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Draining the Language out of Color

Words mold many aspects of thought, says linguist Paul Kay, but not all aspects. The proof lies in the names the world’s languages give to colors

By Philip E. Ross

Would a rose by any other name really smell as sweet? Do our words shape our thoughts, so that "we dissect nature along lines laid down by our native languages," as the linguist Benjamin L. Whorf asserted half a century ago? Is language a straitjacket?

Perhaps to some extent, allows Paul Kay, 69, emeritus professor of linguistics at the University of California at Berkeley. Those are hardly fighting words, and Kay, dressed in fuzzy shoes and a fuzzy sweater, his feet up on his desk, doesn’t seem a pugnacious fellow. Yet he and his former colleague, Brent Berlin (now at the University of Georgia), have been at the center of a 35-year running debate concerning Whorf’s hypothesis, called linguistic relativity. "Our work has been interpreted by some people as undermining linguistic relativity, but it applies only to a very restricted domain: color," Kay remarks.

Relativity can be demonstrated, somewhat trivially, to any landlubber who sees a mere boat when his mariner friend cannot help seeing a ship, skiff or scow. The stakes are raised considerably, however, when one extends the argument from man-made concepts to natural phenomena, as Whorf did in an essay, published posthumously in 1956. He argued that "we cut nature up, organize it into concepts, and ascribe significances as we do largely because we are parties to an agreement to organize it in this way, an agreement that holds throughout our speech community and is codified in the patterns of our language."

In sifting through the color terms of the world’s far-flung languages, Berlin and Kay were reacting to ambitious statements, amplifying Whorf’s, in many standard linguistics textbooks, that chose color as "the hard case, the locus classicus, of relativity," Kay says. "They must have thought that if arbitrary linguistic categories determine perception of color, then this must determine the perception of everything."

Kay and Berlin hit on color terminology in the early 1960s while comparing notes on their field research. Kay, a New York City–born, New Orleans–bred cultural anthropologist, had just returned from 15 months in Tahiti. Berlin, a linguistic anthropologist reared in Oklahoma, had been researching a Mayan language of southern Mexico. "We found that in both our languages, all the major color terms but one were exactly like those in English, and in the one area of difference, they differed in exactly the same way." (They grouped green and blue to form what Kay and Berlin called "grue"). That two such profoundly unrelated languages should name colors alike seemed to point to some universal linguistic pattern.

In the mid-1960s Berlin and Kay ended up at Berkeley. They had their graduate students scour the Bay Area for native speakers of foreign languages, quizzing them with standard color chips, not unlike those used as samples for paint. Their object was to establish the meanings of basic color terms—that is, those that could not be analyzed into simpler terms (such as "blue-green") and were not defined as characteristic of a given object (such as "salmon"). Later Berlin and Kay collaborated with other researchers to expand their sample to 110 languages.

Color lexicons vary, first of all, in sheer size: English has 11 basic terms, Russian and Hungarian have 12, yet the New Guinean language Dani has just two. One of the two encompasses black, green, blue and other "cool" colors; the other encompasses white, red, yellow and other "warm" colors. Those languages with only three terms almost always have "black-cool," "white-light" and "red-yellow-warm." Those having a fourth usually carve out "grue" from the "black-cool" term.

The tree of possibilities turned out to have branching points, some of them rather rare. Still, the manner in which languages can build up their color words is tightly constrained, suggesting the existence of universal constraints on semantic variation.

Berlin and Kay published Basic Color Terms in 1969, starting years of speculation that the pattern they discovered reflected a universal trait of neurophysiology. "I have been associated with the argument that it had to do with
higher-order neural processing, but it now turns out that there is no physiological evidence for or against that view," Kay says. He is therefore an agnostic on why languages build color vocabulary the way they do.

Back in the 1960s a model of color vision propounded by the late Russell L. De Valois, a Berkeley psychologist, had been interpreted as establishing that the categories red, yellow, green and blue were hardwired into the brain. That interpretation, however, fell apart after the model failed to predict the mix of frequencies that the eye perceives as "pure" colors (for instance, the model did not explain why the reddest-looking red contains a touch of blue). That left no physiological rationale for color categories. A more recent theory attributes universals in color vocabularies to the way the world is colored—that is, to the natural distribution of wavelengths.

In any case, Kay notes, the degree to which the perceived world is man-made seems to explain the variation in the number of color words. Hunter-gatherers need fewer color words because color data rarely provide much crucially distinguishing information about a natural object or scene. Industrial societies get a bigger informational payoff from color words.

Kay plans to probe subtler aspects of color-naming. With Terry Regier of the University of Chicago, he wants to study variation across color-term systems and compare the results with predictions made by a number of psychological models. If, for instance, one or more basic colors belong to a color category, can that information be used to project the boundaries of the entire category? Do those languages that have the "grue" color, say, make the category larger than "green" and "blue" combined, smaller, or the same size? The goal is to explain a specific cognitive universal—color—in terms of general psychological processes.

Although linguistic relativity does not apply to the naming of colors, Kay explains, there is no reason to rule it out in the naming of other domains—size, sharpness, degree of consanguinity or whatever. He also sees no reason why language may not shape the way we think about some aspects of color (other than its names):

"There is a wealth of evidence showing that what people treat as the same or as different depends on what languages they speak.

"Two key questions must always be kept separate," Kay adds. "One is, do different languages give rise to different ways of thought? The other is, how different are languages?" It is possible, he says, that the respective answers are "yes" and "not very."

One of the most interesting inquiries into these questions is being conducted at the Max Planck Institute for Psycholinguistics in Nijmegen, the Netherlands, where Stephen C. Levinson and his associates are studying the psychological consequences of the differing ways in which languages describe space. Several languages lack subjective terms analogous to "left" and "right," using instead absolute directions, akin to "north" and "south." In such a language, one might say, "There's a fly to the north of your nose."

Presented with an arrow pointing to their left, speakers of Guugu Yimithirr, a language of Australia, will later draw it pointing to the left only if they are still facing in the direction in which they saw the arrow in the first place. If, however, they turn around, they will draw it pointing to the right—that is, in the same absolute direction as the original arrow.

Here, then, is an example of language categories molding thought and behavior in a striking way. Kay concludes that linguistic relativists may be correct that the languages people speak mold their thoughts. "But it is unlikely that the various languages of the world are so different from one another, in underlying conceptual structure, that the ways their speakers think are incommensurable."

Or as Terence Africanus, the Roman essayist, put it: "I am a man; nothing human is alien to me."