Encyclopedia of Cognitive Science

Volume 2

Editor-in-Chief

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nature publishing group

London, New York and Tokyo

Published by
Nature Publishing Group, 2003
The Macmillan Building, 4 Crinan Street, London, N1 9XW, UK

Associated companies and representatives throughout the world

www.nature.com

ISBN: 0-333-792610

Distributed on behalf of the Nature Publishing Group in the United States and Canada by
Grove's Dictionaries, Inc.
345 Park Avenue South,
New York,
NY 10010-1707,
USA

British Library Cataloguing in Publication Data
Encyclopedia of cognitive science
1. Cognitive science – Encyclopedias
I. Nadel, Lynn
153'.03

Library of Congress Cataloging in Publication Data

A catalog for this record is available from the Library of Congress

Typeset by Kolam Information Services Pvt. Ltd., Pondicherry, India
Printed and bound by The Bath Press, England

Chomsky N (1961) Some methodological remarks on generative grammar. *Word* **17**: 219–239.
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Linguistic Relativity

Intermediate article

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CONTENTS

Languages differ dramatically from one another in terms of how they describe the world. Does having different ways of describing the world lead speakers of different languages also to have different ways of thinking about the world?

DOES LANGUAGE SHAPE THOUGHT?

Humans communicate with one another using an amazing array of languages, and each language differs from the next in innumerable ways (from obvious differences in pronunciation and vocabulary to more subtle differences in grammar). For example, to say that 'the elephant ate the peanuts' in English, we must include tense – the fact that the event happened in the past. In Mandarin and Indonesian, indicating when the event occurred would be optional and couldn't be included in the verb. In Russian, the verb would need to include tense and also whether the peanut-eater was male or female (though only in the past tense), and whether said peanut-eater ate all of the peanuts or just a portion of them. In Turkish, on the other hand, one would specify (as a suffix on the verb) whether the eating of the peanuts was witnessed or if it was hearsay. It appears that speakers of different languages have to attend to and encode strikingly different aspects of the world in order to use their language properly (Sapir, 1921; Slobin, 1996). Do these quirks of languages affect the way their speakers think about the world? Do English, Mandarin, Russian, and Turkish speakers end up attending to, partitioning, and remembering their experiences differently simply because they speak different languages?

The idea that thought is shaped by language is most commonly associated with the writings of Benjamin Lee Whorf (Whorf, 1956). Whorf, impressed by linguistic diversity, proposed that the categories and distinctions of each language enshrine a way of perceiving, analyzing, and acting in the world. In so far as languages differ, their speakers too should differ in how they perceive and act in objectively similar situations. This strong Whorfian view – that thought and action are entirely determined by language – has long been abandoned in the field. However, definitively answering less deterministic versions of the 'does language shape thought' question has proven to be a very difficult task. Some studies have claimed evidence to the affirmative (e.g. Boroditsky, 2001; Bowerman, 1996; Davidoff *et al.*, 1999; Gentner and Imai, 1997; Levinson, 1996; Lucy, 1992; Dehaene *et al.*, 1999), while others report evidence to the contrary (e.g. Heider, 1972; Malt *et al.*, 1999; Li and Gleitman, 2002).

In recent years, research on linguistic relativity has enjoyed a considerable resurgence, and much

new evidence regarding the effects of language on thought has become available. This chapter reviews several lines of evidence regarding the effects of language on people's representations of space, time, substances, and objects.

SPACE

Languages differ considerably in how they describe spatial relations. Many such differences have been noted among English, Dutch, Finnish, Korean, and Spanish, among others (Bowerman, 1996). For example, English distinguishes between putting things into containers ('the apple *in* the bowl', 'the letter *in* the envelope') and putting things onto surfaces ('the apple *on* the table', 'the magnet *on* the refrigerator door'). Cross-cutting this containment/support distinction, Korean distinguishes between tight and loose fit or attachment. For example, putting an apple *in* a bowl requires a different relational term (*nehta*) from putting a letter *in* an envelope (*kitta*), because the first is an example of loose containment and the second an example of tight fit. Further, putting a letter *in* an envelope and putting a magnet *on* the refrigerator are both described by *kitta* because both involve close fit.

To test whether these cross-linguistic differences are reflected in the way English and Korean speakers represent spatial relations, McDonough *et al.* (2000) showed scenes involving tight or loose fit to Korean- and English-speaking adults. After they had seen a few examples of either tight fit or loose fit, the subjects were shown an example of tight fit on one screen, and an example of loose fit on another. While Korean-speaking adults looked longer at the kind of spatial relation they had just been familiarized with, English speakers did not distinguish between the tight- and loose-fit scenes, looking equally long at the familiar and novel scenes. Further, when given several examples of tight fit and one example of loose fit (or vice versa), Korean adults could easily pick out the odd picture, but English speakers could not. Finally, McDonough *et al.* found that unlike adult English speakers, prelinguistic infants (being raised in both English-speaking and Korean-speaking households) distinguished between tight and loose fit in the looking-time test described above. This pattern of findings suggests that infants may come ready to attend to any number of spatial distinctions. However, as people learn and use language, the spatial distinctions reinforced by their particular language are the ones that remain salient in their representational repertoire.

Dramatic cross-linguistic differences have also been noted in the way languages describe spatial locations (Levinson, 1996). Whereas most languages (e.g. English, Dutch) rely heavily on relative spatial terms to describe the relative locations of objects (e.g. left/right, front/back), Tzeltal (a Mayan language) relies primarily on absolute reference (a system similar to the English north/south direction system). Spatial locations that are north are said to be downhill, and those south are said to be uphill. This absolute uphill/downhill system is the dominant way to describe spatial relations between objects in Tzeltal; no relational equivalents to the English terms front/back or left/right are available (Levinson, 1996).

To test whether this difference between the two languages has cognitive consequences, Levinson (1996) tested Dutch and Tzeltal speakers in a number of spatial tasks. In one study, participants were seated at a table and an arrow lay in front of them pointing either to the right (north) or to the left (south). They were then rotated 180 degrees to a second table which had two arrows (one pointing to the left (north) and one to the right (south)), and were asked to identify the arrow 'like the one they saw before'. Dutch speakers overwhelmingly chose the 'relative' solution. If the stimulus arrow pointed to the right (and north), Dutch speakers chose the arrow that still pointed to the right (though it now pointed south instead of the original north). Tzeltal speakers did exactly the opposite, overwhelmingly choosing the 'absolute' solution. If the stimulus arrow pointed to the right (and north), Tzeltal speakers chose the arrow that still pointed north (though it now pointed left instead of right). Thus, Tzeltal speakers' heavy reliance on absolute reference in spatial description appears to have affected their interpretation of (and performance on) a nonlinguistic orientation task.

Further studies of this task showed that English speakers (English is the same as Dutch in this respect) do not always favor relative responses; certain contextual factors can be used to induce English speakers to produce both absolute and relative responses on these tasks (Li and Gleitman, 2002). This is not surprising since English speakers use both absolute and relative forms in their language. It remains to be seen whether the same contextual factors can induce Tzeltal speakers to produce relative responses despite an apparent lack of relative terms in Tzeltal.

In summary, the evidence available so far suggests that reference frames and distinctions made available by one's language may indeed impose important constraints on one's spatial thinking.

TIME

Languages also differ from one another on their descriptions of time. While all languages use spatial terms to talk about time ('looking *forward* to a brighter tomorrow', 'proposing theories *ahead* of our time', 'falling *behind* schedule'), different languages use different spatial terms. For example, in English, we predominantly use front/back terms to talk about time. We can talk about the good times *ahead* of us, or the hardships *behind* us. We can move meetings *forward*, push deadlines *back*, and eat dessert *before* we're finished with our vegetables. On the whole, the terms used to order events are the same as those used to describe asymmetric horizontal spatial relations (e.g. 'he took three steps *forward*' or 'the path is *behind* the store'). In Mandarin, front/back spatial metaphors for time are also common (Scott, 1989). Mandarin speakers use the spatial morphemes *qián* (front) and *hòu* (back) to talk about time. What makes Mandarin interesting for present purposes is that Mandarin speakers also systematically use vertical metaphors to talk about time (Scott, 1989). The spatial morphemes *shàng* (up) and *xià* (down) are frequently used to talk about the order of events, roughly translated into English as *last* and *next*. Earlier events are said to be *shàng* or 'up', and later events are said to be *xià* or 'down'. In summary, both Mandarin and English speakers use horizontal terms to talk about time. In addition, Mandarin speakers commonly use the vertical terms *shàng* and *xià*.

So, do the English and Mandarin ways of talking about time lead to differences in how people think about time? Specifically, are Mandarin speakers more likely to construct vertical timelines to think about time, while English speakers are more likely to construct horizontal timelines? A collection of studies showed that Mandarin speakers tend to think about time vertically even when thinking for English (Boroditsky, 2001). For example, Mandarin speakers were faster to confirm that March comes earlier than April if they had just seen a vertical array of objects than if they had just seen a horizontal array. The reverse was true for English speakers. Another study showed that the extent to which Mandarin–English bilinguals think about time vertically is related to how old they were when they first began to learn English. In another experiment native English speakers were taught to talk about time using vertical spatial terms in a way similar to Mandarin. On a subsequent test, this group of English speakers showed the same bias to think about time vertically as was observed with Mandarin speakers.

This last result suggests two things: (1) language is a powerful tool in shaping thought, and (2) one's native language plays a role in shaping habitual thought (how we tend to think about time, for example) but does not completely determine thought in the strong Whorfian sense (since one can always learn a new way of talking, and with it, a new way of thinking).

SHAPES AND SUBSTANCES

Languages also differ in the extent to which they make a grammatical distinction between objects and substances. For example, in English, objects like candles and chairs have distinct singular and plural forms (e.g. one candle versus two candles), but substances like mud and wax do not. Further, objects and substances are distinguished in English in counting. While one can say 'one candle, two candles, three candles' and so on, counting substances is a bit trickier. Instead of saying 'one mud, two muds', English speakers must specify the unit of measurement such as 'one mound of mud' or 'one cup of mud' (words like 'mound' and 'cup' here are called 'unitizers' because they specify the unit of measurement).

Unlike English, some languages do not have a grammatical boundary between objects and substances. In Yucatec Mayan, for example, all nouns act almost as if they refer to substances. All nouns require a unitizer when counting (usually specifying shape or form, for example 'one long thin unit'), and don't necessarily need to take distinct plural and singular forms (Lucy and Gaskins, 2001). This means that 'two candles' in English is more like 'two long thin units of wax' in Yucatec. Does talking about objects as if they were substances in their language lead Yucatec Mayans to attend more to the materials and substances that comprise the objects? Several studies suggest that this is indeed the case (e.g. Lucy and Gaskins, 2001). English speakers and Yucatec Mayans were shown an example object (e.g. a plastic comb with a handle) and asked to choose which of two other objects was more similar to this example. The two choices varied from the example either in shape (a plastic comb with no handle), or in material (a wooden comb with a handle). English speakers preferred the shape match, saying that the two combs with a handle were more similar (even though they were made of different materials). Yucatec Mayans, on the other hand, preferred the material match, saying that the two plastic combs

were more similar (even though they differed in shape). These findings suggest that aspects of grammar can in fact shape the way speakers of a language conceptualize the shapes and materials of objects.

OBJECTS

Finally, languages also differ in how names of objects are grouped into grammatical categories. One such common feature of languages is grammatical gender. Unlike English, many languages have a grammatical gender system whereby all nouns (e.g. penguins, pockets, and toasters) are assigned a gender. Many languages only have masculine and feminine genders, but some also assign neuter, vegetative, and other more obscure genders. When speaking a language with grammatical gender, speakers are required to mark objects as gendered through definite articles and gendered pronouns, and often need to modify adjectives or even verbs to agree in gender with the nouns. Does talking about inanimate objects as if they were masculine or feminine actually lead people to think of inanimate objects as having a gender?

A recent set of studies suggests that the grammatical genders assigned to objects by a language do indeed influence people's mental representations of objects (Boroditsky *et al.*, in press). For example, Spanish and German speakers were asked to rate similarities between pictures of people (males or females) and pictures of objects (the names of which had opposite genders in Spanish and German). Both groups rated grammatically feminine objects to be more similar to females and grammatically masculine objects more similar to males. This was true even though all objects had opposite genders in Spanish and German, the test was completely nonlinguistic (conducted entirely in pictures with instructions given in English), and even when subjects performed the task during a verbal suppression manipulation (which would interfere with their ability to subvocally name the objects in any language). Other studies demonstrated that Spanish and German speakers also ascribe more feminine or more masculine properties to objects depending on their grammatical gender. For example, asked to describe a 'key' (a word masculine in German and feminine in Spanish), German speakers were more likely to use words like 'hard, heavy, jagged, metal, serrated, and useful', while Spanish speakers were more likely to say 'golden, intricate, little, lovely, shiny, and tiny'. To describe a 'bridge', on the other hand, (a word feminine in German and masculine in Spanish), German speakers said 'beautiful, elegant, fragile, peaceful, pretty, and slender', while Spanish speakers said 'big, dangerous, long, strong, sturdy, and towering'. These findings once again indicate that people's thinking about objects is influenced by the grammatical genders their native language assigns to the objects' names. It appears that even a small fluke of grammar (the seemingly arbitrary assignment of a noun to be masculine or feminine) can have an effect on how people think about things in the world.

CONCLUSION

Languages appear to influence many aspects of human cognition: evidence regarding space, time, objects, and substances has been reviewed in this article, but further studies have also found effects of language on people's understanding of numbers, colors, shapes, events, and other minds. Considering the many ways in which languages differ, the findings reviewed here suggest that the private mental lives of people who speak different languages may differ much more than previously thought.

Beyond showing that speakers of different languages think differently, these results suggest that linguistic processes are pervasive in most fundamental domains of thought. That is, it appears that what we normally call 'thinking' is in fact a complex set of collaborations between linguistic and nonlinguistic representations and processes. Further research into linguistic relativity may help uncover the exact nature of the interactions between these many processes in the service of complex cognitive function, as well as help us to establish what might be core or universal in human cognition.

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