



SEEING BOTH SIDES

DO PEOPLE WHO SPEAK DIFFERENT LANGUAGES THINK DIFFERENTLY?

The role of language in mind

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Imagine you were born among the Pirahã, a remote tribe in the Amazon. You would speak a language with, it seems, no words for color, no words for uncles or cousins, no words for numbers, no easy way to talk about the future or to make complex sentences by embedding (Everett, 2005). What, then, would be the character of your thoughts? Or suppose you parachute into the tribe, and learn to speak their language, do you think you could easily tell them about your world?

Armchair thought-experiments of this kind used to intrigue linguists, laymen, and psychologists, such as Sapir, Whorf and Carroll. Then with the rise of the cognitive science movement in the 1960s they became suddenly unfashionable, because human cognition was viewed as a uniform processing machine, with a structure and content largely built into our genes. It followed that the Pirahã, unbeknownst to themselves, actually had the concepts 'pink', 'cousin', '17', 'next year', even 'algorithm' and 'symphony' - they simply didn't have the words for them (Fodor, 1975). There was a universal language of thought, 'mentalese', for which different languages were merely an input-output system (Pinker, 1994). This view is now losing ascendancy, for a number of reasons, one is the rise of alternative computational metaphors (Parallel Distributed Processing, neural networks) that emphasize learning from experience, and another the phenomenal rise of neurocognition and the beginnings of neurogenetics, both of which reveal the importance of human differences.

Another reason why interest is returning to the role of language in cognition is empirical. It turns out for example that the Pirahã can't think '17'; they really don't have elementary number concepts (Gordon, 2004). No experiments have been done on their color discrimination, but in other cultures we find a systematic relation between the kinds of color words and color concepts. For example, speakers of a language like English with a 'blue' vs. 'green' distinction exaggerate the actual distance (in JNDs or just noticeable differences) between blue and green, while speakers of a language (like Taruhumara) with a 'grue' term covering both green and blue, do not (Kay & Kempton, 1984, Davidoff et al., 1999). Recently Kay and colleagues have shown that this effect is due to the right visual field, which projects to the

left brain hemisphere where language is processed (Gilbert et al., 2006), and that toddlers switch their categorical perception for color over to the left hemisphere as they learn color terms (Franklin et al., 2008a, b). Less surprisingly, a native language also changes our audition, we become blind (or rather deaf) in early infancy to sounds not in our language (Kuhl, 2000). Thus language alters our very perception of the world around us.

What about more abstract domains like space and time? It turns out that the way we talk about time in a language makes a difference to how we think about it. In Chinese, a vertical spatial metaphor is often used so that earlier events are 'up' and later ones 'down', whereas in English we prefer to think of the future 'ahead' and the past 'behind'. Chinese speakers, but not English speakers, are faster to respond to a time question when they have previously seen a vertical spatial prime (Boroditsky, 2001). This suggests that for thinking about abstract domains like time we borrow the language we use for the more concrete spatial domain, and so different spatial language makes a difference to temporal thinking.

Spatial language itself differs radically across languages. In some languages there are no terms for 'left' and 'right' (as in 'the knife is left of the fork'). Instead one has to use notions like 'north' and 'south' even for things on the table (Majid et al., 2004)! Systematic experimentation in over a dozen languages and cultures shows how powerful these differences are (Levinson, 2003). Speakers of north/south vs. left/right languages remember and reason in ways consistent with their spatial strategies in language, even when language is not required. An interesting question is which system is most natural? Experiments with apes and pre-linguistic infants suggest that the north/south one is core, and the left/right emphasis comes from our own culture and language (Haun et al., 2006). So next time you pass the salt, think about how you might be thinking about it differently had you been born in another culture!

Our senses, and arguably our more abstract thoughts too, may be set up innately to deliver veridical information and inference, but rapidly in infancy we imbibe the language and categories of our culture and use these to make the discriminations and inferences that the culture has found useful through historical adaptation to its environment. As psychology enters an era of preoccupation with individual differences, we can be sure that many more ways in which language and culture influence cognition (and, no doubt, constraints on those effects) will be discovered.