturation. The category of red does not refer merely to the 620 nm–700 nm with a core meaning which would consist of the clearest examples (Rosch, 1973:112), but covers a range not accounted for by the opposition of black and white in the binary segmentation of the other color properties of brilliance and saturation.

The characteristic organization of categories in the Berlin and Kay Stage II could be illustrated by the color categorization of the I'wak of northern Luzon, Philippines, which is limited to the categories, black, white and red, but as has been pointed out not in the perspective of color foci but in terms of the opposition between the properties of color. It would be necessary to deal first with the kind of reality the I'wak encounters in relating himself to his environment and his society in order to gain a perspective on the relationship between his color categories and the outlook he has on reality.

The people that inhabit the Cordillera mountain ranges in Northern Luzon, Philippines, are collectively known as Igorot, meaning, people of the mountains. One among these is the I'wak. The area where this people may be found is in the southern part of the mountains where it comes into conjunction with the Caraballo mountain range, covered by the southeast part of the province of Benguet; the northeastern part of Pangasinan province; the northwestern part of Nueva Ecija and the southwestern part of Nueva

Vizcaya. The range of elevation of this mountain habitat is from 500 to 1900 meters above sea level. The vegetation ranges from grassland marked by extensive expanses of *Imperata cylindrica* and *saccharum spontaneum* at the lower elevations and moonsoon type primary and secondary forests at the higher elevations. In-between are deciduous second growth vegetations. The area is subject to the southwest moonsoon. There is a marked wet and dry seasons with the wet part commencing about June, intensifying during July, August and September, then tapering off by November. The dry season starts in earnest in March (Dickerson, 1928). The precipitation is over 120 inches annually. The terrain is generally rugged.

The I'wak are some 2,000 people, speaking a language that is a dialect of the Inibaloi. They live in enclaves high in the mountains among the larger and more dominant ethnic groups of the area like the Ibaloi and Ikalahan. Pushed out of the more fertile river flood plains and valleys, they live near the headwaters of rivers in land that is steep and craggy. Lacking level land, they are forced to pursue their lives on the steep mountain slopes, practicing slash-and-burn cultivation. Their basic staple is taro, *Colocasia esculenta*. But as they are pushed higher and higher into the mountains, the extent of the land they cultivate has dwindled such that their fields are no longer able to yield enough for their minimum subsistence requirements. Their only recourse, therefore, was to shift to a crop with a higher yield than taro, hence the change in recent years to sweet potato (*Ipomoea batata*). They, however, still prefer taro as the initial crop in newly opened fields since to them taro is a ritual and feast food. They cultivate some ten varieties of this crop, both wet and dry. Of the sweet potato they plant about fourteen varieties. The sweet potato is planted about a month after the planting of taro, and the cuttings are implanted between the rows of taro, so that after the taro harvest the sweet potato for the next three years will dominate the field.

The people are structured along cognatic lines, that is, a person is related to both the paternal and maternal sides. There is, however, a partrilateral bias. Postmarital residence is generally patrilocal. The basic social unit is the household which may consist, according to their own norms, of from one or more individuals. The collectivity may consist of individuals from one nuclear family to an extended one with a maximum of three generations. The qualifying element for such discrete units to be accepted as a distinct household is the capacity to interact self-sufficiently with the rest of the society in terms of ritual requirements. This is expressed in terms of the possession of pigs for use in ritual sacrifices. An individual living alone in a house with pigs of his own is considered a separate household by himself. Even a nuclear family but impoverished enough not to own pigs, would not be accepted as a separate household, but would be attached to one that is ritually independent.

For ritual purposes the various households are organized about a ritual house belonging to a *membunung* or sayer of prayers, to form a *san-a'wikan*. The basis for affiliation to this grouping is again reckoned through the kin relationship usually along partrilateral lines. Several of this *san-a'wikan* may be found in a single community, more or less, expressing the kinship groupings. The people are generally village exogamous. There are no preferred or prescribed forms of marriage. The I'wak social organization, therefore, exhibits a flexibility in terms of affiliation. An unattached individual could be affiliated to a unit of his choice. In the higher level of integration, a household could shift membership to another *san-a'wikan* system depending on the conditions of conflict and solidarity obtaining between the members. The categories of membership in social relations are flexible and adaptive to situations, and conducive to manipulation.

The importance of the pig in the life-style of the I'wak can only be gleaned from the fact that each house has a hearth with two

fireplaces: one for the people to cook their meals on, and the other for the pigs. And it is easy to know which fireplace is for the pigs because the single most valuable cultural object of the I'wak sits there — a huge copper caldron called *ga-ambang* where the feed of the pigs is perpetually cooking. The same vessel is used to cook the pig in when it is finally sacrificed. More time is spent in cooking the feed of the pigs during an evening than that spent on preparing the evening meal for the members of the household. In fact, the people do not sleep until the feed for the next morning is not yet ready for this has to be continually stirred and mashed to an acceptable consistency to suit the pig's palate. There are seasons of hunger that the I'wak has to go through, but the pigs do not go hungry. The influence of the pigs on the I'wak is such that the pig pen is an architectural feature of the I'wak house, incorporated underneath the living area.

The temperatures are cold where the I'wak lives because of the high elevations, so that the architecture, although highly impoverished is very organic and functional in features. It consists of three areas: cooking and living areas, with the latter elevated some two feet above the ground to accommodate the pig pens. The best ones are made of board with grass roofing, made so enclosed and without any windows that the heat from the fires are kept in. Smoke, therefore, collects inside the house and coats everything in it with a black film that eventually hardens. The low eaves and the little door, and the lack of windows leave the interior of the house a twilight zone even during the brightest part of the day. The I'wak, when he comes in and out of his house is continually adjusting his eyes to the differential exigencies of darkness and brightness.

Craft is limited to basketry and wood carving, since the I'wak was never able to develop textile weaving unlike the other groups in the Cordilleras, since they passed directly from the use of barkcloth to trade

clothes. Metal, too, is a trade item. The use of color does not enter into their basketry nor woodcraft, except in terms of the natural color of the materials used. Eventually, objects of their material culture become blackened by soot, because of the smoke from their hearth that gradually blackens everything in the house. The aesthetic quality of their artifacts are thus discernable more with reference to form than to color. However, references to color does enter into the more pragmatic aspects of life. They, for instance, differentiate between the colors of the sweet potato they raise. The varieties, for instance, range from white to yellow, orange, to the red violets. But described colorimetrically, the I'wak would reduce these number to only two categories, white and red. In fact, the I'wak color categories consists of only three terms: *amputi*, *atuling* and *ambalanga*.

The three terms corresponds roughly to the terms, white, black and red. The roots of the words are *puti*, *tuling* and *balanga*, with the prefixes implying a tendency towards of a quality of the particular category of color. The roots are not used independently. If an I'wak would make a statement — the pig is black, he would say, "*Atuling ey kinlum*," and not "*Tuling ey kinlum*." There is no reference to the color foci directly but merely an indication of a tendency towards or a quality of.

There are other references to color which is specific, as for instance, the term *ambilunget*, meaning dark, with reference to the darkness of clouds, or the darkness of night or the dimness of a room. The term is not used with reference to skin complexion. The term *nakuspa-an*, meaning pale, is used referring to complexion, too. For all practical purposes, the monolexic color terminologies are the three terms given above.

Given the color terms, Berlin and Kay (op. cit.: 3) stated that when we speak of color categories, we refer to the foci rather than to their boundaries or total areas. The

reason given for this is the possibility that the brain's primary storage procedure for the physical reference to color categories is concerned with points of color rather than to the volume, with only secondary processes of lower salience accounting for the extension of the reference points in the color away from the focus. This rationalization, however, is incongruent with the Stage II of their scheme, since with the three color term stage could not possibly account for the fact that the focus, red, would then be applicable to the particular wavelength and to no other except the secondary extension of the focus, while it is evident that red category is used to apply to many other reference points along the color spectrum not covered by the other two categories, black and white.

Among the I'wak, for instance, the focus of red shifts along the axis of hues on a long continuum and fading out only where the categories black or white takes over. Thus green leaves are described as *atuling*. As the leaves progressively yellow from dryness, the color reference is now *ambalanga*. As the leaves turn into darker shades of brown, the reference continues to be *ambalanga* or *atuling* depending on the brightness. The similar shade of brown of a complexion, however, when compared to a darker shade would be referred to as *amputi*. There is no constant focus for a particular color but covers a wide range of extension. The boundaries of categories even are amorphous and are taken in the context of a situation (cf. Malinowski, 1965:37 and R. H. Robbins, 1971:37). Operationally, a contrast is necessary in order to categorize. A yellow would be *ambalanga* in contrast to *amputi*; it would be *amputi* in contrast to *ambalanga*. Depending on the context, it could be *amputi* or *ambalanga* in contrast to *atuling*.

The way the I'wak manipulates the terms deviates from the internally structured "core meaning" formulated by Rosch (1973:112) which consists of clearest cases with other category members decreasing in similarity to

that core meaning. The I'wak categories do not have a core meaning *per se* except within a particular context of a binary opposition. Taking even one hue, brown — with full brilliance it is described as *ambalanga*, and progresses through the category until the brilliance diminishes and then after a marginal sequence it is referred to as *atuling*. With full saturation, it pales considerably to the category, *amputi*.

It is evident that without color foci established by the expediency of technology as is obtaining among the I'wak, the organization of categories are amorphous and flexible enough to allow manipulation to suit the context of a situation. The evolutionary stages of Berlin and Kay with reference to foci would be true only with reference to the more developed stages where a multiplicity of terms would imply advanced segmentation which would necessitate the notion of color foci. Foci become established as segmentation becomes more pronounced. The narrower the segments the more definite the location of the foci. Where a minimum of terms implies that the limited categories would be made to apply to the whole and constant range of the color spectrum, the entire concept becomes inoperative and would require another approach. As terms multiply and categories are further segmented, there would by necessity be corresponding changes in the underlying principles that govern this development. The categorization principles that operate in the earlier stages could not possibly be the same principles that would operate in the more complex levels, since the referents would be different.

The I'wak views the world in the perspective of three color categories only. But the world to the I'wak is not necessarily white, black and red alone, but reflects the entire range of the color spectrum for the categories are broad and adaptive, corresponding to the level of his technology and reflective of his social adaptability. With a subsistence type of economy, the I'wak

technology allows little room for role diversification, so that these social positions are generalized and not specialized for specific action. The roles are not, therefore, focus specific but are flexible enough to admit of manipulation to suit situations. His categories reflect this adaptive flexibility as in the manner by which he categorizes the continuum of perceived realities.

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