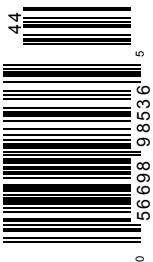


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COLOR PRIMITIVE

JOSH BERSON

There could very easily be a tribe of people who are all colourblind and who nonetheless live very well; but would they have developed all our colour names, and how would their nomenclature correspond to ours? What would their natural language be like?? Do we know? Would they perhaps have three primary colours: blue, yellow and a third which takes the place of red and green?—What if we were to encounter such a tribe and wanted to learn their language? We would no doubt run into certain difficulties.¹

—Ludwig Wittgenstein, *Remarks on Colour*, 1977

The striking contrast presented by the natives of Lifu [island] with those of the Torres Straits at once suggests that the existence of colour-blindness in a race might be of great importance as an ethnic character, and the other data also tend to show that colour-blindness may be a characteristic of certain races and the existence or absence of this defect may help us in the difficult task of deciding on ethnic affinities.²

—W. H. R. Rivers, *Reports of the Cambridge Anthropological Expedition to Torres Straits, Volume II: Physiology and Psychology*, 1901

When the informant appears reasonably at ease, please open the booklet to page 2 and proceed with the naming task. As you may be aware, many languages do not contain a word meaning “color.” Yours may well be one of these. Experience has shown, however, that it is always possible to find some verbal formula to elicit color responses. Sometimes these translate to, “How has it been dyed?” or “How does it strike the eye?” or “What is its appearance with respect to red, blue, etc.?” and so on. Probably none of these three is just the thing needed for your language, but with a little experimentation you should be able to find a question that elicits color words. You will be aided in this by the stimulus objects themselves, which differ from each other only with respect to color.³

—Brent Berlin, Paul Kay, and William Merrifield, “World Color Term Survey: Instructions to Field Workers,” 1976

The concept of basic vocabulary is everywhere. No matter where you turn, linguists, sociologists, computer scientists, and even literary critics are paring back the dictionary, editing the lexicon, looking for a minimal set of words whose meanings can be relied upon to not vary

too much from one occasion, person, text, culture, or era to another. The aim is a reinvention of the science of behavior, a data-driven exploration of the various strategies by which symbol-using creatures (that would be us) bind form to meaning and transmit meanings over space and time. Consider the Computational Story Lab at the University of Vermont, which has gathered “happiness scores” for the ten thousand most commonly occurring English words and word fragments on Twitter and used these to create a “Hedonometer,” a remote-sensing apparatus for human mood. The data are impressive, though some of the methodological assumptions—e.g., concerning the demographics of Twitter users and even the very reliability of word happiness scores—are open to question.⁴ Notable too are the collaborative experiments conducted by literary scholars at Stanford University and the University of Wisconsin to see if frequency counts for only a handful of commonly occurring words and punctuation marks could be just as useful as a functional typology of 200 million distinct English strings in determining the genre of nineteenth-century novels.⁵

These are two of the better-thought-out efforts to take advantage of the fact that, as linguist Joan Bresnan puts it, “the massive growth of language technologies has made the spontaneous use of language in natural settings a rich and easily accessible alternative” to the intuitive impressions offered by research respondents regarding their own language use. In the case of literary criticism, these same “language technologies” have dramatically expanded the corpus available for stylistic and thematic comparison, among other ways by allowing researchers to assemble detailed data on the frequency of occurrence and usage over time of particular words in a given set of textual genres.⁶ These language technologies make it possible to formulate testable hypotheses about what, if anything, makes a word or concept basic (that is, universal, uniform, and consistent in its scope of reference), though it’s becoming apparent that popular contenders for the essence of basicness, notably frequency, want for explanatory power.⁷ But the quest for a minimal set of semantic universals—the “atoms” of thought, as it were—did not begin with the revolution in computing power of the past twenty-five years.

Consider color, on the face of it a candidate for a domain of meaning “found in every culture” if ever there was one. In 1969, ethnobotanist Brent Berlin and linguist Paul Kay published *Basic Color Terms: Their Universality and Evolution*, a survey of the use of words for colors in ninety-eight languages for which data were available. For twenty languages, the authors and

their students elicited color terms directly from speakers, using “standardized color stimuli” in the form of a “a set of 329 color chips provided by the Munsell Color Company” of Baltimore. With the exception of Tzeltal, a Mayan language spoken in the Chiapas region of Mexico for which Berlin and colleagues had collected data from forty speakers, they often consulted just one speaker per language, working with whoever was fortuitously available in the San Francisco Bay area. Data for the remaining seventy-eight languages came from published reports and via personal communication with other researchers. Berlin and Kay make their position on the existence of semantic universals clear at the outset. Anthropologists and linguists have, they claim, “misinterpreted” the “essential methodological point” of previous ethnoscientific studies “as an argument against the existence of semantic universals.” The cause of this error is a tendency among American anthropologists and linguists toward “extreme linguistic relativity,” whose proponents cite “the alleged semantic arbitrariness of the lexical coding of color” in support of their view.⁸

Later on, Berlin and Kay put the point in more personal terms. Not long after the work of neurologist and psychiatrist W. H. R. Rivers as part of the 1898 Cambridge Anthropological Expedition to Torres Straits, a “concern with evolutionary schemes fell into scientific disrepute in American ethnology and linguistics during the first half of this century, due primarily to the extreme cultural relativism of Franz Boas and his students. Thus, the ethnographic and comparative work on color nomenclature of the 1950’s was carried out within the framework of the linguistic relativity hypothesis.”⁹ Berlin and Kay’s own work represents, they assert, a “rediscovery” of both a theoretical framework within which semantic universals become fit topics of ethnographic research and of an evolutionary hierarchy of color words worked out in most of its particulars by Rivers and his contemporary Hugo Magnus, a Jena-based ophthalmologist who conducted experiments in color vision and terminology with the Ovaherero in German Southwest Africa in the 1870s.¹⁰

Berlin and Kay’s major finding is that “there exist universally for humans eleven basic perceptual color categories.” Not all languages have words for all eleven categories, but if a language has fewer than eleven basic color terms, its color nomenclature is predictable: all languages have words for black and white; if a language has a word for just one additional color, it will be for red; a language with four basic color terms will add to black, white, and red either yellow or green. A language with five color terms will include both green and yellow. At “Stage V,” blue appears as a distinct term from green

and black; at “Stage VI,” brown makes its entrance, and “Stage VII” sees the debut of words for one or more among purple, pink, orange, and gray. The hierarchy of color terms is implicational, that is, later stages in the hierarchy include the earlier stages as prefix. The hierarchy of color terms is also “properly ... evolutionary” in the sense that “color lexicons with few terms tend to occur in association with relatively simple cultures and simple technologies.”¹¹ Berlin and Kay’s taxonomy, with languages classified as Stage I, Stage II, Stage IIIa and IIIb, and so on up to Stage VII, evokes nothing so much as the family of stadial theories of civilization that took form in the lectures of Adam Ferguson, Adam Smith, and their colleagues at the University of Edinburgh in the mid-eighteenth century and provided inspiration for the theories of the evolution of private property put forward by Lewis Henry Morgan and Henry Sumner Maine in the 1860s and 1870s.¹²

The fact that “sound and color are both wave phenomena” is taken by Berlin and Kay as their cue to compare the evolutionary hierarchy of basic color terms with the fixed developmental sequence observed by Roman Jakobson and Morris Halle at the MIT Psychoacoustics Lab for infant acquisition of sensorimotor control over phonological contrasts.¹³ But where the phonologists had focused on the individual, Berlin and Kay argue that color vocabulary obeys a similar developmental trajectory at the level of the community, going on to speculate that “the development of color nomenclature in the child” mirrors the arc from Stage I to Stage VII observed in the languages of the world.¹⁴

Rivers had made a similar argument about the cultural evolution (and, in his case, degeneration) of color discrimination, and Berlin and Kay try to distance themselves from the former’s tentative proposal that “defect in nomenclature for a colour may be associated with defective sensibility for that colour.”¹⁵ Yet by comparing speech sounds to colors, as opposed to color *terms*, they do in fact lean in the direction of an evolutionary hierarchy of physiological discrimination. They take a step further in this direction when they note that “our essentially linguistic investigations have led, seemingly inescapably, to the conclusion that the eleven basic color categories are pan-human perceptual universals.” Ultimately, however, they pull back to the plane of language, even if for them language arises from “a species-specific ability, ultimately based on species-specific bio-morphological structures”—something like what creole theorist Derek Bickerton would later dub a Language Bioprogram.¹⁶

The 1898 Cambridge Anthropological Expedition

to Torres Straits, and Rivers's work on color vision in particular, represented, for the generations of practitioners that came of age in its wake, the last moment when anthropology and psychology could be said to share a body of assumptions about the nature of human behavior and the methods suited for its investigation. As Henrika Kuklick, the preeminent historian of British social anthropology, observed, by the 1920s "the category of 'primitive' had changed meaning."¹⁷ *Basic Color Terms* is an *éloge* to that earlier order of behavioral science that fantasized that *primitive* could refer simultaneously to a developmental stage at the level of the species, the community, and the individual.

Color words had figured prominently in debates both on the Sapir-Whorf (or linguistic relativity) hypothesis and on the universality of concepts and semantic domains. In *Word and Object* (1960), W. V. Quine, warming up to the thought experiment on the indeterminacy of translation for which he would be best known—a linguist attempting to learn the language of a "hitherto untouched" people in the field with no recourse to dictionaries or intermediaries—notes that "color words are notoriously ill-matched between remote languages," that the words for "red" in two unrelated languages could indicate very different colors.

Basic Color Terms purported to offer a new framework, one that affirmed the validity of postulated universals of human behavior, and grounded them simultaneously in the developmental trajectories of the species, the culture, and the individual organism. From this perspective, semantic universals could abide, seed-like, in the minds of all members of the species yet not find expression in a particular language until the material culture of its speakers gave them cause to invoke or refer to particular universals.

Thus psychologist Eleanor Rosch set out to recreate the evolutionary process posited by Berlin and Kay by experimentally inducing a basic color vocabulary in sixty-eight young male Dani, schoolchildren from a community in the Indonesian province of Irian Jaya "whose color term usage was restricted to the two basic Dani color terms *mili* (roughly 'dark') and *mola* (roughly 'light')." ¹⁸ The experiment, designed to test the hypothesis that color classification is a function of a set of physiologically determined—"focal," in Berlin and Kay's terminology—hues, produced mixed results at best, and even today, there is no consensus as to the consistency, across individuals or communities, of focal hues. Berlin, Kay, and Rosch were strongly influenced by the theory of hue opponency, proposed by Ewald Hering in his posthumously published *Outline of a Theory*

of the Light Sense (1920). Hue opponency holds that the phenomenal experience of color rests on a physiologically manifest disposition to perceive contrasts in three mutually independent primary chromatic channels: black–white, red–green, and blue–yellow. At the time Berlin, Kay, and Rosch were writing, it was widely assumed that the Hering opponency channels were manifest in some sort of subcellular apparatus in the lateral geniculate nucleus (LGN) of the thalamus, the LGN being a principal relay channel for nervous signals from the retinae to the occipital lobes of the cerebral cortex. Since then, it has become clear that there is no support for primary color opponency in the LGN. But as the search for a universal color lexicon gathered force as a field-based project, the physiology of color perception faded from its proponents' agenda.¹⁹

Starting in the mid-1970s, Berlin and Kay teamed up with the Dallas-based Summer Institute of Linguistics to analyze 110 "unwritten" languages from all parts of the globe, resulting in their World Color Term Survey (later simply World Color Survey). The Summer Institute of Linguistics (now SIL International), founded in 1934, is the largest organization in the world dedicated to ethnographic fieldwork. SIL recruits its fieldworkers from Protestant Evangelical communities, primarily in English-speaking countries. Fieldworkers tend to be young and to have little to no training in linguistics outside that which they receive through SIL, which by the 1950s had developed a reputation, both within university-based linguistics programs and among host governments in areas where it conducted fieldwork, for the innovative and rigorous character of its fieldwork training. At least until recently (and for many active participants still today), SIL's avowed purpose has been to make the Gospel available to all humanity. It is an organization very much committed to the determinacy, or at least possibility, of translation. Since 1992, SIL has become known outside the linguistics and evangelical communities for its atlas of dialect geography, *Ethnologue*.²⁰

Berlin and Kay's "Instructions to Field Workers" for their survey gives a sense of the material particularity implicated in eliciting semantic universals in the field (not to mention the stultifying concrete-mindedness the authors attributed to the people who would be doing the work):

You [the fieldworker] have been provided with two sets of color stimuli. Both are contained in the 14-1/2" x 7-1/2" metal box. Please open that box now. You will find inside the box a piece of cardboard on which a

large number of circular color patches of 1/4" diameter have been pasted. Please put this aside for the moment. In the box you will now see that there are six trays containing color chips enclosed in glass slide cases. There are 330 of these chips. Each of the first five rows contains 56 chips and the sixth row contains 50 chips. You will note that each slide case has a white side and a gray side. The chips have been packed with the white side facing the front of the box and the grey sides facing the hinges. The color patch shows through the grey side. On the back (white) side of each chip there has been written a number between 1 and 330. The chips in the first row have been numbered, from front to back, 1–56, in the second row 57–112 ...

The second set of stimulus materials consists of the piece of cardboard on which a large number (410) [of] circular color patches have been glued. These are exactly the same colors as contained in the first stimulus set. The reason there are 410 of these as against 330 of the loose chips is, as you may have already noted, that the entire top and bottom rows of the array consist of 40 copies of the pure white and pure black chips, respectively.²¹

A basic color term must be monolexic, which is to say, expressions like "lemon-colored" are out. In addition, "its signification [must not be] included in that of any other color term, ... its application must not be restricted to a narrow class of objects, ... [and] it must be psychologically salient for informants." Occurring early in lists of color terms generated through free-listing, they need to be more or less invariant among speakers and across instances of use. "Try to restrict the informant," Berlin, Kay, and their co-author William Merrifield counsel in the instructions for administering the focal hue-mapping exercise, "to a single chip in so far as possible, but if the informant insists that several chips are equally good representatives of a color you may accept this as final."²²

Earlier, Rivers had noted the difficulty of identifying a distinct semantic domain for color, that is, a class of words used for colors and nothing else, as well as the tendency of color terms to be borrowed from other domains, especially flora. In languages with productive derivational morphology (reduplication, for instance, in the Torres Strait), a color word used independently by a number of speakers may simply reflect the productivity of a derivational pattern intersecting with the salience of a certain substance of practical value rather than the prior existence of a color term. So even if numerous speakers call a tuft of wool dyed bright yellow "turmeric-turmeric," that does not mean "turmeric-turmeric" was a

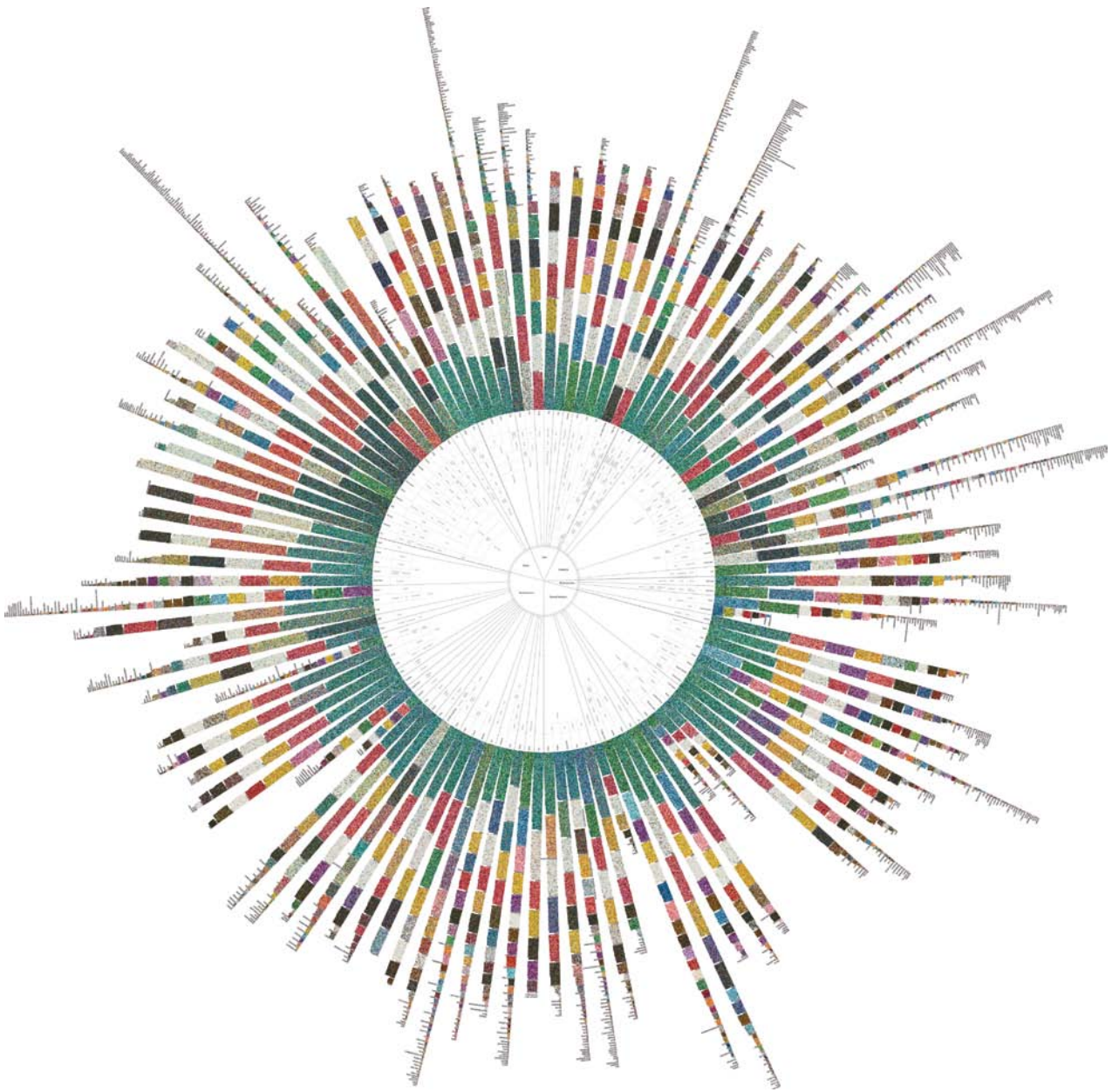
common word for a particular color prior to that day.²³

The square-jawed late-Fordist tone of the Basic Color Terms enterprise—the "14-1/2" x 7-1/2" metal box" with its 330 semigloss cardstock chips, the "Instructions to Fieldworkers"—reflects the project's paradoxical relationship to modernity as architects of the World Color Survey researchers understood it. On the one hand, modernity entails the passing of a time when a linguist might stumble upon a "hitherto untouched" community—perhaps in the highlands of New Guinea—where phenomenal experience and its construal in language and thought have not been contaminated by the sensibility of *homo industrialis*. The newly modern native knows many new things, including new names for colors. But to prove the existence of semantic universals, particularly in domains as intimately linked to phenomenal experience as color classification, you have to get data from communities that have never been exposed to television—or movies, billboards, magazines, supermarkets, or clothing made with synthetic dyes. To participate as a research subject in ethnoclassification studies is to become modern—and so to lose one's status as an emblem of the universal.

The "Instructions" notes that some languages do not have a word for "color," but it was not until the survey was well underway that those involved—some of them at least—began to consider whether color itself might represent not a semantic universal but the outcome of a specific historical process in which color comes to attract conceptual salience independent of particular colored things.

Rivers had speculated that the deficiency in sensitivity to blues he observed in the Torres Strait reflected the fact that his subjects had an undeveloped aesthetic sense. An "over-development of the sensory aspect of mental life," a product of an ongoing, subsistence-driven need to respond to stimuli in the natural environment, inhibited the islanders in the formation of abstract concepts, and thus of attention to sensations not of immediate practical value. The authors of the World Color Survey, not really in a position to deny their speaker-consultants either abstract concepts or aesthetic sensitivity, reluctantly began to countenance the Emergence Hypothesis, that is, the possibility that color emerges as an abstract domain of reference only in response to certain changes in material culture, notably the widespread circulation of standardized pigments and dyes starting in the mid-nineteenth century.²⁶

Not just color *qua* domain, but the perceptual salience of hue, as opposed to, say, lightness or quality of reflectance (shininess, brilliance), it turns out, results



above and overleaf: Graphic representation by Fathom Information Design of data from the World Color Survey. According to Berlin, Kay, and Merrifield, “an average of 24 native speakers of each of 110 unwritten languages were asked (1) to name each of 330 Munsell chips, shown in a constant, random order, and (2), exposed to a palette of these chips and asked to pick out the best example(s) (“foci”) of the major terms elicited in the naming task.” The results for each language are shown as a series of blocks that extend from the center, in order of the most frequently used term to the least. For instance, terms used for a greenish-blue color are prevalent in most lan-

guages, followed by terms for what we might perceive as red, black, white, etc. Each pixel represents a single respondent’s categorization of a single color chip. While the speakers of one language used only three color terms to describe the entire spectrum (for example, the Dan, visible in detail overleaf), speakers of other languages used over sixty terms. This chart was produced using Processing, a programming language for data visualization. The survey’s colorspace was originally in Lab (CIE L*a*b*) and was converted by Fathom to RGB (and by Cabinet to CMYK in order to print it using an offset press). Copyright Fathom Information Design, 2014.

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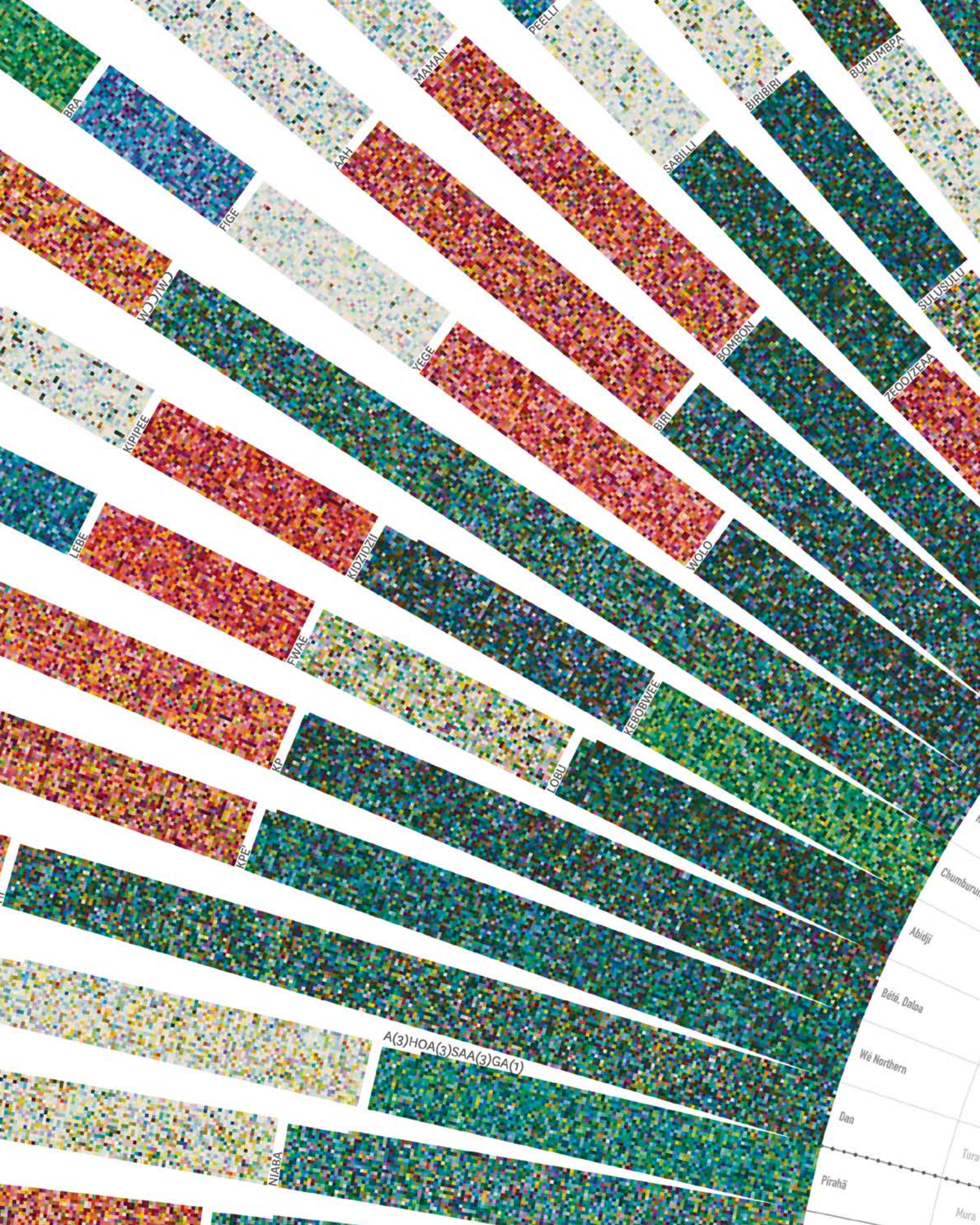
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Thomas Headland, anthropologist with the Summer Institute of Linguistics, eliciting color data from a member of the Agta, an indigenous people of the Philippines, 1973. Courtesy Thomas Headland.

from a process of collective innovation that has played out on a timescale accessible to any observer willing to stick around for a few years or return periodically. Anna Wierzbicka, whose Natural Semantic Metalanguage represents the longest-running ongoing research program dedicated to identifying semantic universals, has declined to admit color. Color, Wierzbicka argues, exists, where it exists, not at the level of the semantic atom (universal, not susceptible to redescription in simpler terms) but of the semantic molecule. Her prime example of a language that, until recently, lacked a color concept is the Central Australian language Warlpiri, where, as recently as the 1960s, fieldworkers found there was no way to ask what color something was.²⁷

If Berlin and Kay's evolutionary schema for basic color terms—Stage I, Stage II—seems to echo the stadial theory operative in, among other places, the British colonization of Australia, perhaps it is because the emergence of color, at home and in the colonies, was itself an outcome of a process of subject-formation driven by colonization and the anxieties it called forth. The need to depict the skin of colonizer and colonized in such a way as to make the racial identities of all figures in a painted scene immediately and unequivocally recognizable preoccupied British art educators as late as the 1920s

and inspired preferences for particular pigments—in at least one instance procured specifically from the colony in question—judged superior for representing the skin of certain races.²⁸

Despite appeals by linguist Stephen Levinson and others to the recent history of language contact and to an appreciation of language-specific patterns of conceptualization that cannot be elicited with basic vocabulary tests, the Berlin and Kay model has had remarkable staying power in linguistics. Take, for instance, the debate over Pirahã, a language spoken in the Brazilian Amazon that linguist Daniel Everett has controversially deemed too simple to conform to Noam Chomsky's model of Universal Grammar. Ironically, despite his assertion that Pirahã evinces a syntactic and conceptual structure rudimentary to a degree previously thought impossible, Everett is aligned with his critics in that he believes that he has found an exception to Berlin and Kay's model, which for him is operative in other cultures and languages, rather than a wholesale refutation of it.²⁹

At the heart of the dispute is a disagreement over the significance of the gaps Pirahã presents in the "explicit instantiation" in language of cognitive resources (such as color vision) presumed to be universal.³⁰ That is, do Pirahã's exceptional gaps impose, as Everett

argues, constraints on the language and its speakers that, taken together, reflect and foster an “immediacy of experience principle”—suggesting not that their language is untranslatable, but that they have difficulty even *thinking* in anything but immediate, concrete terms?³¹ Since members of the Pirahã community who learn Portuguese (invariably, as Everett tells it, through accidents of circumstance that lead an individual to spend an extended period of time away from the Pirahã community) have no trouble learning to count or apply color terms or use relative clauses or reason counterfactually, the controversy is also over the relationship between cognitive faculties and concepts. The core issue, however, remains the relationship between concepts and words: How much “explicit instantiation” in language is necessary for conceptualization? When can we infer the presence of a concept from multiple speakers using a similar paraphrase, even if an explicit word for the concept is absent in their language? Threaded through these questions is one not often explicitly raised in debates over semantic universals: what political work is done by treating as universal the very concept of a concept?

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- 12 For context, see Jennifer Pitts, *A Turn to Empire: The Rise of Imperial Liberalism in Britain and France* (Princeton: Princeton University Press, 2006).
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- 14 Brent Berlin and Paul Kay, *Basic Color Terms*, p. 108.
- 15 W. H. R. Rivers, *Reports*, p. 49. Brent Berlin and Paul Kay, *Basic Color Terms*, p. 148.
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- 24 Special thanks to Rebecca Lemov for helping me see this.
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