Language and Perceptual Experience

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In 'The Experience of Perceptual Familiarity' (*Philosophy*, **71**, 1996), I argued that the experience of familiarity of appearance—something's looking or sounding familiar, in particular—is a distinctive perceptual experience, rather than, as philosophers and psychologists have often suggested, a *sui generis* 'feeling', occurring subsequent to perception. The experience of something looking familiar, to take the case I shall focus on here, is characterized by one's having a relatively detailed visual impression of the object *in less time and with less effort* (less directed perceptual attention) than would be necessary were the object unfamiliar. We are sensitive to the relative speed and ease with which a percept is achieved and we learn to infer from a percept being achieved quickly and effortlessly that the perceived entity is familiar.

If the experience of perceptual familiarity depends on sensitivity to relative ease of perception, then, I argued, it requires there to be a discrepancy between the speed and effortlessness with which a percept of a familiar object is achieved and the greater time and effort that would be required, to achieve an equally detailed percept, were the object unfamiliar. A prediction of my hypothesis is that we will *not* have the experience of perceptual familiarity when faced with relatively simple stimuli, such as pure colours and tones, the perception of which is always immediate and effortless, regardless of familiarity. In these cases, ease of perception will not alter as a function of familiarity with the stimulus, and we will not experience familiarity of appearance.

Evidence was presented to show that this prediction is confirmed. Whereas subjects in picture recognition tests report two main strategies, verbal encoding (memorizing a verbal description of the picture) and relying on the picture 'looking familiar', and can still accurately recognize many pictures when prevented from engaging in verbal encoding, subjects in colour recognition tests do not report an experience of looking familiar, and, if they happen to forget the verbal description they have memorized, are absolutely unable to judge which colour they have previously seen in the experiment. On my view, this is easily explained; in colour memory, recognition is highly dependent on verbal encoding, because the subjects cannot use perceptual fluency to determine whether they have seen the

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colour sample before. Similar evidence was adduced from the realm of auditory stimuli.[1]

In this paper, I assume the validity of the hypotheses proposed in 'The Experience of Perceptual Familiarity', and I show how the reliance of accurate colour recognition on verbal encoding sheds light on an old debate in psychological anthropology, concerning attempts to provide empirical validation of the Whorfian hypothesis that a person's native language strongly influences his or her psychological states and abilities and behaviour.

I shall consider one series of experiments intended to investigate the influence of language on experience and behaviour, which has been much discussed in the psychological and anthropological literature on the relation between language and thought. I propose that the results of these experiments, which have been exciting to philosophers and anthropologists alike, are unsurprising, if one accepts my account of perceptual familiarity. I believe that, if we maintain a clear distinction between the effects of language on perception and its effects on recognition, we shall be in a better position to assess and understand the extent to which the natural language we have learnt to speak influences our experience of the world.

Language and Thought

The question of the relation of natural language and thought is one of those philosophical issues from which analytical philosophy has retreated; it has seemed too large a question to admit of easy analytical clarification and it faces the same difficulties of empirical investigation as the nature-nurture debate.[2] At the start, it would be prudent to say a little about the limited scope of this paper, and how it relates to what has been said by philosophers recently about the general topic.

One large issue which has been addressed on occasion by analytic and 'post-analytic' philosophy is the question of whether language is required for thought. The Lockean picture, according to which thought is an inner process which precedes language, and human beings only developed language for the purpose of *communicating*

[1] 'The Experience of Perceptual Familiarity', *Philosophy*, **71** (1996), 83–100: see, especially, 96–99.

[2] The recent publication of *Language and Thought: Interdisciplinary Themes*, P. Carruthers and J. Boucher (eds) (Cambridge University Press, 1998) might initiate a new trend.

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pre-existing thought, has been the target of much twentieth-century philosophy, even though a version of this view tends to be assumed in the cognitive sciences.

The theme is well illustrated in the later Wittgenstein's suspicions about William James's report of a Mr Ballard, a deaf-and-dumb man who claimed to have had complex thoughts about the origin of the universe, prior to learning any language.[3] James thought that this case showed the possibility of thought without language. Wittgenstein does not deny that general possibility, but asks whether Ballard's 'translation' of his earlier, pre-linguistic thoughts was accurate. Did Ballard really have the *same* thought that he could later have, with the help of sign-language, before he learnt language? In general, Wittgenstein's point is that the *same* thought that goes with a meaningful linguistic utterance cannot occur without language. Thinking something without language is not the same process as thinking something with language, but with the language subtracted.[4]

Wittgenstein's position, therefore, is not an outright denial of the possibility of thought without language, but the Wittgensteinian worry naturally leads to the question of whether there are certain thoughts which could not be had without language. Might not complex thought or systematic thought *require* language, in the sense that a causal condition of the possibility of thinking a complex thought might be the *availability* in language of a sentence expressing that thought? More strongly, might not complex thought necessarily *involve* language, in that thinking a complex thought might be *constituted* by the 'use' or representation of a sentence expressing that thought?

> A dog believes his master is at the door. But can he also believe his master will come the *day after tomorrow*?[5]

Here are some plausible examples of thoughts one cannot have without language: there are 25 matches on the table, 50 states in the USA, 39 books in the Old Testament.[6] The argument appears

[3] Cf. W. James, *The Principles of Psychology* (1890), Vol. 1 (Cambridge, Mass.: Harvard University Press, 1981), 257, and L. Wittgenstein, *Philosophical Investigations*, G. E. M. Anscombe and R. Rhees (eds) (Oxford: Blackwell, 1958), sect. 342.

[4] See L. Wittgenstein, *The Blue and Brown Books* (Oxford: Blackwell, 1969), 42.

[5] L. Wittgenstein, op. cit., note 3, p. 174.

[6] See S. Blackburn, *Spreading the Word* (Oxford University Press, 1984), 138. Compare A. Clark, 'Magic words: how language augments human computation', op. cit., note 2, *passim*, where it is argued that language enhances, rather than enables, thought.

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straightforward. One cannot understand the thought that there are 25 matches on the table unless one knows the truth-conditions of the belief that there are 25 matches on the table. To know this would presuppose knowledge of counting, and hence of some sort of symbols, some notation recording the number, some process of 'ticking off' each element to be counted against a mark, whether it be a word or a notch in a stick. But it is not clear how strong this argument is. Perhaps only some primitive structured system of associations is required, rather than a system of external marks or artificial symbols: language may not be required.

It is clear that there are unresolved questions here of the greatest importance. I mention them primarily to indicate a set of issues with which I am not directly concerned here. It may be that certain, complex thoughts could not be had without language (perhaps not language as we know it, but some system of external marks). Or it may be that the same thought as one we ordinarily have through language could alternatively be had by entertaining images or other inner signs. But there is a quite separate question that needs to be addressed. Whether or not a certain thought which is mediated by an English sentence, say, could be brought about through an extra-linguistic medium, or through a synonymous sentence in another language, it is tempting to think that the regular mediation of thought by one particular natural language, rather than another, will have a substantial effect on the thought processes of those who speak that language.

So, we turn to the thesis that the *particular* language one speaks (or, more exactly, the particular grammar and vocabulary a speaker possesses) influences the way in which one thinks, determining the 'world-view' of a linguistic community. This is, of course, the 'Sapir-Whorf hypothesis', and its dominance in the social sciences is well-known.

Language, Experience and Perceptual Discrimination

There is a danger of expressing the Sapir-Whorf hypothesis in such a way that it is quite obviously true. Here is the line of thought about which there is little dispute. If A's language has a single word that covers both what English speakers call 'yellow' and what English speakers call 'orange', A cannot readily differentiate *in her language* between yellow and orange. The sentence 'The colour gradually changed from yellow to orange' in English will require a more complex expression in her language. Assume that the thought expressed by the sentence 'The colour gradually changed from yel-

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low to orange' is a kind of thought which, for most English speakers, is *in fact* (though perhaps not *necessarily*) mediated by that sentence, and other sentences synonymous with it. Assume also that the distinction between yellow and orange is not salient in A's linguistic community in virtue of any non-linguistic factors. Under these circumstances, it seems very plausible that the linguistic difference will affect thought to the extent that the thought expressed by 'The colour gradually changed from yellow to orange' occurs to the English speaker more readily than it does to A. If a cognitive state or process, such as having the thought that the colour gradually changed from yellow to orange, typically involves language, then the availability of linguistic items with which to express the cognitive state would surely increase the ease and likelihood of exhibiting the state.

But there is a more ambitious version of the Sapir-Whorf thesis, according to which primitive or fundamental aspects of thought and experience, which, at the very least, we are strongly inclined to believe that we have *independently* of any language (such as perceptual experience, and our concepts of time, matter and colour), are determined by the particular language that we have. To hold that such apparently non-linguistic cognitive skills and perceptual experiences are influenced or determined by language is an entirely bolder claim.

In the remainder of this paper, I shall be concerned with the bold claim that perceptual experience is influenced by language. Let me begin by quoting a passage from a text which is not mainly concerned with the issues at hand, but provides a useful illustration of the position I wish to criticize.

> Consider two men walking in a wood. One of them is a botanist with the name of every tree and shrub at his command. The other man, by contrast, is as ignorant of botany as his companion is knowledgeable, so that his experience of the wood is, on the whole, one of a barely differentiated mass of wood and leaf. Plainly, possession of the botanical language, and all that went into learning it, makes the first man's experience of the wood a great deal more finely differentiated and significant, *qua* experience of the wood as a wood, than is the second man's experience of it. The second man, despite his botanical ignorance, might have aesthetic experiences arising from his walk which leave the first man's more prosaic scientific experience quite in the shade; but the point at issue here is the relevance of their relative commands of the language specific to making their experience of the wood *qua* wood more and less finely discriminative respectively.[7]

[7] A. C. Grayling, *An Introduction to Philosophical Logic*, 3rd edn (Oxford: Blackwell, 1997), 203.

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It is useful to have the suggestion stated so clearly and appealingly. A. C. Grayling is arguing, here, that the possession of a (botanical) vocabulary will make a person's *experience* (of a wood) more finely differentiated, more finely discriminated.

I am reminded of Simon Blackburn's uncharacteristically hasty remark that

> there is no distinction between learning to discriminate finely between various modes of taste, colour, or feeling, and learning a vocabulary with which to express the differences.[8]

The implausibility of the latter claim is clear. We could not learn a vocabulary of colour, say, unless we were, previously, able to discriminate between different modes of colour. Learning colour-terms *presupposes* certain pre-linguistic discrimination and recognition abilities. Moreover, we can and do notice differences between colours, tastes, feelings, and so on, prior to knowing the different words associated with them. Later, I shall argue that possession of vocabulary facilitates recognition-memory, but it is incorrect to suggest that it enables perceptual discrimination.

Furthermore, pre-linguistic perceptual discrimination abilities are, arguably, unaffected by the language we learn. Having a certain complex vocabulary for, say, colours or trees does not alter one's *ability* to discriminate colours or trees, in the sense of *making one able* to tell them apart, when simultaneously presented. The ability is not created by possession of vocabulary. It is not as if we are otherwise unable to tell certain trees or colours apart, and language performs the function of discrimination. For example, people in a dye factory do not become able to discriminate colours better.[9]

It is also worth bearing in mind that beings can in fact learn to recognize or remember perceptual discriminations (e.g., different trees), without learning any vocabulary, for example by associating individual kinds or types with *behavioural responses*. Animals do this, for example, for certain types of plants.

Even if Blackburn's claim, the view that perceptual discrimination necessarily involves distinction in vocabulary, is false, we need to assess Grayling's suggestion that vocabulary affects perceptual experience. The claims are very similar, since the effects Grayling supposes that vocabulary has on experience are effects on the 'discriminative' nature of that experience. But Grayling does not suppose that discrimination must involve language.

It is possible, I think, to isolate what is true in Grayling's argu-

[8] S. Blackburn, op. cit., note 6, 137.

[9] J. B. Carroll, *Language and Thought* (Englewood Cliffs, New Jersey: Prentice-Hall, 1964), 95.

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ment, and distinguish it from Blackburn's false claim. It is plausible that, in the case of complex stimuli, e.g. kinds of animal or tree, perceptual discrimination is *facilitated* by prior perceptual experience of instances of the kinds in question, and here the process of learning a vocabulary does play a role. Thus, we may *more easily tell apart* two simultaneously presented trees, if we have had previous experience of trees, such that we have had our attention drawn to the features that distinguish them. And our attention *may* have been drawn to the differences by our awareness that there are different *words*; we assume other people saw a difference, and look for it.

Language may thus make us *notice* similarities and differences which we previously ignored. But language is not *necessary* for drawing attention to a difference or a similarity. J. B. Carroll makes this point with a simple example. Certain native American languages have different grammatical forms for their verbs of *handling*, depending on the shape of the thing that is being handled. It was discovered that children who spoke such languages noticed differences in shape more readily than other children in the same community who spoke English. But middle-class, English-speaking children in cities also readily noticed the differences in shape, presumably because of their behavioural experience with shapes in the nursery.[10]

Now, if language does draw our attention in this way to, say, the distinguishing features of different trees, then we may find, I think, that the *experience* of the trees is indeed different for the 'expert', but this is of course not because of his vocabulary *per se*. It is through his prior perceptual *experience* of the distinguishing features, to which his attention has been drawn by the linguistic discrimination, that the way things actually *look* may change, that the trees may come to *look* different. (The sorts of way in which I think they may look different include the expert's visual attention—his 'eyes', as we say—being drawn automatically to certain significant features, the trees 'looking familiar', and so on.)

It is important, therefore, to distinguish the results of possessing a specialist vocabulary *per se* (perhaps: improved *recognition*, improved *memory* of discriminations made, and also the vocabulary drawing our attention to differences in the world) from results of the *perceptual experience* that went with learning the vocabulary (namely, the trees *looking* different, *looking* familiar, the *experience* being more 'finely differentiated'). We must be wary of over-exag-

[10] See J. B. Carroll, op. cit., note 9, 108–109. Cf. J. A. Lucy, *Language Diversity and Thought: A Reformulation of the Linguistic Relativity Hypothesis* (Cambridge University Press, 1992), 198–202.

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gerating the role that language plays in determining the nature of experience.

The Sapir-Whorf Hypothesis

The most radical view of the influence of language on thought has been the 'linguistic relativity' or 'Sapir-Whorf' hypothesis of the American linguist and anthropologist, Edward Sapir (1884–1939), and his more famous student, Benjamin Whorf (1897–1941). As we have seen, the strongest version of the hypothesis holds that even primitive or fundamental aspects of thought or perceptual experience, which we are inclined to think that we have *independently* of any language (such as perceptual experience, and our concepts of time, matter and colour), are determined by the particular language that we have. For Sapir and Whorf, the particular natural language one speaks greatly affects one's thought and behaviour, so that there is radical linguistic relativity, different linguistic communities possessing entirely different concepts. We are at the mercy of our particular language.

Whorf hypothesized that large-scale *grammatical* patterns in individual languages compel people in different communities to think in different ways, that there are causal correlations between these grammatical patterns and our concepts of time, matter, and so on. Thus he speculated that we think of *ten days* as an aggregate of discrete entities because of the use of cardinal numbers:

> our tongue makes no distinction between numbers counted on discrete entities [e.g. 'ten men', where there is a perceptible spatial aggregate] and numbers that are simply 'counting itself' [e.g. 'ten days', where the aggregate is metaphorical]. Habitual thought then assumes that in the latter the numbers are just as much counted on 'something' as the former.[11]

Days are thus transformed into discrete, object-like entities. The conceptual structure of plurality and of objecthood is imposed by language on our experience of time. Again, for Whorf, it is because we treat 'summer', 'winter', 'sunset', etc., grammatically, in just the way we treat nouns denoting places—because we say such things as 'at sunset' or 'in winter' (compare 'at a corner' or 'in an orchard') that we think of different *times* set beside one another like a spatial configuration. The Hopi, on the other hand, have 'adverbs' for temporals, and therefore do not objectify times.

[11] B. L. Whorf, 'The Relation of Habitual Thought and Behavior to Language', in B. L. Whorf, *Language, Thought, and Reality*, J. B. Carroll (ed.) (Cambridge, Mass.: MIT Press, 1956), 140.

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There are several such examples. One might state Whorf's thesis in 'The Relation of Habitual Thought and Behavior to Language' as follows. A linguistic identity within two disparate linguistic patterns causes us to *transfer* elements of the referent of the one pattern to the other, so that we think of the latter referent in the way we think of the former. In general, in Whorf's writings, the linguistic element that is identical across usages is most often grammatical form, rather than vocabulary. Whorf's primary concern was with the effect of grammatical patterns on thought. Indeed, he expresses the 'linguistic relativity' principle (or, as we should now say, the Sapir-Whorf hypothesis) as the thesis that

> users of markedly different grammars are pointed by their grammars towards different types of observations.[12]

There are, admittedly, some examples of a lexical identity or difference influencing thought, in Whorf's writings, of which the oft-quoted example of the Eskimo words for snow is the most familiar.

> To an Eskimo, this all-inclusive word ['snow'] would be almost unthinkable; he would say that falling snow, slushy snow, and so on, are sensuously and operationally different, different things to contend with; he uses different words for them and for other kinds of snow.[13]

In the same paragraph, Whorf mentions a case of lexical identity: the Hopi calling aeroplanes, aviators, and flying insects by the same name. What is most significant here is that, whereas Whorf is confident and explicit in his ambitious claims of the influence of grammar on thought, his discussion of the effect of verbal identities and differences is far less clear. Are the Hopi led to see a resemblance between flying insects, aeroplanes, and aviators? Whorf does not say they are. Certainly he does not believe that they actually confuse the three, for he writes that

> (t)he situation, of course, decides any possible confusion among very disparate members of a broad linguistic class.[14]

Similarly, there is considerable vagueness in the sentence 'falling snow, slushy snow, and so on, are sensuously and operationally different ...'. For *us* too, surely, falling snow, flying snow, and snow on

[12] B. L. Whorf, 'Linguistics as an Exact Science', op. cit., note 11, 221.

[13] 'Science and Linguistics', op. cit., note 11, 216. Cf. 'Languages and Logic', op. cit., note 11, 233–5, and 'Language, Mind, and Reality', op. cit., note 11, 261, for supposed examples of verbal identities influencing thought.

[14] 'Science and Linguistics', op. cit., note 11, 216.

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the ground are 'sensuously and operationally different', by any standard meaning of that phrase—we *see* them as different and would *handle* them differently. At best, the Eskimos readily *notice* differences we do not. Whorf does not state the effects of lexical identities and discriminations with anything near the precision and imagination of his speculations about the influence of grammar.

I surmise that the reason for this is that, while Whorf was convinced of the effects of the grammar of a language upon the thought of its speakers, he was less certain of the influence of its vocabulary.[15] Grammar could conceivably embody a general way of thinking, which could be transferred from one category of referents of language to another, or forced upon a speaker, obliged, by her language, to observe a certain distinction, but a mere word could only influence thought and behaviour when it carried connotations or suggestions, independent of its literal meaning, which might be misleadingly transferred across applications.

Moreover, it does not seem that Whorf believed that our language (whether vocabulary or grammar) would directly influence our perception, as opposed to thought and conceptualization. Thus, Whorf was certain that

> the apprehension of space is given in substantially the same form by experience irrespective of language.[16]

There is therefore reason to question the standard attribution to Whorf of the view that the colour vocabulary of a linguistic community will influence the ways colours are experienced and conceived. Nevertheless, as we shall see, it is the question of the influence of colour vocabulary on colour perception that has received the most attention from psychologists and anthropologists attempting to investigate the Sapir-Whorf hypothesis empirically.

Empirical research on the Sapir-Whorf Hypothesis

One of several important criticisms frequently made of Whorf's work is that it exhibits a tendency to use the existence of differing linguistic forms itself as evidence of differing patterns of thought. It has been realized that what empirical research on the Sapir-

[15] I concur, therefore, with J. A. Lucy, op. cit., note 10, 39–40.

On the Eskimo vocabulary example, see L. Martin, 'Eskimo words for snow: a case study in the genesis and decay of an anthropological example', *American Anthropologist*, **88** (1986), 418–23.

[16] 'The Relation of Habitual Thought and Behaviour to Language', op. cit., note 11, 158.

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Whorf hypothesis requires is an operational criterion of 'thought' or 'conceptualization' that is *independent* of language, in order to determine the effect of language—a cognitive ability we can test, that is independent of language.

Recognition has been suggested as one such criterion. In the 1950's, the American psychologists Roger Brown and Eric Lenneberg saw themselves as providing an empirically verifiable interpretation of Whorf's speculations, using colour recognition as the cognitive ability, supposedly independent of language, whose correlation with colour vocabulary would be tested. Widely diverging languages have widely different colour vocabularies, and it may be assumed that the ease of verbal classification of a particular colour (the number of words needed to name it, etc.) will differ from language to language. If ease of verbal classification were correlated with accuracy of recognition in English, then, Brown and Lenneberg reasoned, it would be so correlated in all languages, and different colours would be most accurately recognized by speakers of different languages.

In their very influential 'A Study in Language and Cognition', Brown and Lenneberg indeed found a correlation between ease of verbal classification of a colour stimulus within a particular linguistic community, on the one hand, and accuracy of recognition of that stimulus, on the other, confirming, they supposed, the Whorfian hypothesis that the world is differently experienced and conceived in different linguistic communities. Subsequent work in the 1980's attempted to re-instate their conclusions. J. A. Lucy and R. A. Schweder defended Brown and Lenneberg's results against criticism by Eleanor Rosch.[17]

Brown and Lenneberg were the first to find a correlation between what they called 'codability' (ease of, and agreement on, verbal clas-

[17] See R. W. Brown and E. H. Lenneberg, 'A Study in Language and Cognition', *Journal of Abnormal and Social Psychology*, **49** (1954), 454–62; E. Rosch, 'Linguistic Relativity', in *Thinking: Readings in Cognitive Science*, P. N. Johnson-Laird and P. C. Wason (eds) (Cambridge University Press, 1977), 501–22; J. A. Lucy and R. A. Schweder, 'Whorf and his Critics: Linguistic and Non-Linguistic Influences on Color Memory', *American Anthropologist*, **81** (1979), 581–615; L. C. Garro, 'Language, Memory, and Focality: A Re-Examination', *American Anthropologist*, **88** (1986), 128–36; J. A. Lucy and R. A. Schweder, 'The Effect of Incidental Conversation on Memory for Focal Colours', *American Anthropologist*, **90** (1988), 923–31; J. A. Lucy, 'The Scope of Linguistic Relativity: An analysis and review of empirical research', in *Rethinking Linguistic Relativity*, J. Gumperz and S. Levinson (eds) (Cambridge University Press, 1996), 37–69.

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sification of a colour stimulus) and accuracy of recognition. More recent research has found a correlation between what is called 'communication accuracy', on the one hand, and recognition, on the other, where the former is a measure of the degree to which a particular colour may be verbally described, in such a way as to enable another person to pick it out of an array, on the basis of the description.[18] It is the discovery of correlations of this sort that has frequently been proposed as giving support to the Sapir-Whorf hypothesis.[19]

The experiment in question (from Brown and Lenneberg) is one in which the subjects are first shown a sheet of one (or four) uniform colour(s) for between 5 seconds and 1 minute, and then, shortly after, a large array of (120) colours, in the form of a colour-chart. The subjects included both American college students and native speakers of the Zuni native American tribe of New Mexico. The experimental task was to recognize, on the chart, the colour previously seen. The samples were presented, removed and recognized one at a time. There were some colours that the Zuni recognized more accurately than the English-speakers, and some that the English-speakers recognized more accurately than the Zuni. It became apparent that the colours that a particular linguistic community could recognize more accurately were the colours for which the community in question had single-word labels. Thus, if the colour in question is, say, red and the Zuni describe this shade by a compound expression, then the Zuni speakers will recognize the shade less accurately than English speakers.

The correlation Brown and Lenneberg thought they had established is between the existence of a single word in the vocabulary of the linguistic community, on the one hand, and what they call the 'availability' of the colour category, on the other. Categories which were easily classified verbally in a particular language would be more 'available', as they put it, to members of that language-community than less easily named categories.[20] This notion is sharply

[18] See D. Lantz and V. Stefflre, 'Language and Cognition Revisited', *Journal of Abnormal and Social Psychology*, **69** (1964), 472–81; J. A. Lucy and R. A. Schweder, 'Whorf and His Critics', op. cit., note 17.

[19] See, e.g., R. W. Brown and E. H. Lenneberg, op. cit., note 17, *passim*; J. Fishman, 'A Systematisation of the Whorfian Hypothesis', *Behavioural Science*, **5** (1960), 329; J. A. Lucy and R. A. Schweder, op. cit., note 17, *passim*; D. E. Cooper, *Philosophy and the Nature of Language* (London: Longman, 1973), 107; J. Lyons, *Language and Linguistics* (Cambridge University Press, 1981), 307; P. Carruthers and J. Boucher, 'Introduction: opening up options', op. cit., note 2, 13.

[20] R. W. Brown and E. H. Lenneberg, op. cit., note 17, 456.

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distinguished from mere *ability* to perform perceptual discrimination, which they accepted is uncorrelated with linguistic differences.

It seems that a category is 'available', in Brown's and Lenneberg's sense, if its members are *readily* discriminated from other categories, readily fall together into a distinct group, when we perceive them. Different categories are more 'available' for different language communities. Brown and Lenneberg echo Whorf's famous example of the Eskimos and snow, and write:

> (W)hen the Eskimo steps from his igloo in the morning and is confronted by a snowy world, these snows will fall into named categories for him in a way that they will not for the American. If however the American were subjected to a discrimination learning experiment, or if the perceptual structure were otherwise made worth his while, he could see the snow as does the Eskimo.[21]

The idea is that different language communities readily *notice* different perceptual discriminations. People with differing colour vocabularies are led to notice different colour discriminations.

Brown and Lenneberg explicitly interpreted the Sapir-Whorf hypothesis as the conjunction of the thesis that structural differences between language systems are *correlated* with non-linguistic cognitive differences in native speakers, and the stronger thesis that the differences causally *influence* or *determine* the native speakers' world-views. They suggested that the correlation they had found lent strong support only to the Whorfian hypothesis that 'the world is differently experienced and conceived in different linguistic communities'.[22]

Brown and Lenneberg were careful to say that the correlation lends support to this non-causal thesis only, and not to the stronger claim that it is language which causally influences the psychological states or abilities. But philosophers have not been so careful. For example, D. E. Cooper, discussing a variation on the Brown and Lenneberg experiments, suggests that the experiments support the stronger thesis that the possession of the language *causes* the differing conceptualizations, and, in addition, takes the experiments to show that vocabulary affects *perception*, rather than 'availability'.[23]

Now it is, in fact, quite plausible to hold that there is a causal relation between the possession of a certain colour vocabulary and *recognition-memory* for (not perception of) certain colour categories. When initially presented with a colour sample, an association may

[21] R. W. Brown and E. H. Lenneberg, op. cit., note 17, 456.
[22] R. W. Brown and E. H. Lenneberg, op. cit., note 17, 454.
[23] D. E. Cooper, op. cit., note 19, 107–108.

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be formed in the subject's mind, between the sample of a particular shade and the word for that colour, and it is likely that this facilitates subsequent *recognition*. Certainly, 'verbal encoding', as psychologists call it, is the most commonly reported method of remembering such colour stimuli. Subjects would rehearse the name of the colour, whilst waiting to see the chart, and then pick out the shade which matches or re-evokes the name. Having a single-word label for a colour would be likely to aid recognition.

It seems we can retain words in memory in a way we cannot retain images. In colour recognition, verbal encoding seems to be the main basis of subjects' recognition. There is research that shows that subjects *think* that this is their main strategy[24], but, of course, subjects' introspective beliefs about their strategies are notoriously fallible.[25] However, there is also research that indicates that verbal encoding *is* the dominant strategy. J. A. Lucy and R. A. Schweder noted the effects of subjects' forgetting the term they had associated with the colour sample:

> Without memory for the basic term (e.g. 'it was a blue'), subjects had absolutely no idea which colour, or type of colour, they had seen. Subjects just stared helplessly at the array.[26]

Brown and Lenneberg (and all those who followed their line of research into the 1980s) chose recognition as the cognitive ability to be tested as to its correlation with verbal encoding, and they assumed that the accuracy of recognition-memory for the members of a category was an index of the 'availability' of that category, e.g., that, if a colour was accurately recognized after an interval, then that colour category was more 'available' than one not accurately recognized. Presumably the idea is that two samples, the identity of colour of which was recognized, would more readily fall together into a distinct group, when perceived simultaneously, than two samples the identity of colour of which was not recognized.

Now, if 'availability' were to refer to the tendency of members of a category to be grouped together when perceived at different times, the choice of recognition as an index of 'availability' might be justified. However, to hold that accuracy of recognition is an appropriate index of the degree to which members of a category are

[24] L. C. Garro, op. cit., note 17, *passim*; J. A. Lucy and R. A. Schweder, 'Whorf and his Critics', op. cit., note 17, 593.

[25] R. E. Nisbett and T. D. Wilson, 'Telling more than We Know: Verbal Reports on Mental Processes', *Psychological Review*, **84** (1977), 231–59.

[26] J. A. Lucy and R. A. Schweder, 'Whorf and his Critics', op. cit., note 17, 593. See discussion in my 'The Experience of Perceptual Familiarity', op. cit., note 1, 97–98.

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grouped together, readily discriminated from others, when perceived simultaneously, is, in my view, a mistake.

I should emphasize that I am not making the familiar point that accuracy of recognition is not an adequate index of *discrimination abilities*, since one can, obviously, successfully discriminate entities one has great difficulty in accurately recognizing.[27] Rather, I put forward the stronger contention that it is wrong to regard accuracy of recognition of members of a category as an index of our tendency to *notice* the discrimination between that category and others, that is, as indicative of the tendency of members of that category to be *readily* grouped together when seen simultaneously.

The reason this is a mistake is that the processes underlying recognition-memory differ according to the stimuli to be recognized. The cautionary note that my hypotheses regarding colour recognition lead us to sound is that in *colour* memory, recognition is highly dependent on verbal encoding, because the subjects cannot use perceptual fluency to determine whether they have seen the colour sample before. There is not the option, that there is in, say, picture recognition, of recognizing colour samples by their perceptual familiarity.

The high correlation between ease of verbal classification (or communication accuracy) and accuracy of recognition is, therefore, I would argue, a result of the special case of recognition-memory for phenomenologically simple stimuli such as colours, and does not reflect the kind of general phenomenon which those who favour a Whorfian hypothesis seek to establish. One cannot generalize from a single test of recognition, since that process cannot be assumed to be the same regardless of chosen stimuli. The correlation between verbal encoding and accuracy of recognition, a process that is more or less mediated by verbal encoding, depending on the stimuli used, cannot, therefore, be held to demonstrate a correlation between verbal encoding and subjects' tendency to notice discriminations, a disposition which is not necessarily mediated by linguistic encoding at all.

In this way, it may be seen that the cognitive ability tested in experiments of the kind Brown and Lenneberg pioneered—recog-

[27] Brown and Lenneberg did not intend to show that different linguistic communities have different discriminatory *abilities*, as already noted, and several commentators have correctly emphasized that the effect of linguistic encoding peculiarities is not that certain groups can perceive differences between colours that others cannot discriminate. See J. B. Carroll, op. cit., note 9, 95ff; J. Lyons, op. cit., note 19, 307; P. Kay and W. Kempton, 'What is the Sapir-Whorf Hypothesis?', *American Anthropologist*, **86** (1984), 72.

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nition-memory for colours—is not, after all, *independent* of language. It is not the non-linguistic marker needed to verify the correlation between language and non-linguistic cognition or experience.

An example will clarify this point. Brown and Lenneberg and other philosophers and linguists who think their research on colour recognition important support for a Whorfian hypothesis make much of an early cross-cultural study by Lenneberg and Roberts, in which it was found that the Zuni, who call orange and yellow by a single term, 'frequently confused the orange and yellow colours' in a recognition-memory test.[28] (This is itself a misleading way of putting things. What is meant is that the Zuni frequently misidentified an orange colour sample on the array with a yellow sample previously seen, and *vice versa*.)

But this mistake of recognition is arguably due precisely to the necessity of verbal encoding in accurate recognition of colours. When two stimuli share the same name in a linguistic community, *and* the method of recognition involves storing the *name* of the sample and then identifying a subsequent item as bearing the same name, it comes as no surprise that different items of the same name are frequently identified with each other, by native speakers in that community.

Firstly, however, none of this shows that the Zuni would similarly 'confuse' entities of other types that shared the same name. In particular, we are not given good reason to suppose that the Zuni would similarly 'confuse' *complex* stimuli that share the same name. There is no reason to think they would 'confuse' pictures of differing animal species that shared a common name, for example. Suppose the recognition-memory test involved pictures of animals rather than colours, and suppose (absurdly), for the sake of argument, that the Zuni have one word for domestic cats, leopards, and lions. The Zuni would surely not 'confuse' domestic cats and lions; after seeing a picture of a cat, a picture of a lion might re-evoke the same label, but the picture would not *look* sufficiently familiar, and would thus not be judged as the same as that of the cat.

Secondly, moreover, none of this shows that the Zuni readily group yellow and orange things together when they see them *simultaneously*, or would not be disposed to discriminate between them. We cannot infer this from a confusion of the two, over time, that may be merely due to the type of encoding process used in recognition.

[28] R. W. Brown and E. H. Lenneberg, op. cit., note 17, 461. Cf. E. H. Lenneberg and J. M. Roberts, 'The Language of Experience', *International Journal of American Linguistics*, **22**, Memoir 13 (1956), 31.

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There is thus no evidence from the phenomena Lenneberg and Roberts recorded to suggest the general principle that entities of the same name are more readily grouped together, on the basis of their perceptual appearance, than entities of different names. Brown and Lenneberg were misguided, then, in thinking that the correlation between lexical identities and discriminations, on the one hand, and tendencies to notice perceptual similarities and differences, on the other, could be proved by establishing a correlation between codability and accuracy of recognition. Their followers have generally tended to draw less ambitious conclusions from the codability/recognition correlation, such as that ease of verbal encoding facilitates memorability, a plausible doctrine, but not equivalent to the bolder Whorfian claim that language affects non-linguistic cognition and experience. Even these conclusions, however, cannot be taken as certain until extensive experiments are carried out on memory for stimuli of many varying types. What would be needed, if an attempt were to be made to defend the Whorfian claim of the widespread effect of native language on psychological abilities, is a thorough, comparative examination of recognition-memory for stimuli of differing levels of complexity.

Of course, methodological constraints have largely determined the choice of colours as the stimuli in such experiments.

> Colours have been the favourite stimulus material because their physical nature can be described relatively easily, standard stimulus material is readily available, the relative frequency of occurrence in the environment is not too likely to affect subjects' reactions in an experiment, and perceptual qualities may also be controlled relatively easily.[29]

But there has no doubt been an unconscious assumption, false, on my account, and very misleading, that colours, being so easy to *see*, must be just as easy to *recognize* as more complex entities, and can serve as a paradigm for all instances of recognition. The correlation between ease of verbal encoding and accuracy of recognition has been found to be less for recognition of pictures of facial expressions than for colours[30], and the facilitation of memorability by verbal encoding may well diminish, as entities become more complex,

[29] E. H. Lenneberg, 'Language and Cognition', in D. D. Steinberg and L. A. Jakobovits (eds), *Semantics* (Cambridge University Press, 1971), 546. Cf. E. H. Lenneberg and J. M. Roberts, op. cit., note 28, 6–7; R. W. Brown, 'Reference: In Memorial Tribute to Eric Lenneberg', *Cognition*, **4** (1976), 129ff.

[30] N. H. Frijda and J. P. van Geer, 'Codability and Recognition: An Experiment with Facial Expressions', *Acta Psychologica*, **18** (1961), 365.

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and memory is more able to benefit from the experience of familiarity of appearance.

It is far too premature to conclude, then, on the basis of experiments on colour recognition, that 'the structure of one's language influences perception and recall'.[31] That it influences perceptual discrimination has been demonstrated in no study; that it influences perceptual recognition and recall may have been shown for certain classes of entity, but there is no *a priori* reason why we should not discover, for instance, that recognition-memory for pieces of music is quite unaffected by whether or not we are able to name the piece played. It may be true that one's language affects what one remembers, or even what one notices or thinks, but this has not been demonstrated by the existing tradition of psychological research on recognition-memory.

It should be noted at this point that there is at least one other important recent source of evidence on the influence of colour vocabulary on colour perception, in the work of P. Kay and W. Kempton.[32] Kay's and Kempton's work, which compares English speakers with speakers of Tarahumara (a Mexican language, which has one word for both our 'green' and 'blue' colours), investigates subjective judgments of similarity of simultaneously perceived colours, rather than recognition judgments. The Sapir-Whorf hypothesis will predict that colours just on either side of the green-blue boundary will be judged by English-speakers to be further apart than Tarahumara speakers will judge them to be. This is precisely the result that is found.

The experiments are intriguing. It is sufficient to note that the experiments at first sight appear to demonstrate an effect of differing colour vocabulary on colour perception. But Kay and Kempton show convincingly that the correlation between colour vocabulary and judgments of similarity of colours that they demonstrate does *not* involve an effect on the actual perception of the colours in question. Rather, judgments of similarity are mediated by a linguistic 'name strategy', in which subjects judge that two colours must be more different in appearance because they have different names. Once again, we notice that the form of cognition or judgment that is tested in the experiment, which might be taken to show a Whorfian effect, is *not* in fact *non-linguistic*.[33] These experiments, then, do not lead to the conclusion that subjective experience of colour is in general affected by one's colour vocabulary. The Whorfian effect here is limited to the cases in which verbal strate-

[31] J. Lyons, op. cit., note 19, 307.

[32] P. Kay and W. Kempton, op. cit., note 27, 65–79.

[33] Kay and Kempton do not see it quite this way: op. cit., note 27, 76.

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gies are directly involved in the experimental task. Certainly, this is no demonstration of Sapir's view that we are 'at the mercy of our particular language'.

Conclusion

Where do these reflections leave us? Let me summarize. I have been mainly concerned here with the strongest version of the Sapir-Whorf hypothesis, according to which fundamental aspects of a speaker's experience and conceptualization are causally influenced or determined by his or her native language. I began by distinguishing it from a version of the Whorfian hypothesis with which it is difficult to disagree, namely the view that a speaker's language will have an effect on which linguistically mediated thoughts come most readily to mind.

One illustration of the stronger hypothesis comes from the claim that a botanical expert's vocabulary, say, would make his experience of a wood more finely discriminated than that of someone without botanical vocabulary. I did not disagree with this claim, but pointed out that, although learning such a vocabulary will no doubt bring the salient features of various trees to the attention of the expert, it is not the vocabulary *per se* but, rather, the experience of trees that is naturally involved in learning the vocabulary which has effects on subsequent experiences of woods.

What is needed, in order to evaluate the strong Whorfian claim, is empirical research on the correlation between the vocabulary (or grammar) of speakers and their non-linguistic perceptual abilities. Research in the tradition of Brown and Lenneberg was considered. Brown and Lenneberg claimed that a stimulus category was more 'available' for speakers whose language provided for easy verbal encoding of the category. So, if a language has a single word for all and only 'yellow' things, then speakers of that language would more readily notice the similarity in colour of yellow stimuli, when perceived, than speakers of a language in which yellow things are denoted with a more complex linguistic expression.

I pointed out that the hypothesis of perceptual familiarity, for which I have argued elsewhere, explains the correlation between ease of verbal encoding and accuracy of recognition-memory. But it also shows that such a correlation is poor evidence for a general relation between vocabulary and the 'availability' of a perceptual category. In the colour memory experiments of this experimental tradition, recognition is highly dependent on verbal encoding because subjects cannot use perceptual fluency to determine familiarity.

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One mistake to avoid is thinking that language directly influences or determines perceptual experience, when, in fact, it is the perceptual experience that went with language-learning that affects experience. A more serious mistake is thinking that language directly influences non-linguistic perceptual experience, when what it influences is, in fact, a linguistic phenomenon itself. The second mistake is the one found in the tradition represented by the experiments of Brown and Lenneberg, or Kay and Kempton.

So, my conclusion is a recommendation of caution. We must be wary of exaggerating the role that language plays in determining the nature of human experience. Certainly the oft-cited experiments on colour vocabulary and recognition should not be regarded as proving the influence of natural language on perceptual experience. Where is the latterday Whorfian to turn, in search of empirical support? One place may be Lucy's recent work indicating an influence of the *grammatical* treatment of *number*, on similarity judgments and recognition memory.[34] But social scientists and philosophers sympathetic to this line of research will do well to consider alternative explanations of the apparent effects of linguistic differences, analogous to those I have defended above.[35]

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[34] See J. A. Lucy, *Grammatical Categories and Cognition: A Case Study of the Linguistic Relativity Hypothesis* (Cambridge University Press, 1992), *passim*. Lucy shows that plural number is signalled more obligatorily and more widely in English than in Yucatec. For example, whereas both languages grammatically signal number of animals, Yucatec does not grammatically signal number of implements. Lucy then demonstrates, *inter alia*, that, in picture recognition memory tests, Yucatec speakers, unlike English speakers, misidentify pairs of pictures containing a change in the number of implements more often than pairs of pictures containing a change in the number of animals. My view is that the recognition memory, similarity-judgment, and other tests Lucy uses are not genuinely non-verbal, so that the results lend little support to the 'bold' Whorfian claim of linguistic influence on non-linguistic cognition or perceptual experience, but I shall not pursue this here.

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