Color Categorization
Paul Kay
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Lexical color categorization consists in the division of the color sensations into classes corresponding to the significata of the color words of a particular language. *Perceptual color categorization* consists in the division of the color sensations into classes by the perceptual processes of an organism – human or non-human, adult or neonate, possessed of knowledge of a language or not so possessed. Conflict among views on the relation of lexical to perceptual color categorization has prevailed for over a century. Nineteenth century classicists, anthropologists and opthalmologists were aware that all languages do not reflect identical lexical classifications of color. Some, such as the classicist (and statesman) William Gladstone, concluded that differences in color lexicons reflect differences in perceptual abilities, e.g., "... that the organ of color and its impressions were but partially developed among the Greeks of the heroic age" (see Berlin and Kay 1969 [B&K]: 135). Others, like the opthalmologist Hugo Magnus, recognized that failure to distinguish colors lexically need not indicate inability to distinguish them perceptually (see B&K: 144f). These and other late nineteenth century scholars tended strongly to view differences in color lexicons in evolutionary terms.

In the 1920's, '30's and '40's Edward Sapir (e.g., 1921: 219) and B.L. Whorf (e.g., 1956 [1940]: 212ff) rejected evolutionism for the doctrine of radical linguistic and cultural relativity. The favorite field for the empirical establishment and rhetorical defense of the relativist view, which became established doctrine by the 1950's and '60's, was the lexicon of color. With respect to color categorization, there have been two major traditions of research stemming from the relativity thesis: a within-language, correlational line of research and a cross-language, descriptive one.

Early work in the former tradition (e.g., Brown and Lenneberg 1954, Lenneberg and Roberts 1956) is primarily concerned with establishing a correlation between a linguistic variable distinguishing colors (for example, how easy different colors are to name or how easy they are to communicate about) and a non-linguistic cognitive variable over colors: memorability. Discovery of such a correlation was interpreted as support for the Sapir-Whorf view that linguistic categorization can influence non-linguistic perception/cognition. In the '50's and '60', such correlations were reported within English and, to a limited extent, in other languages (Stefflre, Castillo Vales and Morely 1966). Since it was *assumed* at the time that the linguistic variable (codability or communication accuracy) would vary across languages, correlation between a linguistic and the non-linguistic variable within a single language (almost always English) was taken to validate the docrine that the coding systems of different languages induce differences in the non-linguistic cognition of their speakers. Eleanor Rosch (e.g., Heider 1972) challenged this assumption on the basis of the apparent universal lexical salience of certain 'focal' colors (identified by B&K). Rosch showed that universal perceptual salience determines both the non-linguistic and the linguistic variables of the correlational approach, thus undercutting the logic of this line of research. Rosch's view was criticized by Lucy and Shweder (1979), who also challenged her experimental procedure; Lucy and Shweder's experimental procedure was in turn challenged by Kay and Kempton (1984), who supported Rosch's view of the matter. (Kay and Kempton, using a non-correlational, cross-linguistic experimental procedure, showed that certain non-linguistic color classification judgments may be influenced by the lexical classification of color in a language, while others are not so influenced, thus re-establishing limited Whorfian effects in the color domain.)

In the tradition of cross-language description, the studies of the '50's and '60's likewise reflected the dominance of radical linguistic relativism (Ray 1952, Conklin 1955, Gleason 1961: 4). These studies sought to discover and celebrate the differences among color lexicons. In 1969, using the original stimulus set of Lenneberg and Roberts (1956), B&K compared the denotation of basic color terms in twenty languages and, based on these findings, examined decriptions of seventy-eight additional languages from the literature. They reported that there are universals in the semantics of color: the major color terms of all languages are focussed on one of eleven landmark colors. Further, they postulated an evolutionary sequence for the development of color lexicons according to which black and white precede red, red precedes green and yellow, green and yellow precede blue, blue precedes brown and brown precedes purple, pink, orange and gray. These results were challenged on experimental grounds, mostly by anthropologists, (e.g., Hickerson 1971, Durbin 1972, Collier 1973) and largely embraced by psychologists (e.g., Brown 1976, Miller and Johnson-Laird 1976, Ratliff 1976). A number of field studies stimulated by B&K tended to confirm the main lines of the universal and evolutionary theory, while leading to reconceptualization of the encoding sequence (Kay 1975). Based on earlier, unpublished work of Chad K. McDaniel, which established the identity of some of the universal semantic foci of B&K with the psychophysically determined unique hues (see also in this connection Miller and Johnson-Laird 1976: 342-55, Ratliff 1976, Zollinger 1979), Kay and McDaniel (1978) again reconceptualized the encoding sequence, introducing the notion of fuzzy set into a formal model of color lexicons and emphasizied the role in early systems of categories representing fuzzy unions of Hering primaries. Kay and McDaniel also related the universal semantics of color to the psychophysical and neurophysiological results of Russel De Valois and his associates (e.g., De Valois et al. 1966).

Since 1978, two important surveys of color lexicons have been conducted, both supporting the two broad B&K hypotheses of semantic universals and evolutionary sequence in the lexical encoding of colors: the

World Color Survey (Kay, Berlin, Maffi and Merrifield 1997) and the Middle American Color Survey (MacLaury 1997). Relativist objection to the B&K paradigm of research on color categorization has continued, emphasis shifting away from criticism of the rigor with which the B&K procedures of mapping words to colors were applied toward challenging the legitimacy of any such procedures (e.g., Lucy 1997, Saunders and van Brakel 1997).

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