

# Continuing Commentary

Commentary on **B. A. C. Saunders and J. van Brakel (1997). Are there nontrivial constraints on colour categorization? BBS 20:167–228.**

**Abstract of the original article:** In this target article the following hypotheses are discussed: (1) Colour is autonomous: a perceptuolinguistic and behavioural universal. (2) It is completely described by three independent attributes: hue, brightness, and saturation. (3) Phenomenologically and psychophysically there are four unique hues: red, green, blue, and yellow. (4) The unique hues are underpinned by two opponent psychophysical and/or neuronal channels: red/green, blue/yellow. The relevant literature is reviewed. We conclude: (i) Psychophysics and neurophysiology fail to set nontrivial constraints on colour categorization. (ii) Linguistic evidence provides no grounds for the universality of basic colour categories. (iii) Neither the opponent hues red/green, blue/yellow nor hue, brightness, and saturation are intrinsic to a universal concept of colour. (iv) Colour is not autonomous.

## Grammars rule O.K.

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**Abstract:** Colours are not the sorts of thing that are amendable to traditional forms of scientific explanation. To think otherwise is to mistake their ontology and ignore their normativity. The acquisition and use of colour categories is constrained by the logic of colour grammars.

We have lived too long with what J. J. Gibson (1968) has called “one of the worst muddles in the history of science,” the meaning of the term “colour.” As Saunders and van Brakel (1997) (S&vB) point out in their welcome critique of the current orthodoxy concerning colour categorisation, our cheerful insouciance on this matter is an invitation to circular reasoning (sect. 2.2, para. 8). The received view, the authors show, though supposedly uniting diverse fields, does not have the sound evidential support that it should within these fields. By publicising the local disagreements that exist, S&vB invite us to examine the assumptions that lie beneath this view. Witness their culminating reminder of “the normative dimension of colour research and of the deep problems of colour ontology” (sect. 7, para. 3). My commentary is a contribution to this further task.

**Ontology.** What is colour? There is a fundamental distinction to be drawn and maintained between categorical colours and the colouredness of coloured things, between something having a colour of a definite kind (as opposed to some other kind) and its merely being coloured (as opposed to being colourless). The former implicates knowledge, the vehicle for which is language. The latter is a visible property of things closely related to other such properties such as shape, size, and texture. We attribute colours to objects according to a conceptual scheme we acquire in the course of learning a vocabulary and grammar of colour. We discriminate things in sight with the help of differences in their colouredness, and, whereas discrimination is something that *happens* under appropriate viewing conditions, categorising is something we *do*. What colour perception cognises is therefore quite distinct from what colour vision discriminates.

The received view fails to mark this distinction and in consequence tries to explain colours in terms appropriate to the study of coloured things, that is, in terms devised for the description and explanation of an independently existing reality, one independent of *our* lives. In so doing, it adopts the terminology of physics, psychophysics, and neurophysiology. Proponents of this view have succumbed to the temptation to assume that the ways we have of identifying colours are made necessary by objective properties of

colour, which they construe either as physical properties of things “out there” in the world or as properties of our sensings “in here,” in our heads. That is, they assume that the external supports on which colour categorisation rests must somehow be pulled into the act of identification itself and made to function inside it. Instead of being left outside where they belong, and treated holistically as they should be, they are incorporated within the system, where they create that familiar mythology of displaced devices. Such ontological confusion is rife in colour research.

**Normativity.** Attempts to explain colour categories strictly in terms of natural science fail for the reason that there is an inescapable and irreducible normative dimension to colours. Colours permeate our lives; they enable us to do things, and those who have concepts different from ours see colours differently. The knowledge each of us brings to bear when we categorise colours is the result of the training we receive in the uses of colour language. It is manifest in our participation in the customary practice of identifying colours, with reference to public samples and in accordance with the grammar of our language. The grammar of colour is antecedent to all theories of colour, and is presupposed by them. However, grammar does not – cannot – tell us anything about the physical nature of coloured things or how these are causally discriminated in sight. This is the province of natural science. Conversely, the knowledge that informs identification when we categorise a colour is not accessible to traditional methods of scientific investigation. Only an analysis of the logic of colour concepts can do this. Although categorisation *relies* upon our natural tendencies to respond to coloured things in certain ways, it does not *reduce* to these tendencies, nor to their physiological bases. Visual processes and their associated neurologies merely allow identification. Thus the link between the neural representation of colour (=colouredness) and the linguistic representation of colours can only be indirect, and the way to explore it is by bringing together conceptual and empirical investigations. No more, no less; no phenomenology, no reductive materialism.

Our concept of colour is the creation of language under the influence of culture (Gage 1993; Lyons 1995). Hence, if we are to refer to colours as such, we must have at our disposal a language with a colour vocabulary. The matter of what is and what is not a colour word, however, is not a straightforward one. Not all cultures acknowledge colour categories. Unlike Western cultures, whose languages have profuse colour-referring terminologies, the historical product of developments in art and craft, as well as in philosophy and in science, many non-Western cultures have languages that refer to colours and to colour only sparingly, if at all (Lyons 1995; see also Gellatly 1995). In these cultures the category of colour may be indistinguishably mixed up with other ex-

periential categories, for example, what *we* would separately call texture, luminosity, freshness, and so on (see, e.g., Conklin 1955). Or, if they have no concept of colour, and lack names for colours as such, they may have words that they use to describe the appearance of things in terms of what *we* would designate as colour. There is, therefore, no “natural” way of classifying colours, no cross-cultural support for a separate domain of “pure” colours onto which different languages are mapped. Colours, as *we* know them, are not universals of human perceptual experience.

**The natural and the normative.** Physical nature and human nature are part of the framework in which we categorise colours. How the world is and how we are constituted as sentient beings are preconditions for identification. However, it is the language we speak that limits our understanding and, in turn, the knowledge we bring to bear when we categorise. Rather than having their meanings imposed by the constraints of nature, colour words take on such constraints insofar as these can be put to use for social and communicative purposes, that is, insofar as they are meaningful. This inverts the assumed priority of things. The received (Platonistic) view takes colour categorisation to be the outcome of attaching labels to an ordered set of focal colours that are naturally salient to our visual system, then generalising to similar instances. However, although aspects of our conceptual scheme depend upon our neurobiology, the former cannot be elucidated in neural terms. The criteria for explaining the colours of our scheme are logically distinct from the physiology of the enabling system. Practical purposes establish pertinences. For example, although our colour sense enables us to distinguish blues from greens, it is only if we have a use for this distinction, only if it serves a communicative purpose, that we make it meaningful. Those colours that are important for us are selectively and differentially attended to by our culture. Thus we distinguish blues from greens, whereas other cultures, for whom this distinction is not important, see these as the same colour, as belonging to the same category. Colour, though visually salient, is not conceptually salient until cultural development makes it so through the acknowledgment of colours. It is the need for any conceptual scheme for colours to be socially accessible that explains the biological correlates and cultural regularities of such schemes.

Nontrivial constraints on colour categorisation must exist if we are to explain why people within a culture talk about and communicate by means of colour. However, such constraints are to be found in the logic of particular colour grammars.

## Colour word usage within languages follows the Berlin and Kay ordering

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**Abstract:** Colour word usage *within languages* follows the same ordering as that proposed by Berlin and Kay *between languages*. This provides additional validation and support for Berlin and Kay’s schema.

In a recent commentary (McManus 1997a) on the target article by Saunders and van Brakel (1997t) (S&vB). I tried to make the substantive point that the Berlin and Kay (1969) ordering of colour words *between languages* is in part validated by the appearance of the same ordering on the usage of words *within languages*, citing studies of my own (McManus 1983; 1997b) and others (Hays et al. 1972) on a range of languages, including Chinese. In addition I made some minor comments, as did others, about an “appearance of sloppiness” (S&vB’s original phrase) in their own work.

In their reply Saunders & van Brakel (1997r) chose to ignore the question of variation within languages due to “marginality” (their Table R2). Instead, under the heading of “Sloppiness” they claimed that:

McManus indicates that he has reported data on the frequency of colour words in Chinese poetry, which would lend support to Berlin and Kay’s (1969) order of evolutionary antiquity. Table 1 and Figure 1 of McManus’s (1983) data are labelled “Chinese poetry” (Chou & Chen 1935). However, Chou & Chen (1935) say nothing about Chinese poetry, providing data only on colour preferences of Chinese students (p. 214).

I am not sure whether this comment was put under its heading with ironic intent, but sloppiness seems here to be self-referential, because on p. 301 of their paper Chou and Chen (1935) clearly state: “Ouyang (10) and J. Y. Chen (3) had counted the frequency of various color words contained in Chinese poems and prose. The frequencies of appearance in Chinese literature of our nine colors are shown in Table 7.” Table 7 then sums the data from the two colours and provides a rank ordering. It is these summed data that I used in my 1983 paper.

Perhaps now that the precise reference to the frequency of colour word usage in Chinese has been spelled out, and similar data have also been cited for English, Spanish, French, German, Russian, Romanian, and Hebrew, S&vB could address the substantive issue? Does now what would otherwise seem an inexplicable coherence of ordering within a range of different languages actually provide strong support for the ordering of Berlin and Kay (1969)? If it does not, then some alternative explanation of the data must be provided.

## “Universals of colour” from a linguistic point of view

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**Abstract:** Saunders and van Brakel’s observation that “linguistic evidence provides no grounds for the universality of basic color categories” also applies to the concept of “colour” itself. The language of “seeing” is rooted in human experience, and its basic frame of reference is provided by the universal rhythm of “light” days and “dark” nights and by the fundamental and visually salient features of human environment: the sky, the sun, vegetation, fire, the sea, the naked earth.

Is “purple” a universal human concept or a universal cognitive category? Nobody has claimed it is, but why not? Presumably, if all languages had a word for “purple,” a claim of this kind would seem more convincing, but it is well known that many languages do not have such a word. It is less widely appreciated, however, that the same argument applies to “colour” itself. While all languages have a word for the concept “see” (Wierzbicka 1996), many, indeed most, do not have a word for “colour.” There is no linguistic evidence, therefore, that “colour” is a universal concept or a universal cognitive category.

There is also no evidence that concepts such as “black,” “white,” “red,” or “green” are universal. Indeed, linguistic evidence suggests that they are not: Many languages do not have words corresponding in meaning to the English words *black*, *white*, *red*, or *green*, and there are many in which basic interpretative categories for visual experience are quite different from those linked with English words (e.g., *mili* and *mola* in the Papuan language Dani, or *gungundja* and *gulgantja* in the Australian language Gu-jingarliya; for detail discussion, see Wierzbicka 1996). Of course, one could still claim that lexical evidence does not matter and that the English words *black*, *white*, *red*, and *green* reflect “human cognition” better than Dani or Gu-jingarliya terms do, but to claim this is to give twentieth century English a privileged position and to treat it as a pinnacle of human cognitive development.

As I have tried to demonstrate in my book *Semantics: Primes and universals* (Wierzbicka 1996), the language of “seeing” is rooted in human experience, and its basic frame of reference is

provided by the universal rhythm of “light” days and “dark” nights and by the fundamental and visually salient features of human environment: the sky, the sun, vegetation, fire, the sea, the naked earth, the earth covered with snow. Because some of these fundamental and visually salient features of human experience are universal, it is only to be expected that they will be reflected, in some way, in recurring features of the vocabulary of seeing. Insofar as they are also variable, however, with different kinds of scenery prevailing in different parts of the globe, it is also to be expected that the vocabulary of seeing will be far from uniform, even apart from such obvious and often discussed differences as the presence and the cultural importance of durable colouring agents.

Our colour sensations occur in our brains, not in the world outside, and their nature is no doubt constrained by our human biology (which links us, in some measure, with other primates), but, to be able to communicate about these sensations, we project them onto something in our shared environment. The huge variability of “colour talk” across languages and cultures, discovered in the last two decades, and especially in the last ten years, is compatible with a theory that links colour naming with common – but variable – features of the visible human environment and human visual experience, but not with theories trying to explain it in terms of neurophysiology.

In defending their 1969 hypothesis and their subsequent work on colour against charges of ethnocentrism Kay and Berlin (1997, p. 196) state that in the World Colour Survey “monolingual speakers were sought insofar as possible” and that “in the naming task, each speaker was shown the chips one by one and asked to name the colour.” But there would appear to be an obvious contradiction: How can one ask a monolingual speaker, who does not have a word for *colour*, to name the *colour* of a chip? The monolingual speaker may be induced (or cajoled) to point at a particular chip, and to utter some word at the same time, but if the authors then interpret such a procedure as “naming the *colour* of the chip,” this would appear to be a further illustration of the ethnocentric bias of their approach.

Saunders and van Brakel (S&vB) ask: “Why do the innate categories always coincide with twentieth century American English?” To my mind, there is only one possible answer to this mordant question: Berlin and Kay’s search for “colour universals,” important and stimulating as it was, has nonetheless proved to be fundamentally misconceived. S&vB are right in decrying the ethnocentrism of the assumptions underlying this search. It is time to turn in a different direction.

## Authors’ Response

### Colour word trouble

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**Abstract:** In reply to Wierzbicka’s advocacy of semantic primitives we argue that talk of *the* semantic primitives (like TO SEE) repeats the fallacies addressed in the target article at a higher level. In reply to Malcolm’s plea for a Wittgensteinian grammar of colour words, we argue that he uses words like “we” and “us” too easily, falling into the trap of “silly relativism.” In reply to McManus’s science of word counts, we reiterate the nineteenth-century criticism that this method is based on an illegitimate application of seemingly rigorous statistical methods.

Although none of the continuing commentaries engages closely with the themes of the target article (Saunders & van Brakel 1997t), we welcome their suggestions for developing approaches touched on in passing, namely, semantic primitives (**Wierzbicka**), a Wittgensteinian approach (**Malcolm**), word counts (**McManus**).

### R1. Semantic primitives

We hope **Wierzbicka** will forgive our crude shorthand in summarising her position as one of semantic primitives plus environmentalism. Hers is a minimalist argument for what *must be* the case. But, aside from transcendental/empirical problems lurking here, to take TO SEE as a primitive is to repeat at a more abstract level the same mistake she so eloquently exposes for COLOUR and BASIC COLOURS (as when she says “how can one ask a monolingual speaker, who does not have a word for *colour*, to name the *colour* of a chip?”). This is an argument not against the capacity of “seeing” in the flow of life but against the semantic primitive TO SEE. To argue that TO SEE is a semantic primitive is still “to give twentieth century English a privileged position.” Therefore we cannot concur when she says that “the language of ‘seeing’ is rooted in human experience” and we worry about buried presuppositions in such seemingly innocuous utterances as “sensations [which] we project . . . onto something in our shared environment.”

**Wierzbicka’s** (1991) definitions of the meaning of words in terms of such primitives as TO SEE only mean what they do if a complex background is presupposed. Furthermore, crucial to her approach is a sharp distinction between pragmatic and semantic equivalence. She does acknowledge that semantic primitives can have different pragmatic meanings, yet she argues that they are universals in the sense that “without being definable themselves (without circularity) they enter the definitions of countless other words, expressions, and constructions” (Wierzbicka 1988).

Linguists (e.g., Casagrande 1954) and philosophers (e.g., Quine 1990) have raised questions about this kind of strategy. For example, how does **Wierzbicka** know that the semantic primitives are primitives in languages other than English (irrespective of whether they are “primitives” of English in the first place)? The conclusion that “all languages have a word for the concept SEE,” may, as Murray and Button (1988) point out, “only be attested by the wide number of commensurate translations, while the adequacy of each translation choice may only be attested by the presupposed simple ‘basicness’ of the concept, which suggests its ‘universal’ nature and hence manifest translatability.” **Wierzbicka** stresses that the question of semantic primitives is an empirical one. However, empirical questions can only be raised *given* some sort of background. It is one thing to say that “all peoples of the world see things (provided they are not blind),” which is an empirical statement; it is quite a different thing to say that TO SEE is a semantic primitive always and everywhere.

Consider the disagreement between two native Polish speakers living and publishing in English-speaking academia. According to **Wierzbicka** (1986), the Polish *tesknic* has no equivalent in English; according to Kolenda (1987), it translates simply as *longing*. The crucial issue is *not* whether **Wierzbicka** is right in pointing to the “untranslatability” of emotion words. It is that this sort of disagreement

does arise. To merely respond “but there must be semantic or cognitive primitives underlying the disagreement” is either an ostrich policy or a smuggling in of a reductive argument. A similar example can be found in the colour-naming literature, where there is continuing disagreement regarding whether English “red” can be translated by one word into Hungarian, or whether it divides over two “basic” colour terms (BCTs). Consulting native Hungarian speakers or English-Hungarian/Hungarian-English dictionaries has not settled the issue.

This problem repeats itself no matter the level of abstraction. **Wierzbicka** criticised Lutz’s (1988) suggestion that Ifaluk *nunuwan* translates as “thought/emotion.” Rather, according to Wierzbicka, *nunuwan* corresponds to the semantic primitive TO THINK and *niferash* with TO FEEL. Once again the move is made: there are primitives and they are the English words/concepts simultaneously “raised” to a higher power of abstraction and “lowered” to a “basic” level. *Nunuwan* and *niferash* are therefore made more abstract and more basic to streamline them into consonance with English. To have made *nunuwan* and *niferash* the semantic primitives might be regarded as a step in the right direction; but in fact it would merely invert the ethnocentric move, which is no solution at all. Fundamental dangers lie in the easy assumptions that (1) semantic primitives exist; (2) there are no translation problems; and (3) English words/concepts are *the* semantic primitives.

According to one nineteenth century source (Allen 1879), colour terms develop first where colour helps to distinguish among objects that are otherwise similar, the object name sufficing where colour and objects go together uniformly. The availability of dyes and pigments then renders the use of abstract colour names a felicitous invention, making it possible to talk about a quality or feature irrespective of the object upon which it is found. If **Wierzbicka’s** advocacy of “a theory that links colour naming with common – but variable – features of the visible human environment” were limited to this epistemological level, then that theory would be compatible with the target article.

## R2. Grammar(s)

We are sympathetic – with reservations – to a Wittgensteinian approach to “colour” (Saunders & van Brakel 1988). Wittgenstein (1969, p. 135) said: “To say that we use the word ‘blue’ to mean ‘what all these shades have in common’ by itself says nothing more than that we use the word ‘blue’ in all these cases.” So far, so good; what further? Unfortunately, **Malcolm** is not helpful here. His commentary takes a range of Wittgensteinian “concepts” for granted, in particular Wittgenstein’s rather idiosyncratic use (by cognitive science standards) of words such as “logic,” “rule,” and “grammar.”<sup>1</sup> Perhaps this is unavoidable, but Malcolm does not make it easier. First, he uses the word “grammar” in the plural (in his abstract and concluding sentence). As far we know Wittgenstein never uses “grammar” in the plural,<sup>2</sup> though such use would by no means be innocent in a Wittgensteinian context.<sup>3</sup>

Second is **Malcolm’s** easy use of “we” and “our” (following Wittgenstein), as when he talks about *our* concept of colour or says “those who have concepts different from ours

see colours differently.” This lends itself to “silly” relativistic readings (of the sort ascribed to Winch, 1958, or Bloor, 1976). This ethnocentric use of “we” is particularly disturbing when applied to more concrete cases, as when Malcolm says: “many non-Western cultures have languages that refer to colours and to colour only sparingly, if at all,” encouraging the idea that, if all is said and done, “we” Westerners are more sophisticated. Why not discuss instead why Dournes (1978) finds 23 BCTs in Jörai (Viet Nam), Bulmer (1968) counts 15 BCTs in Karam (New Guinea), and Cakchiquel (Guatemala) has, according to the “rough” working sheets of the Kay et al. *World Color Survey* (1991), at least two BCTs for each of red, blue, and purple? Why not address why talking in this way might be nonsense or worse?

Similarly, **Malcolm’s** view that “we distinguish blues from greens, whereas other cultures, for whom this distinction is not important, *see these as the same colour, as belonging to the same category*” (emphasis added) might, in a convoluted way, be Berlin and Kay’s (1991/1969) stance<sup>4</sup> but is rejected by us (S&vB) both as a way of talking and as a metaphysics. Rather, we suggest with Wittgenstein that (1977, sect. 1.14). “There is, after all, no *commonly* accepted criterion for what is a colour, unless it is one of *our* colours” (emphasis added).

Invoking Wittgensteinian “grammar” fails to go far enough. Perhaps talk of colour grammar might better be related to the bringing forth of particular natural responsivenesses by means of specific and special tools. Change the procedures, and the responsiveness changes, the “natural” becoming visible for the normative it is (Saunders 1998). Colour grammar, provided it is not tied to a hidden metric, is not then a closed system but an ever-open edge, a point **Malcolm** misses by accepting “colour” (his “colouredness of coloured things”) as a Platonic form (despite arguing against it at a different level). His polarization of the natural and the normative (cf. his dichotomy of “the province of natural science” and “the logic of colour concepts”) therefore does not help. The aim of the target article was to challenge his two-tier structure – normative above, natural below. *Nothing* is gained by fuelling the two-culture syndrome and science/culture wars in saying the “criteria for explaining the colours of our scheme are logically distinct from the physiology of the enabling system.” Moreover, it is not enough to criticise the “received view,” the Cartesianism Wittgenstein so despised, which construes colour either “as physical properties of things ‘out there’ or as properties of our sensings ‘in here’ in our heads” (as “sensations”).

Malcolm advocates neither phenomenology, nor reductive materialism. Fine, but what follows? Since Wittgenstein wrote about these things, new “received views” have emerged.<sup>5</sup> Moreover, insofar as he wrote extensively on colour, it might have been more relevant, given the nature of the target article, to elaborate the “colour grammar(s)” approach by reference to Wittgenstein’s utterances on “four primary colours:”

It is a fact that we communicate with one another about the colours of things by means of six colour words.

Now in this sense there are four (or, with white and black, six) pure colours.

If I say “there is a particular similarity among the primary colours” – whence do I derive the idea of this similarity? Just

as the idea “primary colour” is nothing else but “blue or red or green or yellow” is not the idea of similarity too given simply by the four colours?<sup>6</sup>

Although Wittgenstein did not intend his utterances to support the neurophysiological account, advocates of that approach will no doubt interpret him as doing so. Malcolm might have tackled this issue.

### R3. Word counts

We agree with **McManus** that Chou and Chen (1935) include a reference to word counts in Chinese texts. We overlooked these data (which are mentioned only in passing), because we had (and have) great difficulty figuring out what sort of science McManus is advocating: **McManus** (1983; 1997b) refers to “Chinese poetry”, though Chou and Chen (1935) refer to “Chinese language” (twice), “Chinese literature” (three times), and “Chinese poems and prose” (twice). No information is provided about sources or about the Chinese characters counted (not trivial; see Table R1). Moreover, the legend for the scale of McManus’s (1983) Figure 1 implies that the number of basic colour words counted in “Chinese poetry” is ten times higher than the 459 words Chen and Ouyang counted in Chinese literature and reported in the *Chinese Journal of Psychology* in 1923 (Nos. 3 and 4).

Chou and Chen (1935) is primarily an article on colour preference. McManus et al. (1981) wrote that “the results [of the ‘vast literature on colour preferences’] are generally worthless, since adequate accounts of the colours are not given.” As Chou and Chen themselves raise such sensible doubts as “Chinese characters . . . do not exclusively stand for colors” and “the question whether color words are really the same as actual colors,” one wonders what significance

should be attributed to this word count of 1923. Innumerable sources report that for thousands of years Chinese has had a “five-colour symbolism”<sup>7</sup> (the first five characters in Table R1). This supports **McManus**’s thesis without any word count at all. He might also have referred to Baxter (1983), steeped in specialist knowledge of Chinese language and arguing that in the “earlier period” (ca. 1500–771 BCE) Chinese was “stage IIIb” and in the “later period” (ca. 770 BCE–220 CE) it was “stage IV.”<sup>8</sup> Then *we* (S&vB) would have argued that Baxter simply takes the truth of the Berlin and Kay theory for granted and tailors Chinese characters accordingly.

**McManus** (1997b) has counted half-a-million basic colour words in databases such as *MedLine*, *PsycLit*, *MathSci*, and *English Poetry*. This method simply presupposes privileged lexical domain (innate similarity spaces plus a metric) and then buries that presupposition. We are at a loss to see the relevance of this endeavour. Perhaps McManus will reply, Don’t be such a bore; (word-) counting *just is* doing science. Then we can only quote Allen (1879, p. 264), apologizing for the long-windedness that was customary of his time.<sup>9</sup>

Now, I am not a great believer in that system of word-counting which is so favourite a device of Mr. Gladstone. It appears to me a fallacious and illegitimate application of seemingly rigorous statistical methods, for the value of the word can never be properly appreciated apart from its context. Nevertheless, in order to meet the enemy with his own weapons, I have counted up all the colour-epithets in Mr. Swinburne’s “Poems and Ballads” . . . *Yellow* is mentioned 13 times, *tawny* once; but the more poetical word *gold* numbers 113 repetitions, and *golden* 16.

As we argued at length in the target article, it is a fundamental methodological error to gather data fitting a preconceived model and then to conclude that the data sup-

Table R1. A few Chinese characters often translated by English colour words; glosses cover a period of about 3,500 years

	Transcriptions	Glosses
白	<i>bái, bye, pai, pāk</i>	White, clear, pure, plain, blank; in vain, for nothing, free of charge, gratis, open, unselfish; other “white” term: <i>sù</i> 素
黑	<i>hēi, ha, hok</i>	Black, dark; secret, shady, wicked, sinister; other “black” terms: <i>lú</i> 旅, 廬, 黠, <i>zī</i> 茲, 滋, 緇
赤	<i>chì</i>	Red; other “red” terms: <i>zhū</i> 朱, <i>dān</i> 丹, <i>tóng</i> 彤, <i>chēng</i> 赭, 經, <i>jiàng</i> 絳, <i>xīng</i> 駢
黃	<i>huáng, uong</i>	Yellow, fallow, short for the Huanghe river; fizzle out, fall through; brown (only when said of shoes)
青	<i>qīng, ts’eng, thsing, thang</i>	Green, blue or green (“grue”), dark blue, black, “more blue than indigo”; green grass, young (bamboo, people), luxuriant; <i>zǐ</i> [紫 “purple”] is <i>qīng</i> coloured
蒼 or 倉	<i>cāng, huang, thsang, thong</i>	Dark green, blue, grey, light blue, sky blue, blue green, ashy, “appearance of the sky,” blue or green (“grue”)
玄	<i>xuán, hiuan, ngun</i>	Dark blue, dark-cool, black, unknown, hidden; “dark” as in <i>xuán</i> wine “dark water,” reddish black
紅	<i>hóng, hung, chung</i>	Red, revolutionary, red cloth, bunting, etc., used on festive occasions, symbol of success, bonus, dividend; pink
藍	<i>lán, lām</i>	Blue, indigo plant, aniline
綠	<i>lǜ, lo</i>	Green, green or blue or yellow, chlorine

Sources: Baxter (1983), von Strauss (1879), Gernet (1957), Caskey-Sirmons and Hickerson (1977), Chinese–English dictionaries, and our own color-naming data (unpublished).

port the model. To be sure, we are not suggesting that **McManus** should now start counting the occurrence of “gold” in *PsycLit* or *English Poetry*. We merely suggest that Allen’s “Victorian” science is perhaps more relevant than McManus’s (1997b) “top-journal” science: “The anomaly for yellow may be related to the problem of whether the appropriate description of stages III and IV is yellow/green or yellow/grue [green/blue], although the mechanism is not clear” (McManus 1997b).

#### R4. Conclusions

The kinds of problems the target article raised have to do with why the only relation between, say, a certain (physical) luminosity and a certain (subjective) brightness, is a very fragile *ceteris paribus* law, likely to break down at any moment, and unable to support a strict psychophysical law (van Brakel 1992). This “anomalous monism” (Davidson 1970) does not fit neatly with the structural/functional story of psychophysics and neurophysiological mechanisms and fits even less well with the categories-and-semantics story. To spin out this gossamer thread of “anomalous monism” was one of the target article’s main, though perhaps understated, aims, as too was its suggestion that so-called bridge laws or supervenience relations are empirical *ceteris paribus* regularities (van Brakel 1999)—not metaphysical necessities – of a particular ontomethodology and its technology (Saunders 1998).

If one insists on talking about words, as **Wierzbicka** (semantic primitives), **Malcolm** (grammar of colour words), or **McManus** (word counts) do, then we (S&vB) suggest that it is more important to concentrate on some “real-life” examples, for example:<sup>10</sup>

龍戰于野，其血玄黃

which has been glossed as “The dragons fight in the open country; their blood is *xuán* and yellow.” Or:<sup>11</sup>

天子駕倉龍，載青旗，衣青衣，服倉玉

which has been glossed as “The Son of Heaven drives *cāng* dragons, carries a *qīng* banner, clothes himself in *qīng* clothes, and wears *cāng* jade” (see entries for *xuán*, *cāng*, and *qīng* in Table R1). A word of caution is needed in reading this sort of table. Such tables have often been constructed to display the evolutionary thesis of Berlin and Kay. Space–time compression in particular suggests that the data are synchronous (which they are not). Constructing such tabulations is one of the means by which BCTs are bootstrapped into existence, their conditions of fabrication erased by “cleansing.” A second means of bootstrapping is to apply the “translation” rules (for instance, any gloss that includes black or dark → “black” [Hickerson 1971]). Following these rules it is possible to concoct BCTs out of the Chinese characters. They follow purely from the system of ordering, having no necessity beyond that order. In other words, one can generate BCTs out of anything and nothing (from a text or colour chart).

Alternatively, it might be more appropriate to address the question why the *World Color Survey* reports not only languages with “composite” BCTs for “green and yellow” or “blue and black” but a host of “anomalies.” For example, there are individual speakers who use terms that translate as red + green, and the same is true for white + black, pink + black, yellow + black. There are languages with a large

number of words for white, and the same is true for black. There are consultants who focus green on a pink chip called *red*, red on a chip called *white*, red on a dark red chip called *grue* (“green or blue”), grue in yellow, purple in green, *azul* (“blue”) in yellow-orange. Red is sometimes called *white* or *black* or *blue*, and grue and pink are called “the same” as are pink, purple, and black. In a number of cases consultants used only one word for all the colour chips (e.g., Lele, Chad), scattered terms without system (Maring, New Guinea; Kuku Yalinji, Australia), left parts of the chart blank (Mantjiltjara, Australia), or reached no more than 20% agreement on a term (Murrinh-Patha, Australia). It might also be worthwhile to try to find out why fieldworkers for the WCS were regularly driven to comment that consultants had “eye disorders,” were “colour blind,” “problematic,” “messy,” or behaved like “a cretin” (Kay et al. 1991).

#### NOTES

1. Perhaps the shortest elucidation of “grammar” is that it “is a free-floating array of rules for the use of language. It determines what is a correct use of language, but is not itself correct or incorrect. It is not answerable to the nature of reality, to the structure of the mind or to the ‘laws of thought’” (Baker & Hacker 1985, p. 40). However, such a description itself draws heavily on a Wittgensteinian reading of “rule.”

2. See, for example, Wittgenstein (1921, sect. 3.325; 1969, pp. 1, 19, 13, 26, 70, 109, 135; 1972, sect. 38n, pp. 353, 496, 572, 660, 664; 1974, pp. 63, 68, 82, 133, 142, 152–53).

3. Perhaps Wittgensteinian notions such as “grammar(s)” and “form(s) of life” might be understood *at the same time* in the singular *and* the plural, as empirical *and* transcendental, as local *and* universal (van Brakel 1994).

4. See for example, Kay and Kempton (1984) for a psychophysical experiment demonstrating how English speakers “see” the JNDs around the blue-green lexical boundary as farther apart, whereas Tarahumara speakers “see” the true JND discrimination distances. For a critique, see Saunders (1992, Ch. 9).

5. For an example see Thompson (1995), and for a critique see Saunders (1998).

6. See, for example, Wittgenstein (1977, sect. 3.52, 3.135; 1974, p. 134).

7. Of course it is question begging to talk about *colour* symbolism.

8. Why not conclude instead, following MacLaury (1992), that *hēi*, *xiuán*, *qīng*, *cāng*, *bái* form a brightness scale (see Table R1)?

9. Compare the variety of words in Sanskrit that are often (not necessarily correctly) glossed as red and/or yellow and/or golden (Hopkins 1883; Wood 1902).

10. Yi-jing, Kua II (ca. 1200 BCE); quoted from Baxter (1983), who glosses “dragon” also as “wild horse.” Compare von Strauss (1879): “Der Drache kämpft in der Wildness; sein Blut ist *hiuan* und gelb (*hoang*).”

11. Quoted in *Zhōngwén dà cídiǎn*; here quoted from Baxter (1983).

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**Commentary on Ruth Garrett Millikan (1998). A common structure for concepts of individuals, stuffs, and real kinds: More Mama, more milk, and more mouse. BBS 21:55–100.**

**Abstract of the original article:** Concepts are highly theoretical entities. One cannot study them empirically without committing oneself to substantial preliminary assumptions. Among the competing theories of concepts and categorization developed by psychologists in the last thirty years, the implicit theoretical assumption that what falls under a concept is determined by description (“descriptionism”) has never been seriously challenged. I present a nondescriptionist theory of our most basic concepts, “substances,” which include (1) stuffs (gold, milk), (2) real kinds (cat, chair), and (3) individuals (Mama, Bill Clinton, the Empire State Building). On the basis of something important that all three have in common, our earliest and most basic concepts of substances are identical in structure. The membership of the category “cat,” like that of “Mama,” is a natural unit in nature, to which the concept “cat” does something like pointing, and continues to point despite large changes in the properties the thinker represents the unit as having. For example, large changes can occur in the way a child identifies cats and the things it is willing to call “cat” without affecting the extension of its word “cat.” The difficulty is to cash in the metaphor of “pointing” in this context. Having substance concepts need not depend on knowing words, but language interacts with substance concepts, completely transforming the conceptual repertoire. I will discuss how public language plays a crucial role in both the acquisition of substance concepts and their completed structure.