15 The linguistics of "color"

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Introduction

Returning home from a recent field trip in Mexico, some ten pieces of my luggage were lost by the airline. I was directed to a service desk where I was asked to describe my luggage to the clerk. I was given a large plastic sheet with an array of some eighty to ninety different bags pictured, grouped as to type and each marked with a code number. Apparently the folk vocabulary of most passengers is not adequate to the task of describing luggage accurately, and this chart with its numbered items had been invented to circumvent the indeterminacy of ordinary language and facilitate precise characterizations.

The clerk prompted my entry into this memory-based matching task by asking me whether the bags were latched or zippered, large or small, etc. Not all the selections were obvious: sometimes I wanted to change the code number when I encountered a better match for one of my bags or understood better what alternatives the various groups represented; and some matches were never very satisfactory: for example, my son's French horn had to be matched with the number for a flute case. After I selected a number for each item, I had to describe the color of the bag. Unfortunately, the clerk did not pull out a Munsell array for this part of the task,[1] so he had to settle for my folk descriptions in this respect – but of course, he might well have, since Munsell first designed his color chart at the turn of the twentieth century for just such purposes, for accurate communication, in this case among artists, about colors, where the everyday language seemed wanting, inadequate for precise reference. It is ironic that this specialized device, first developed to circumvent or augment the natural semantics of everyday language, has become a central tool in the investigation of how our semantic systems operate. It is more odd still that it has become the standard by which we evaluate the semantics of other

languages. And it is slightly incredible that it has become the model for the general relationship between natural language and cognition.

Imagine someone trying to convince you that the chart of airline luggage types could profitably be used to study the semantics of nouns in English, even allowing us to find, for example, a set of "basic luggage terms," and could then be used to compare basic luggage terminologies across languages and establish the evolutionary emergence of "luggage terms," and, finally, that the patterns in such data could be explained by the physiological wiring for "luggage" perception characteristic of all humans, not to mention primates. Not to worry that some people do not even seem to have luggage terms at all, or that some systems seem to center on what the luggage is made of or how much it costs rather than on latches and zippers, or that luggage terms intermingle structurally with other terms for containers. The point is that these other people can somehow refer to the items we have pictured on our chart, and in so doing they have, *ipso facto*, "luggage terms" – although they may not all be "basic" ones to be sure, and some poor folks have clearly been struggling along for millennia with "flawed" or "defective" luggage nomenclature because they have not yet undergone sufficient "technological and cultural advancement."

But wait, you protest, color and luggage are entirely different orders of phenomena, one has to do with our physiology and the other with cultural implements. Well, I might agree, but I challenge you to defend that, or any other such contrast, from a *linguistic* point of view. In either case, you are not distinguishing on the basis of language form or function, but on the non-linguistic status of the domain of reference (whether biological or cultural). You are appealing to *the nature of the referents and not to language itself* for your diagnosis of difference. (This is analogous to confusing the physical nature of light with the psychophysiology of color perception.) It is not obvious that from a linguistic point of view the two domains – color and luggage – are different until you show this on linguistic grounds. Inversely, if color terms are in fact so different from other terms, then why should they be taken as a model either for linguistic semantics generally or for the general relations between language and thought?

All of which leads to the general topic I want to treat here, namely, that, in the study of so-called "color terms," serious linguistic analysis has been in short supply. Conceptual muddles abound with respect to

how linguistic categories are *characterized*, how they are *compared*, and how they are *linked to cognition*. Let us examine each of these points in turn.

The characterization of linguistic categories

Berlin and Kay's *Basic Color Terms* (1969: 1) was intended, in the first instance, to be a contribution to linguistic semantics, so let us begin by discussing how to characterize the semantics of linguistic categories. By *semantics* is meant the meaning that a linguistic category contributes to acts of reference and predication across contexts, that is, partialling out the idiosyncrasies of individual uses. Two factors contribute to the semantic meaning value of most linguistic categories. The first is the category's *characteristic referential range*, that is, its routine use to pick out or differentially signal certain referents across a wide range of contexts.[2] Languages differ widely in the referents they merge together and in the number and types of contrasts they recognize. The second factor is the category's *formal distributional potential*, that is, its position within the available categories in the language with which it contrasts and combines. Languages differ widely, if systematically, in how a given referential content is treated; what is a verb in one language may be a noun in another, what is obligatory in one language may be optional in another, and so forth. Patterns of characteristic reference and of formal distribution work together to give a form its semantic value. Research on semantic universals necessarily takes both into consideration. Yet *both* dimensions are routinely ignored in research on color terms which focuses primarily on denotational overlap across languages without any consideration of the typical use of the terms or of their formal status.[3]

Berlin and Kay's initial theory, building on earlier work by Lenneberg and others (Lucy 1992b: ch. 5), tried to develop a semantics of lexical items primarily in terms of their capacity to label certain referents. For example, the meaning of the term *red* was taken to be the specific colors the term referred to, especially the color judged to be the best example of the term. The ordinary everyday referential use of such terms as *red* was apparently never actually assessed systematically, nor was any attention given to their grammatical status in the language. Instead, an artificial stimulus array was

shown to informants and they were asked to label the items in it. This array consisted of a selection from a set of Munsell color samples which varied on hue, saturation, and brightness. As a representative of everyday contexts, the array was very restricted, both in its exclusive focus on color and in the kinds of colors presented (e.g. including no variation in luster, luminosity, or reflectance). In a sense, the stimulus array dictated in advance the possible meanings the terms could have since no other meanings were embodied in the samples. Although restricted in this way, the stimulus array was also very complex, and the labeling task performed with it forced informants to make referential microcomparisons and judgments of a sort rarely encountered in daily life. The task assumed that speech is about labeling accuracy rather than situational intelligibility – to use Havránek's (1964 [1932]) terms.

The particular semantic view that these terms primarily refer to color and the broader linguistic ideology that meaning is really about accurate denotation, both derive directly from the folk understandings of English speakers about how their language works. The hard lesson of linguistics, as with all other sciences, has been that folk views, however intuitively compelling, bear a very uncertain relationship to the full story. Yet nearly all subsequent research in this tradition preserves this restricted focus on the denotation of the three dimensions of color embodied in the Munsell array and of only those three dimensions.

Contrast this with Conklin's (1964 [1955]) approach in his well-known study of Hanunóo color categories. Let us look firstly at how he determined typical referential value. Conklin did use prepared artificial stimuli including painted cards and dyed fabrics; but he also recorded "the visual-quality attributes taken from descriptions of specific items of the natural and artificial surroundings" (1964 [1955]: 190). This made it possible for him to discover the typical referents of these terms without prejudging what they must mean. "This [procedure] resulted," he says, "in the collection of a profusion of attributive words of the nonformal . . . type" (ibid.), by which he means attributive words referring to all visual qualities other than the form or shape of the referent. The very profusion of terms as well as the inconsistencies and overlap in their use was daunting at first until he noticed that in certain

> *contrastive* situations this initial confusion and incongruity of informant's responses did not usually occur. In such situations, where the "nonformal" (i.e., not spatially organized) visible quality of one substance (plant part, dyed thread, or color card) was to be related to and contrasted with that of another, both of which were either at hand or well known, terminological agreement was reached with relative ease . . . Such a defined situation seemed to provide the frame necessary for establishing a known level of specification. (ibid.; location of first closing parenthesis corrected)

In other words, once the terms were put into actual use in a task other than that of labeling, their typical referential values became clear. We sometimes forget that words exist not simply to provide a list of labels for reality but rather to accomplish communicative work, in this case, distinguishing objects or conditions. It is to such cases of use that we must turn if we are to understand their semantics.

It was in this context that Conklin discovered that at the most general level of contrast, there was an underlying four-way classification of such visual stimuli in Hanunóo. He first glosses these four terms by their typical color reference as "black," "white," "red," and "light green," along with his estimates of focus and range, as shown in Table 15.1. Then he goes on to say, however: "this . . . classification appears to have certain correlates beyond what is usually considered the range of chromatic differentiation, and which are associated with nonlinguistic phenomena in the external environment" (1964 [1955]: 191). That is, the terms have other meaning values, meaning values which are not, despite assertions by others to the contrary, merely connotational colorings, but which have to do with other typical referential values. Conklin lists three such additional dimensions of meaning:

> First, there is the opposition between light and dark . . . Second there is an opposition between dryness or desiccation and wetness or freshness (succulence) in visible components of the natural environment which are reflected in the terms *rara'* ["red"] and *latuy* ["green"] respectively. This distinction is of particular significance in terms of plant life . . . A shiny, wet, brown-colored section of newly-cut bamboo is *malatuy* ["green"] (not *marara'* ["red"]). (ibid.)

Table 15.1 Conklin's (1964 [1955]) glosses of Hanunóo visual quality terms[a]

(ma) bi:ru	
color reference:	"relative darkness (of shade of color); blackness" (black)
focal point:	black
range:	black, violet, indigo, blue, dark green, dark gray, and deep shades of other colors and mixtures
other reference:	dark; deep, unfading, indelible
(ma)lagti'	
color reference:	"relative lightness (or tint of color); whiteness" (white)
focal point:	white
range:	white and very light tints of others colors and mixtures
other reference:	light; pale, weak, faded, or bleached
(ma)rara'	
color reference:	"relative presence of red; redness" (red)
focal point:	orange-red
range:	maroon, red, orange, yellow, and mixtures in which these qualities are seen to predominate
other reference:	dryness or desiccation; desiccated; deep, unfading, indelible
(ma)latuy	
color reference:	"relative presence of light greenness; greenness" (green)
focal point:	leaf-green
range:	light green and mixtures of green, yellow, and light brown
other reference:	wetness or freshness; raw; pale, weak, faded, or bleached

[a] "The four . . . terms occur as attributes [adjectives] with the prefix *ma-* 'exhibiting, having,' as indicated in parentheses, or as free words (abstracts)" (Conklin 1964 [1955]: 190).

Notice that if we restrict ourselves to "color" we cannot explain this pattern; and it is *not* a "mere" connotation of the term – it is direct reference pure and simple: "A third opposition . . . is that of deep, unfading, indelible, and hence often more desired material as against pale, weak, faded, bleached, or 'colorless' substance, a distinction contrasting *mabi:ru* ["black"] and *marara'* ["red"] with *malagti'* ["white"] and *malatuy* ["green"]" (ibid.). Conklin concludes by glossing the four terms as "lightness, darkness, wetness, and dryness" and by noting that "what appears to be color 'confusion' at first may result from an inadequate knowledge of the internal structure of a color system and from a failure to distinguish sharply between sensory reception on the one hand and perceptual categorization on the other" (1964 [1955]: 192).

What is crucial to recognize here is that an "adequate knowledge" of the system would never have been produced *by restricting the stimuli to color chips and the task to labeling*. Yet, to this day these remain the two key methodological strategies within the tradition stimulated by Berlin and Kay's work. Much has been made by those in this tradition of the important similarities between the results of their approach and those of Conklin: both reveal a small set of basic terms with colorific values. Yet, nowhere do they engage with the obvious fact that these are not color terms at all in our sense, and that they conflate non-colorific meanings as part of their core referential value.[4] When we get into a position such that we have to say for the Hanunóo that "light" really means "white," "wet" really means "green," and "dry" really means "red," there is something terribly wrong from a linguistic point of view.[5]

Let us look secondly at how the issue of structural position, the second contributor to the semantic value of each linguistic category, might be handled. In the case of lexical items, we want to know what constructions a term can enter into, since a part of its meaning lies in the contribution it makes to an utterance as a whole; and we want to know what other terms pattern in the same fashion, since the meaning of a term depends on what it is in contrast with. Berlin and Kay do not analyze the syntactic status of these terms – there is no mention, for example, of the fact that color terms tend to be included in one type of adjective class in English along with certain other kinds of adjectives, or that the various terms divide into subgroups as a function of their syntactic potential, or that they themselves can in turn

be modified in certain ways. Some of these issues do emerge in the criteria used for justifying the notion of basic term. Where the denotational net has caught too many fish, syntactic criteria such as morphological complexity, distributional potential, substitutability, and scope of modification are invoked to sort out the undesirables. That is, rather than being used as a discovery procedure for how the language works, formal analysis is employed only to justify what has, in the end, quite clearly been decided a priori on intuitive grounds.

Most subsequent work has followed the same general approach. However, in the Kay and McDaniel (1978) revision of the theory, the significance for the meaning of individual color terms of having different numbers of contrasting terms is discussed. Likewise, in MacLaury's (1992) proposed extensions of the theory, the significance of having different numbers and types of category alternates in a system is discussed. In both cases, however, morphosyntactic analysis plays virtually no substantive role in the discussion, the focus being entirely on the implications in the mapping task. Indeed, what little syntactic analysis there was in the Berlin and Kay approach has been even further reduced in subsequent work with some authors feeling substitutability relations of nonhyponymy suffice as a criterion of basicness, while others add unrestricted reference which is better cast as unrestricted combinatorial potential.[6] We do not see in this work an analysis of a language system, or even a formal subsystem within a language, in order to understand how that language structures reference in general, or the qualities of objects in particular, or even colorific information. Rather, we have the extraction of a set of individual lexical items from the grammar primarily on the basis of their capacity to refer to a fixed stimulus array, and then the reduction of that list in terms of the items' denotational potential and internal relations with one another.

Although Conklin, too, tends in this direction, focusing more on denotational value than on system value, he does at least begin by asking what the system-internal regularities are, and it is these regularities which define his set of four terms, not a set of criteria from outside the language. Further, in passing, he does tell us quite a bit about the terms, the kinds of modifiers they take, morphologically related forms, etc. He also discusses how secondary terms are created from the four basic terms which gives us insight into the native

semantics. Here he stresses again the importance of non-colorific information: "Much attention is paid to the texture of the surface referred to, the resulting degree and type of reflection (iridescent, sparkling, dull), and to admixture of other nonformal [= nonspatial] qualities. Frequently these noncolorimetric aspects are considered of primary importance, the more spectrally-definable qualities serving only as secondary attributes. In either case polymorphemic descriptions are common" (1964 [1955]: 191). In short, even though primarily reference-based, Conklin is at least sensitive to the contours of the specific system he is dealing with.

It might be instructive in this regard to look at the distribution potential for a few English adjectives for visual qualities, as shown in Table 15.2. As is immediately evident, the terms having some reference to color are a heterogeneous lot, both in terms of their similarity to other adjectives and in terms of their own internal subgrouping. These differences in potential both contribute to and arise from the meanings of the terms. In particular, what accounts for the absence of the *-en* forms in E through I or for the absence of the *-ing* forms in F and G? There is clearly some difference in lexical meaning here which prompts the differential treatment. It is also reasonable to ask, on syntactic grounds, why terms in the B group are not considered "color terms" and what rules out some of the terms in E and F. The point is not that these questions cannot be answered – several of them can – but rather that the entire approach to color terms has lacked any serious comprehensive analysis of the grammatical dimension of these forms. Important aspects of the meanings of these forms are lost, the generalizability of these findings for other domains of grammar and to grammatical theory (e.g. marking theory) remains unclear, and, perhaps most importantly, one of the key methodological strategies for penetrating the semantics of other languages has been abandoned.[7]

I want to stress here that nothing especially remarkable is being called for – far from it. For over a hundred years now the centrality of distributional analysis in linguistics has been a hallmark of the discipline. It is detailed empirical and theoretical attention to such structural patterns which distinguishes linguistic science from folk understandings of language. To repeat, meaning is not reducible to denotation but is also a function of and a determinant of structural

Table 15.2 Distribution of some English adjectives for nonspatial visible qualities

A	hard		harden	hardening	
	rough		roughen	roughening	
	bright		brighten	brightening	
B	light	lightish	lighten	lightening	
	dark	darkish	darken	darkening	
C	black	blackish	blacken	blackening	dark black
	white	whitish	whiten	whitening	light white
D	red	reddish	redden	reddening	dark/light red
E	yellow	yellowish		yellowing	dark/light yellow
	brown	brownish		browning	dark/light brown
	tan	tannish		tanning	dark/light tan
	grey	greyish		greying	dark/light grey
	green	greenish		greening[a]	dark/light green
	blue	bluish		bluing[a]	dark/light blue
F	pink	pinkish			dark/light pink
	orange	orangish[b]			dark/light orange
	purple	purplish			dark/light purple
	blond	blondish			dark/light blond
G	maroon				dark/light maroon
	silver				dark/light silver
	beige				dark/light beige
	aqua				dark/light aqua
	crimson				dark/light crimson
	scarlet				dark/light scarlet
	violet				dark/light violet
H	dry			drying	
	clear			clearing	
	glossy			glossing	
	shiny			shining	
I	pale	palish			
J	vivid				
	brilliant				
	luminous				
	ruddy				

[a] Unlike other items in this group, *greening* and *bluing* cannot be used as predicate adjectives (is *greening* or is *bluing*) but can be used in certain fixed expressions (e.g. *the greening of America, a bluing agent*).

[b] Often *orangey* in British English (Crawford 1982: 341).

position. Yet in this attempt to probe the semantics of language, attention to linguistic structure is virtually lacking. Individual lexical items are culled from informants and their referential values established by a fixed denotational task. It really does not matter what language the terms come from. Articles surveying terms in a dozen or more languages never mention anything about those languages, or even about the structural value of the terms.[8] *You do not need to know anything about languages or linguistics at all to read this literature or even to conduct research within the tradition.* This should give us pause since the tradition claims to be contributing to our understanding of the semantics of natural languages. You cannot generate a typology of "color systems" across languages without establishing that such systems actually exist as identifiable "systems" in those languages. A content-based collection of lexical items does not constitute a linguistic system.[9]

The comparison of linguistic categories

All these difficulties come to a head in the second topic, namely, the analysis and comparison of different languages, for it is in the study of systems other than our own that intuition is especially suspect and reliance on formal methods absolutely essential, whether we are working with the referential or the distributional aspects of semantics. The key element of these methods is that they must be capable of revealing the diversity of language categories even as we seek to generalize across systems. It is here that the restriction of reference to the denotation of stimuli meeting our own conception of color and the neglect of systematic grammatical comparison limit our understanding.

What is it we want to know? Well, if we are studying semantic systems, looking in particular for semantic universals, then we want to know how the world's languages structure reference. It is worth mentioning at this point that color is not central to the semantic organization of any language that I know of. Unlike agency, time, number, or other such categories, it is never grammaticalized, and it is still not even clear that it forms a well-defined lexical set in distributional terms in very many languages. It is certainly not an obvious choice as a means to understanding the semantics of natural language.

Nonetheless, if we choose to focus on color, for whatever reason, then we want to know how the world's languages structure reference to color stimuli in their semantic systems – and the key words here are *structure* and *system*. We assume that all languages can refer to visual stimuli such as the Munsell array insofar as they are perceptible to most human beings and any language has the capacity to refer to such human experience in some way. So our problem is not simply to describe the capacity of a language to refer to this array, but rather to describe either the existence of a system of color categories, one or more structural units within the language that can be identified as having for their referential content what we call color, or the characteristic incorporation of colorific information into categories of other types. However, I would submit, neither of these goals is achievable without an analysis of the structure of the language. If you do not look at the grammar of the language, you cannot establish either that color terms form a unified syntactic set or that colorific information is incorporated into other morphosyntactic sets in a regular way.

You may ask, though, are there no other routes? Can we not simply use the Berlin and Kay procedure, that is, show our stimuli, extract a list of expressions, and then sort them out to establish the existence of a set of color words using criteria such as hyponymy and range? After all, systematic lexicalization of color reference across languages would constitute a systematic fact. Well, yes, you can do this, and many people have – but then I can do the same thing with reference to "luggage" or any other domain, eliciting responses and then sorting them according to my inclination – and, indeed, there have been many such efforts reported in the ethnoscience literature. Without serious attention to the structural side of the interaction, anything goes.

Or, you might ask, what about the success of the approach? After all, as apologists for this tradition often note, it works! These color systems are there! Surely that is an interesting and important fact in its own right. Well, I agree that something is there, but exactly what? I would argue that *what is there is a view of the world's languages through the lens of our own category,* namely, a systematic sorting of each language's vocabulary by reference to how, and how well, it matches our own. This approach might well be called the radical universalist position since it not only seeks universals, but sets up a procedure which guar-

antees both their discovery and their form.[10] To critique this radical universalism, one need not embrace relativism, but only draw the line between adequate and inadequate methodology, between projecting our assumptions and challenging them. I myself believe that there are universal patterns to the semantic treatment of the phenomena we call color perception, but I believe they bear a very indirect relationship to the findings of the basic color term tradition.

To see how the universal result is guaranteed, let us look at the procedure in its most usual form. We begin by having informants describe the color samples. This is not always easy. As Conklin notes, "Color, in a western technical sense, is not a universal concept and in many languages such as Hanunóo there is no unitary terminological equivalent" (1964 [1955]: 189). Without such a term, how can we attribute "color" as a concept to a language? Well, it is true that informants can have a concept in their language without a verbal label for it also being present in the language; but if there is to be a *linguistic* category, if we are to attribute the concept to the semantic system *of the language*, then there must be *some* mark in the language. Otherwise we have a perceptual or cognitive category, but not a linguistic one. Without either a lexical or other structural mark for the existence of "color" as a unified concept in a language, it should not be attributed to the semantics of the language.

Conklin then goes on to describe his difficulties in eliciting terms.[11] He was forced to ask questions such as "How is it to look at?" and then when his informants responded he asked them to stop providing the sorts of terms he did not want, such as shape terms. Use of the Munsell chips effectively solves this problem by eliminating virtually every other possible dimension of contrast aside from those we consider to be color. Any term applied to these chips and discriminating among them is by definition about color and, on the other hand, anything having to do with color ought to be elicitable using these chips. I am going to grant the second claim for the moment, namely, that this array represents color even though other visual qualities which one might arguably include in the domain of color – such as texture, reflectance, luster, luminosity, and so forth – are not systematically varied in the instrument. To go into this would deflect us from the argument at hand.

Consider now the first claim that any piece of language applied to

these chips will be about color. Of course it may be a pretty complex piece of language and it might be about something else too, so we have to sift the terms by our criteria. That is, we have to decide which responses will count as basic color terms. What are the criteria? Well, we want forms like ours, lexemes which refer exclusively to color across many referents. If there is a complex construction referring to color and we recognize it as such, it is out. If there is a construction that also refers to something other than color and we recognize it as such, it is out. If there is a construction that refers to color only under some conditions and we recognize it as such, it is out. Granted, much of the time these criteria are grossly misapplied, but in aggregate, over many cases, they sharply delimit which of the speaker's responses count.

There are some sad ironies here. The actual grammar of the language being examined plays almost no role in the analysis, yet our own grammatical pattern is applied as the standard for identifying appropriate color forms.[12] The actual range of reference of the forms plays no role in the analysis, only its coverage of the denotational range characteristic of our forms. The local pattern of use of the forms is irrelevant, the only relevant usage being the application of the terms in the denotational naming task. Not surprisingly, this procedure cannot tell us how these other languages handle reference in general or even color reference in particular; it can only tell us how closely they approximate our own technique of color reference.

Wait, though, you say, look how few types of systems actually emerge out of the thousands of logical possibilities! There is structure in these data! Doesn't this show that something is really going on here? Well, to be sure there is some regularity here, but it is doubtful that it is simply due to the nature of color reference in language. The original calculations about logically possible systems were made at a point in the development of the theory when the focus was associated with specific chips; in this situation it made some sense to calculate the logical possibilities because one could know with some confidence when you had a system of a certain type: simply look at the focus. The fact is, however, that foci do not reliably align with unique chips or even with unique hues. Indeed, there are probably very few hues that have not been picked by informants in one language or another as the focus for some category (cf. charts in MacLaury 1992).

The category criteria now hinge on how the array is divided. So when a category is identified now, it is really the investigator who decides which "color" (or "composite color"[13]) it will count as. What are the odds that an investigator would ever report a system with terms corresponding to dark, white, purple, and brown? My suspicion is that it would be coded either as a two-term system of dark/cool versus light/warm with two other non-basic terms, or perhaps as a four-term system of black, white, red, and yellow. Either way, purple and brown simply will not emerge. Indeed, there is no objective way to prove that that is what they "really" are. (Notice that you cannot appeal to psychophysiology to assign these labels if you are trying to show, as a finding, that they match the psychophysiology.) So this "logical possibility" does not stand much of a chance; nor do most of the others. The point again is that what appears to be objective – in this case, a statement of statistical odds – is based on assumptions which are no longer tenable and is, as a consequence, vulnerable in application to a highly interpretive methodology readily skewed towards the theoretical expectations derived from our own language.[14]

No matter how much we pretend that this procedure is neutral or objective, it is not. The procedure strictly limits each speaker by rigidly defining what will be labeled, which labels will count, and how they will be interpreted. To use a political metaphor, it is as if one political party were entitled to dictate what you would vote on, to count the votes, and to report what the results meant. Is it any wonder that the party's candidate would win by a landslide validating a preset mandate? Is it any wonder, really, that all the world's languages look remarkably similar in their treatment of color and that our system represents the *telos* of evolution? What actually *is* astounding is that so much variability still shows up. Perhaps it is worth pointing out, finally, if it is not already obvious, that increased sample size will never address these methodological problems. The assertion that the procedure has worked for literally hundreds of languages counts for nothing if it is fundamentally flawed in the first place. The color chart may be a good tool for improving precision in communications in the worlds of art and commerce, but it is a poor tool for investigating natural language semantics.

Let us look at how a couple of examples would fare with this procedure. Suppose we applied it to Hanunóo speakers. Presumably, when

shown Munsell chips, Hanunóo speakers would use the terms presented in Table 15.1 because colorific information is part of their referential potential. I seriously doubt, however, that the other meanings that Conklin first turned up in the course of analyzing descriptions of plants would have ever been discovered. The system would be characterized as a four-term system. If these other meanings did turn up, by rights the system should be recast as a two-term system. Either way, the interaction of "dryness" and "wetness" with color would count for nothing. If this sort of pattern should be a fairly common semantic pattern across languages – as it in fact is – you would never discover it by this procedure.

The point here is not that Hanunóo is an exotic exception to the basic color term thesis or that the peculiarities of this language are in themselves important. Rather, the claim is that a whole level of analysis is missing from the basic color term tradition, namely, no attention whatsoever is paid to what the various terms actually mean in the sense of what they typically refer to, their characteristic referential range. Yet somehow a tradition that ignores these issues is supposed to provide a way of discovering semantic universals.[15]

Let us take a second example. In an early study of color terms in the Zuni language, Lenneberg and Roberts (1956: 24) claimed that Zuni speakers do not differentiate the colors[16] "orange" and "yellow" but define a common lexical category *lhupz/inna*[17] referring to the two. Let us consider the Zuni case more closely. The Zuni terms used to refer to colors seem to differ from ours more than in the ways just indicated, that is, in their general cultural and linguistic-systemic values as well. Linguist Stanley Newman (1954: 87–88) provided the following information concerning Zuni terms referring to the "color 'yellow'":

> Zuni has two lexemes expressing the literal notion of the color "yellow." Lexeme A would be used in contexts such as "yellow shirt, yellow paint." Lexeme B is employed in combinations such as "yellow skin, yellow leaves." The difference is not one of hue. Rather, lexeme A covers many shades of yellow characterizing an object, while lexeme B refers only to an object that has become yellow (or a related hue, which might be translated by English "pale" or "rusty") as a result of ripening or aging ... [S]uch a distinction ... suggest[s] that an investigation of color terms must recognize that such terms may

express discriminations other than those involved in the color spectrum.

The semantic range of lexeme B, in various morphological combinations, indicates the manner in which certain concepts are linked in terms of Zuni cultural associations. In its singular form lexeme B refers to any ripened or aged yellow object. In the plural it is specialized to refer to pollen or corn meal, a culturally important linkage for other related meanings of this lexeme. When it is preposed to an element meaning "stretching across," it forms the prayer term for "road" and, by extension, "the road of life." Reference here is to the ceremonial sprinkling of corn meal to form a path, symbolizing the sacred road.

In a comparison of the morphological status of the various Zuni terms referring to color, Hickerson (1975) reached a similar, although more general, conclusion about Zuni terminology, namely, that there were two basic kinds of terms with color reference, broad abstract terms deriving from verbs and specific terms deriving from substantives (nouns and particles). She says: "The verbs [referring to color] deal, ultimately, with processes of change or 'becoming'; most of the actual forms indicate an apprehended verbal state. Nouns and particles refer to intrinsic color, specific to a substance or object, and are unchanging. In other words, these two types of terms – verbals and substantives – seem to reflect two basically different types of experience" (Hickerson 1975: 328). Thus, the cultural and systemic meanings of the Zuni terms differ substantially from our own; to the denotational differences noted by Lenneberg and Roberts we must add other features such as a cultural concern with the origin of the color and various specific cultural associations. More generally, even where there is some denotational overlap with our own categories, it need not mean that the meaning value of the category in cultural and systemic terms is similar to our own or even that all the items grouped together as color terms are of the same grammatical type. Where we have adjectival primitives, the Zuni have derived verbal and nominal forms which overlap in denotation but not in overall sense. Where we have static qualities, the Zuni attend to the cause of the color. Focusing on the denotational overlap in the Munsell array misses this aspect of meaning altogether.

Again, the point here is not that the Zuni language is an exotic exception to the Berlin and Kay thesis[18] or that there are some interesting side details to be found in close case studies. Rather, the example reveals how a whole level of analysis is missing from the project, namely, attention to the structural or distributional place color terms occupy in a language. Dixon (1982) in a paper entitled "Where have all the adjectives gone?" surveys how the seven concepts encoded as adjectives in English (e.g. dimension, age, color) are treated in other languages. In the case of color concepts (in particular, black, white, and red), he found that they can be treated as verbs, as verbal classifiers, as nouns, as adjectives, as derived adjectives, as noun-specific adjunctives, or as free particles. Although color concepts tend to be treated as adjectives when a language has such a category, this is by no means universal either. Further, not all the relevant forms need fall within the same formal category within a language. As should be clear from the Zuni case, such grammatical properties have implications for the meanings of these terms. A serious attempt to extract semantic universals would begin with this array of language types and build on it, not ignore it.

If I may generalize here: what disturbs me the most is that nobody has been the least bit interested in all the data which have been discarded. What are the dimensions of visual experience that speakers of different languages tend to choose – and how do they relate to the overall organization of their grammar? What are the elements of meaning that are routinely bound with colorific meaning? What are the kinds of complex constructions that typically occur in reference to color? All of these constitute valid materials for constructing a view of the treatment of color in language. All of them should be of interest. The fact that they are not suggests that the investigators are not, in the last analysis, actually interested in the comparative semantics of languages and what generalities might be formed, but in something else.

The relation of language and thought

This brings us then to the third and final issue, the relation of language and thought. Since the very first, Berlin and Kay have connected their research with the Whorfian hypothesis, the proposal that the

language we speak affects the way we think. Color was regarded by many as a perceptual continuum, and since the 1950s Eric Lenneberg, an American psycholinguist, had been using and promoting the color domain to test Whorf's thesis (Lucy 1992b: ch. 5). Berlin and Kay saw in the phenomenon of basic color terms counterevidence to Whorf's proposal and, indeed, evidence for the reverse, namely that the way we think (or at least perceive) affects, perhaps even determines, the form of our language. The desire to sustain this claim, rather than the impartial investigation of the semantics of natural languages, has been the driving force behind the research on color terms. Now there is nothing wrong in principle with trying to explore such a possibility; but I have argued elsewhere at great length (Lucy 1992b: ch. 5) that Lenneberg's whole approach was methodologically misguided from the outset and that it made something like the Berlin and Kay project and findings inevitable.[19] The universalist conclusions are built into the methodology and conceptualization of language employed in this research. Without repeating the details of the entire argument here, let me sketch the opposition at the heart of it.

If you begin convinced that you know what reality is and you go to see how languages "map" it, you will find, inevitably, that they map *the very same reality*. Why? Because the research procedure essentially *presupposes this common reality at every interpretive juncture*. This radical realism yields a *radical universalism*, because the universal finding is packed into the assumptions; it is definitional. This has really been the unifying theme of my criticism of the use of the Munsell array here. It does not really even matter whether the researchers involved are open-minded and consciously willing to recognize relativism as a possible outcome – because the universalist conclusion is guaranteed by their methodological assumptions. The languages being studied don't stand a chance.

On the other hand, if you begin convinced that you do not (or can not) know what reality is and you go to see how languages "construct" it, you will find, inevitably, that they construct *very different realities*. Why? Because the research procedure essentially *presupposes that every formal fact corresponds to a difference in reality*. Unrestrained, this radical formalism yields a *radical relativism*, because the relativity is packed into the assumptions; again, it is definitional. I happen not to believe that Whorf took this position, but that is immaterial to the present

contrast because I know for certain that some of the critics of color tradition can rightly be called radical relativists. Again, their open-mindedness is of little consequence since their methodological assumptions will always preclude the essentialization necessary for comparison and generalization. One might say that, with them, reality does not stand a chance.[20]

The Asilomar conference was convened in the belief that we are close to a breakthrough in this impasse, that somehow research on color perception will show us a way out of this dilemma. What I want to emphasize in closing is that psychology and neuroscience really cannot resolve this opposition existing at the linguistic and cultural level. Our own culture's scientific goals of specifying what reality really is and what underlies our psychophysical experience of it are beside the point. The radical universalists might become more convinced that their reality is really real and writ into their physiology, but they never needed convincing in the first place; and knowing more about it will not in itself establish that the semantics of languages directly follow the same contours. Meanwhile, the radical relativists will continue to point to the facts of language difference as the irreducible primary fact (somehow more easily knowable than other forms of reality) and will, indeed, remain highly suspicious that the physical and psychophysical concern with color is, in the last analysis, itself an outgrowth of our own language.

I have spent the last ten years working out theory and methodology to address this opposition both conceptually and empirically.[21] I will not describe this research here except to say that it focuses on what I take to be the real linguistic relativity question, namely, whether the obvious differences we see across languages actually do affect thought; and it investigates the question empirically by examining the substantive domain of grammatical number which is of central structural importance in many languages. This is in contrast with the color-term tradition which focuses on whether visual neurophysiology has any effect on those lexical items referring to visual appearance, lexical items which are, in any event, of marginal structural significance everywhere.

I want to close by sketching a route out of this impasse – at least for the linguistic part of the analysis. Conceptually, we must avoid conflating cognitive and linguistic categories. It is misguided for the

cognitive scientist to imagine that there is some innate physical or functional system for every lexical item in English. The fact that we have a word such as *color* or *brown* in English by no means establishes that it is a unified phenomenon at the biological level any more than it does for words such as *luggage* or *suitcase*. The lexicon of our language is not a sure guide to neurophysiology. The history of science has been marked by repeated efforts to evaluate critically rather than merely accept folk wisdom of just this sort. On the other hand, the fact that a physical, biological, or psychological "category" exists by no means implies that languages have to incorporate it into their *structures* either as a piece or, for that matter, at all. Language structures are built to serve human communicative needs and they will formally encode those aspects of experience which are maximally useful for communication and ignore those of little utility.

Methodologically, I recommend balancing the emphasis on form and substance (language and reality) in establishing the semantic system of a language. When working with a foreign language, we are better off first doing the formal analysis to as fine a level as is practical and then, and only then, applying the notional interpretations to those categories. These notional categories should be derived from a full investigation of the typical range of use (or functioning) of the forms. The formal–functional linkages emerging from this analysis (as well as characteristic arrangements of them) then provide the cases over which we form our generalizations. In this way we are forced to take account of both substantive usage and formal distributional facts when we make our comparisons and "translate." Although detailed studies of individual languages in their full complexity have value in their own right, this is not the particular point being advanced here; rather, what is being advocated is that the cases we use to form our generalizations about language universals be real cases with solid data on both characteristic referential range and structural distributional factors. Any approach which characterizes the domain in advance of analysis on the basis of the forms and referents from another language risks distorting the actual situation.

In the present case, based on what we already know, significant generalizations about the linguistics of "color" will be intimately tied up with such factors as whether or not a language has a formal class of adjectives; whether and how it encodes surface appearances; what

animal, plant, or mineral[22] products are of local significance; the relative social importance of inferrable stages of ripeness, rawness, or decay; as well as various metaphoric regularities (e.g. Derrig 1978), etc. Within the context of such an analysis, one can then ask in light of wide-ranging exploration of actual usage whether any of the word classes seem to involve color meanings or whether such meanings distribute across classes or join with other concepts in regular ways. The results of such analyses form the basis for comparative generalizations across languages with regard to how colorific information is incorporated into linguistic systems in regular ways and, if we wish, to what extent "pure" systems of our type exist elsewhere. Such an approach should also provide an important counter-weight to premature judgments about "deficient" color systems, or evolutionarily "primitive" ones. If modern linguistics has shown anything, it is that apparent deficiency in one aspect of a referential system is reliably compensated for by relative elaboration somewhere else in the system. Figuring out these systematic interactions should be the real aim of research and theory and not some rank ordering by external criteria of individual subsystems in isolation.

To conclude, just as we now recognize that color is not "out there" in the light but in our perceptual interpretation of light, it is time to recognize that the communicatively relevant encodings of visual experience do not lie "in there" in the biology but out in socially anchored linguistic systems. It is time we reclaimed our lost linguistic luggage and started describing these linguistic systems in their full complexity. Then, and only then, can we actually address the issue of what regularities there are across languages and how they relate to thought.

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Notes

1 I have since noticed that airport luggage charts usually do have a set of named color patches across the top.

2 Wierzbicka (1990) also criticizes equating the meaning of a color term with the perceptual qualities of a color chip. She proposes explaining cross-linguistic regularities in color term meaning by reference to the sequential encoding of widely recurrent salient experiences. Her approach, however, is intuitional and anecdotal: she provides no procedure for establishing the existence or specific meanings of color terms in a language.

3 The restricted focus on denotational overlap is not confined to the color research tradition. A companion paper (Lucy 1994) develops more fully the argument about the contribution of distributional potential to the meaning of forms by looking at research on the semantics of "space."

4 This criticism about other conceptual material being bound with color has been on the table for over two decades now (see Hickerson 1971, Conklin 1973) but has never been satisfactorily addressed. See also the discussion in Saunders (1992a: 52–53).

5 In a discussion of the "translation" of other languages by means of the Munsell array in the World Color Survey, Saunders points out similarly disconcerting equations: "when a Yupik (Alaska) speaker is claimed to use the black term for yellow, or a Yucuna (Peru) speaker focuses purple in green, or a Bhili (India) speaker focuses green on a pink chip called 'red', all connection between the utterance in the 'experiment' and the originating language is lost" (1992b: 21).

6 For critiques of the original criteria, see Crawford (1982), who calls for ignoring distributional potential, and Wescott (1970), who calls for a finer analysis of it. Of course, changing the criteria amounts to changing the definition of "basic color term." For related discussions concerned with how to reconcile varying kinds of "basicness" see Harkness (1973), Schaefer (1983), and Wierzbicka (1990). In a comparison of various measures for identifying and ranking basic color terms in several European languages, Corbett and Davies (this volume) examine derivational potential as one measure; but they assume basic color terms exist and are only interested in measures to sort them efficiently (into primary and secondary, basic and non-basic), not in whether the concept of "basicness" itself is coherent. They are not interested in the semantic implications of the derivational patterns themselves nor in the theoretical significance of using the various competing measures.

7 For an unusually thorough examination of the morphosyntactic status of color terms see Schaefer (1983). The analysis recognizes and attempts to account for two distinct strata of color terms as well as some special anomalous forms. Kuschel and Monberg (1974: 217) likewise distinguish a stratum of "contextualised color terms, that is terms which are invariably linked to specific natural and cultural objects and which cannot be used in an indiscriminable [*sic*] or abstract way." Cf. note 6.

8 In discussion Paul Kay argued that some color researchers are knowledgeable about the languages they study. Some surely are. Many more, however, make use of the most naive of translation procedures without any systematic investigation of the language; and for those few who do undertake deeper investigation, such knowledge is rendered irrelevant by the method which makes the Munsell array the translation device. Cf. Quine (1990).

9 A number of discussers attempted to dismiss this critique as a call for case studies rather than "group study," but this misunderstands the point. The claim is that generalization must be across *actual* cases – real systems – not illusory ones generated by the research procedure. Generalization is the goal, but any generalization is only as good as the cases on which it is built.

10 Some discussants noted that the relativist climate within anthropology in the 1960s made the apparent discovery of a universal unexpected and impressive. In this sense, the universalist position was certainly not consciously "packed in." However, as the argument here indicates, the universalist conclusion is nonetheless built into the methodology and the conceptualization of language used in the research (Lucy 1992b: ch. 5). Moreover, the subsequent uncritical acceptance of this research stemmed in part from its "good fit" with the dominant universalist trend in linguistics during that same decade as signaled, for example, by the Jakobson and Halle (1956) statement of phonological universals, the ascendency of the Chomskian paradigm (Chomsky 1957, 1965) arguing for universal syntax, the emergence of Lenneberg's (1967) biologically based paradigm within psycholinguistics, and the publication of Greenberg's (1963) work on typological universals. Similar universalist trends prevailed in cognitive psychology. In this general universalist climate, devastating criticisms fell on deaf ears.

11 Kuschel and Monberg (1974) also describe in detail their difficulties with the general notion of color in

Bellona (Polynesia) and in getting informants to see any relationship between the small chips and colors in their natural environment. They suggest that the whole focus on "color" is ethnocentric. Saunders (1992a) makes much the same point about Kwakiutl.

12 Grammar enters into two of the main criteria: basic color terms must not be compounds (i.e., not morphologically complex) and their meaning must not be included within that of another (i.e., the distribution of one term must not be subsumed by another). These criteria, rather than local ones, become the filters through which the forms in other languages must pass. One of the subsidiary criteria also has to do with distributional features, but it is rarely ever invoked; see references in notes 6 and 7.

13 The more recent formulations of Kay and McDaniel (1978) and Kay, Berlin, and Merrifield (1991) concentrate their attention on how many of the sixty-three logical combinations of basic color categories have been empirically observed – especially in systems with fewer than six terms. The criticisms discussed in the text remain applicable although they are more difficult to illustrate because they are at a higher level of abstraction: they represent not the direct projection of our categories, but the projection of combinations of them. (Ironically, one critic of this approach, Wierzbicka [1990], makes use of the same sort of projection.) Composite categories joining yellow with blue, red with green, blue with black, etc., still seem difficult to reconcile with the supposed neurophysiological source of these categories (cf. McNeill 1972: 30–31; MacLaury 1991).

14 Note that this argument is quite independent of the facts that the total number of theoretically acceptable systems has grown quite large, that some researchers now recognize multiple systems within a single language, and that there are many data that do not fit well into any of the available models (see Kay, Berlin, and Merrifield 1991; MacLaury 1992; Saunders 1992a, 1992b).

15 We can encounter similar problems closer to home. In a detailed study of the terms *brun* "brown" and *marron* "brown" in Modern Standard French, Forbes (1979) argues that both terms meet the standard criteria of being monolexemic, not being hyponyms of the other, occurring early in elicited lists, and not being restricted to a narrow class of objects. They also share similar composite denotational ranges on the color chart with *marron*'s range encompassing *brun*'s. The focus for *marron* lies within the original Berlin and Kay cluster for BROWN whereas *brun* lies outside it – which might suggest that *marron* is the "more basic" term. On the other hand, *marron* is about one tenth as frequent in text counts (contemporary oral use may be much higher; cf. discussion of Morgan's work in Corbett and Davies [this volume]), is different from other color terms in derivational and inflectional potential, and is still recognizably related to a fruit name. It is clearly the newcomer to the "basic" color lexicon of French. Although both terms have a wide referential range, Forbes finds that there is a preference for using *brun* to refer to physical types of person, to hair, and to skin, with *marron* relatively infrequent in such uses. This fact can arguably be considered part of the meaning of the term *brun*. This contrast is reminiscent of categories in many languages in which humans and other mammals (especially large ones) are singled out for distinctive linguistic treatment. (Compare, for example, English where there are color terms largely restricted to humans and large mammals [e.g. *blond*, *palomino*]. The same referents also take gender variants [e.g. *woman*, *bull*] and special collective terms [e.g. *people*, *cattle*] in English.) In short, while both French terms clearly meet the criteria of basic color terms and cover a similar range of color chips, they are different in their meanings when we consider their actual range of use. The color chart procedure does not, indeed cannot, capture such meaning differences because it rules them out of court as not relevant to how humans conceptualize color in language.

In the case of some African languages such as Mursi "there are no colour terms which are not also cattle-colour terms" (Turton 1980: 322), so that the entire labeling of an array of color samples is on analogy with these colors:

> the fact that cattle-colour terms are exhaustive of the colour lexicon argues for a strong cultural influence on colour naming. On one of the rare occasions when an informant had difficulty deciding what colour term to apply to a particular stimulus card he muttered "There's no such beast"... That this informant chose this way to express his frustration is significant, for it shows that, in a sense, he was thinking of the cards not as representative examples of abstract colour categories, but as cattle, and he was thinking of them as cattle precisely because he was being asked to pay attention to them, and to classify them, solely in terms of colour. For the Mursi then, distinguishing between colours as such, any colours whatsoever, is analogous to distinguishing between the limited number of colours which naturally occur in their cattle. (ibid.)

Here is an efficient system for solving the referential problem of naming color samples, one long known to

be characteristic of a range of African languages (Woodworth 1910: 329; Turton 1980: 333, 335 n. 3; Schaefer 1983: 174–175, 184 n. 6). Quite naturally, the system distinguishes with considerable delicacy in the red–brown–pink range of colors but more crudely in the green–blue range – not because of relative position in some evolutionary sequence but because of the very nature of the model on which the relevant terms are based. Such systems fusing reference to color sensation with socially significant objects are not confined to Hanunóo, or French, or English, or Mursi – they are a world-wide pattern which should figure centrally in any linguistically oriented description of color reference. Finally, even where a set of Western-style color terms are in use, we can expect there to be domain-specific variation in their salience in application (cf. Bolton 1978).

16 Hickerson (1975) reports that there appears to be no general term for "color" in Zuni. Lenneberg and Roberts give no indication of how the Zuni were asked to list their color terms and name the color samples.

17 Lenneberg and Roberts use a solidus (/) to indicate a glottal stop in Zuni.

18 Indeed the Zuni case is far from unusual. Kuschel and Monberg (1974: esp. 224–225, 230) report similar semantic linkages between a color and the factors precipitating that color. In the case of Samoan, Snow (1971) reports that there are two terms for green, one restricted to animate entities and the other to inanimate entities. This difference in meaning would be impossible to handle within the basic color term model and the term restricted to animates would not even be readily elicited using color chips. Notice that the problem in these cases is the inverse of the Mursi one discussed in note 15.

19 Not to mention that proposals of various sorts for the evolutionary development of color vocabularies have also long been part of the Western tradition (see Woodworth 1910).

20 Everybody seems to be against the simple relativist–universalist opposition these days – but not in quite the same ways. Kay, Berlin, and Merrifield (1991: 13) see biology providing the basic frame and culture accounting for the local, historical residual ("in particular times and places"). Sahlins (1976) forwards a variant of the same scheme in which he accepts the universality of color terms but regards them as input for a higher level of cultural symbolism – thus giving culture a greater, more autonomous role in manipulating the biological "givens." Turton (1980: 334) questions Sahlins's easy acceptance of the universality of terms, but himself accepts that the culturally anchored systems are used to "stand for the differences between universally recognized categories of colour and pattern." Wierzbicka (1990: 140–142) continues in this vein, but for her the universally recognized categories are cultural artefacts anchored in "universals of human experience" rather than direct products of neurophysiology. Finally, Saunders (1992a, 1992b) questions the universality of the human experience of "color" and sees the opposition between relativism and universalism as itself a product of shared underlying "empiricist" assumptions – especially those centering on a clear contrast of form and content (or scheme and reality) (cf. Lucy 1985). The argument presented here accepts many of these points but differs by proposing a procedure for analyzing and comparing systems by identifying formal–functional regularities across languages; that is, it makes identifying the actual range and degree of linguistic difference the first research problem within a concern for typology and explanation.

21 For the general position see Lucy (1992b; 1996); for empirical work on number, see Lucy (1992a); for work exploring whether color-term systems affect thought see Lucy and Shweder (1979) and Lucy (1981).

22 Navaho bases color reference on local minerals (McNeill 1972).

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