

# NewScientist

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you speak control the  
way you think?

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It's said that to have a second language is to have a second soul. *Alison Motluk* meets the psychologists who aim to show that your mother tongue really does affect the way you see the world

# You are what you speak



DOES the language you speak influence the way you think? Does it help define your world view? Anyone who has tried to master a foreign tongue has at least considered the possibility. And those who have ever had cause to remonstrate with a foreign lover may even be convinced.

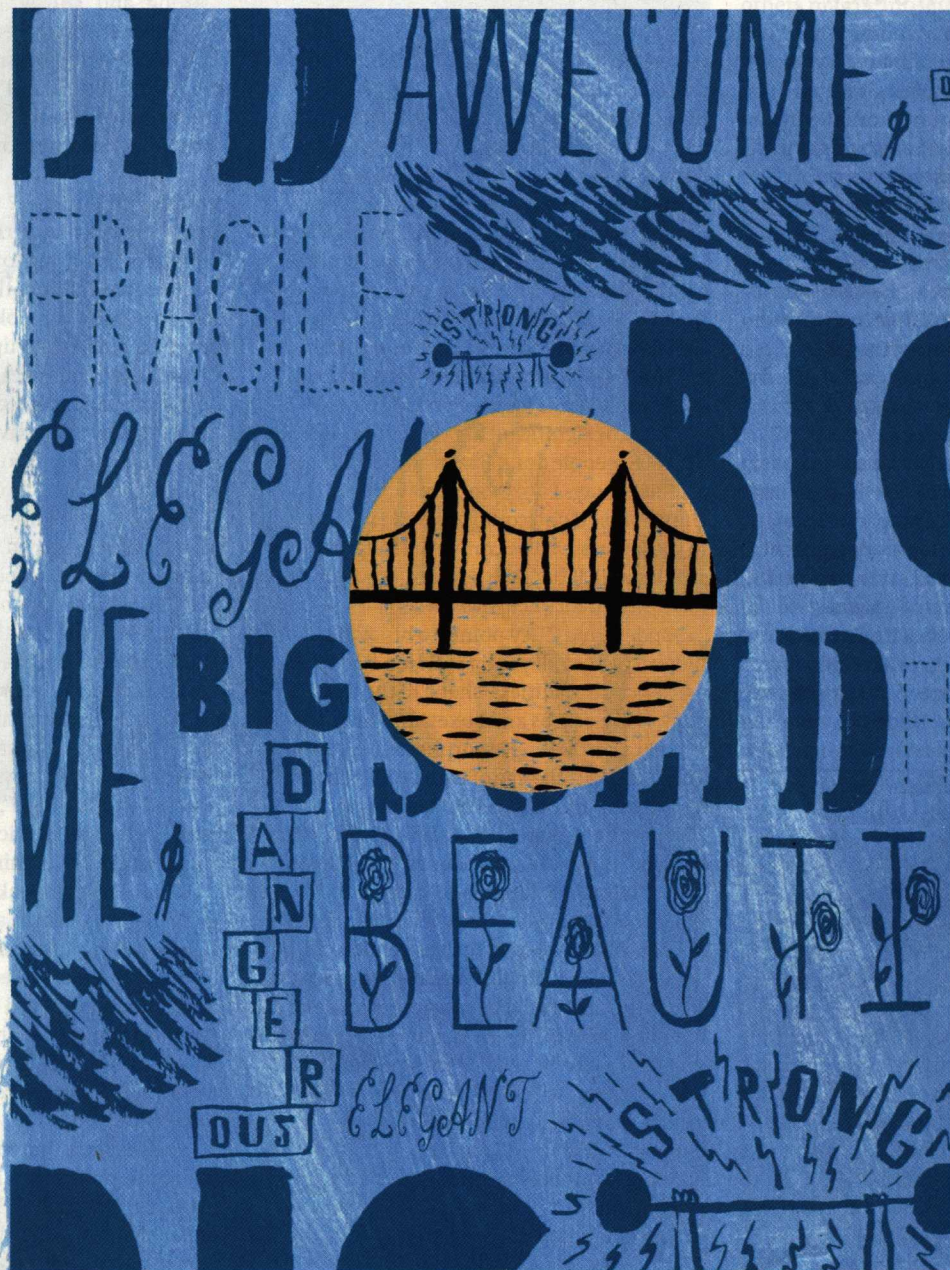
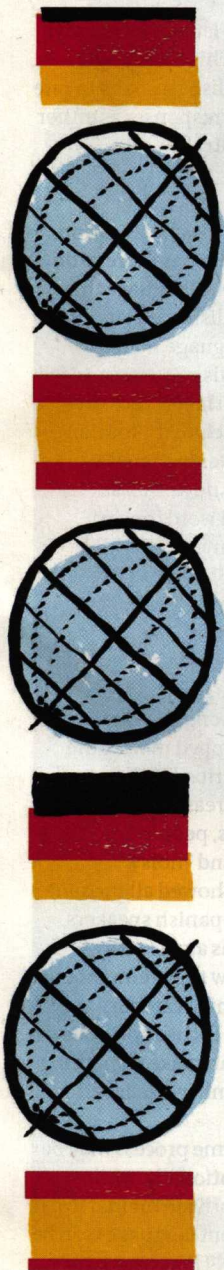
At first glance, the idea seems perfectly plausible. Conveying even simple messages requires that you make completely different observations depending on your language. Imagine being asked to count some pens on a table. As an English speaker, you only have to count them and give the number – let's say there are 11. But a Russian also has to consider what gender the pens are (neuter), then use the neuter form of the word for 11. And a Japanese speaker has to take into account their shape (long and cylindrical) as well, and use the word for 11 designated for items of that form.

On the other hand, surely pens are just pens, no matter what your language compels you to specify about them? Little linguistic peculiarities, though amusing, don't change the objective world we are describing. So how can they alter the way we think?

Scientists and philosophers have been grappling with this thorny question for centuries. There have always been those who argue that our picture of the Universe depends on our native tongue. Since the 1960s, however, with the ascent of thinkers like Noam Chomsky and a host of cognitive scientists, the consensus has been that linguistic differences don't really matter, that language is a universal human trait, and that our ability to talk to one another owes more to our shared genetics than to our varying cultures. But now the pendulum is beginning to swing the other way as psychologists re-examine the question.

This new generation of scientists is not convinced that language is innate and hard-wired into our brain. "Language is not just notation," says Dan Slobin of the University of California at Berkeley. "The brain is shaped by experience." Slobin and others say that small, even apparently insignificant differences between languages do affect the way speakers perceive the world. "Some people argue that language just changes what you attend to," says Lera Boroditsky of the Massachusetts Institute of Technology. "But what you attend to changes what you encode and remember." In short, it changes how you think.

To start with the simplest and perhaps subtlest example, preparing to say something in a particular language demands that you pay attention to certain things and ignore others. In Korean, for instance, simply to say hello you need to know if you're older or younger than ▶



"The word 'bridge' is masculine in Spanish and feminine in German"

the person you're addressing. Even a day's difference can matter. Spanish speakers have to decide whether a relationship is intimate enough to employ *tu* or formal enough to require *Usted*. In Japanese, simply deciding which form of the word "I" to use demands complex calculations involving your age, the age of the person you're speaking to, your gender, their gender and your relative status.

This process is what Slobin calls "thinking for speaking" and he argues that it can have a huge impact on what we deem important and, ultimately, how we think about the world. To give another example, about a third of the world's languages describe location in

languages is the way objects are classified. In English, shape is implicit in many nouns. We think in terms of discrete objects, and it is only when we want to quantify amorphous things like sugar that we employ units such as "cube" or "cup". But in Yucatec, objects tend to be defined by separate words that describe shape. So, for example, a "long thin wax" is a candle. Likewise, "long banana" describes the fruit, while "flat banana" means "banana leaf" and a "seated banana" is a "banana tree".

To find out if this classification system has any far-reaching effects on how people think, Lucy asked English and Yucatec-speaking volunteers to do a likeness task. In one

To construct sentences in these languages, she says, you end up thinking about gender – even if it's arbitrary – thousands of times every day.

To test how this affects the way people think, she presented Spanish and German-speaking volunteers with nouns that happened to have opposite genders in their native tongues. "Key", for instance, is feminine in Spanish and masculine in German, and "bridge" is masculine in Spanish and feminine in German. Boroditsky asked the volunteers to come up with adjectives – in English – to describe these items. German speakers described keys as "awkward", "worn", "jagged" and "serrated", while Spanish speakers saw them as "little", "lovely", "magic" and "intricate". To Germans, bridges were "awesome", "beautiful", "fragile" and "elegant", whereas Spanish speakers considered them "big", "dangerous", "solid", "strong" and "sturdy".

"These are really gender-laden terms," says Boroditsky. She confirmed this by asking a team of "gender-blind" English speakers to rate the adjectives used in these responses as either masculine, feminine or neutral.

#### Oosative or soupative?

Critics argued that perhaps the classification of objects according to gender has more to do with people's culture than the language they use. So Boroditsky took English speakers and taught them a made-up language, called Gumbuzi. In Gumbuzi, words were categorised according to gender-neutral labels "oosative" or "soupative". Oosatives included a fork, an apple and a guitar. Soupatives included a spoon, a pear and a violin. And as well as remembering the Gumbuzi word for each object, volunteers had to remember which category they belonged to. She then assigned pictures of ballerinas and brides, or boys and kings, arbitrarily to either group.

Despite the fact that the English-speaking volunteers had no experience of gender assignment in their native tongue, when the picture of the violin was lumped in with the feminine images, they described it as "artsy", "curvy" and "delicate", whereas when it was with the masculine pictures, people described it as "impressive", "shiny" and "noisy".

The Gumbuzi speakers showed all the same effects as the German and Spanish speakers, says Boroditsky. And she has an idea why. Afterwards, when asked how they remembered which items belonged in which category, the volunteers admitted they'd focused on male or female attributes. "If you can make something meaningful, you can remember much better," says Boroditsky.

She suspects that this same process may be happening, albeit less intentionally, while we learn real languages. "The private mental lives of people who speak different languages can be very different," she argues. "This is incredibly

## To English speakers, time is horizontal and the future lies ahead. In Mandarin, however, time is vertical, springing up from the ground like oil from a well"

"absolute" terms: speakers of many Pacific island languages, for example, would say "north of the tree" or "seaward from the tree" rather than "beside the tree", as we might in English. In these languages, you always need to know where you are in relation to fixed external reference points, says Slobin. "Even when you are in a windowless room, or travelling in a bus in the dark," he says, "you must know your location relative to the fixed points in order to talk about events and locations." So, even if you didn't use the word "north" in conversation, you would always know where it was.

Whether your language places an emphasis on an object's shape, substance or function also seems to affect your relationship with the world, according to John Lucy, a researcher at the Max Planck Institute for Psycholinguistics in Nijmegen in the Netherlands. He has compared American English with Yucatec Maya, spoken in Mexico's Yucatan Peninsula. Among the many differences between the two

experiment, he gave them three combs and asked which two were most alike. One was plastic with a handle, another wooden with a handle, the third plastic without a handle. English speakers thought the combs with handles were more alike, but Yucatec speakers felt the two plastic combs were. In another test, Lucy used a plastic box, a cardboard box and a piece of cardboard. The Americans thought the two boxes belonged together, whereas the Mayans chose the two cardboard items. In other words, Americans focused on form, while the Mayans focused on substance.

But how significant are these findings? "Yucatec people don't live in a world of artefacts," says Paul Bloom from Yale University. "If you could get these results in the Japanese I'd be convinced." Similar studies with Japanese speakers, however, have proved inconclusive.

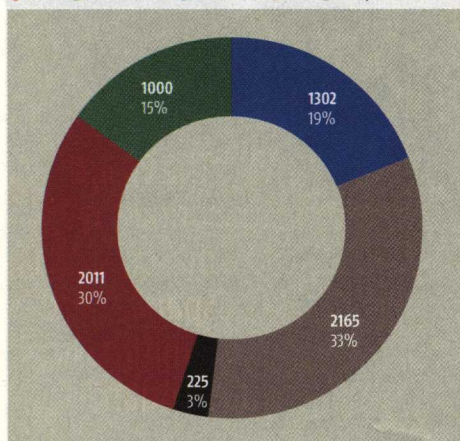
Undeterred, Lucy points to his own studies indicating that all young children tend to focus on the same qualities – shape in the case of objects like combs and boxes, and material when it's something amorphous like sugar. Then, at about the age of eight, differences begin to emerge that reflect language. "Everyone comes with the same possibilities," he says, "but there's a tendency to make the world fit into our [linguistic] categories."

Boroditsky argues that even artificial classification systems, such as gender, can be important. To an English speaker, the idea that words can arbitrarily be considered male or female or neutral is peculiar. It makes no sense that words like "bra" and "uterus" can be masculine while "penis" can be feminine. What's more, there is no agreement between languages. The word "sun" is neutral in Russian, feminine in German, and masculine in Spanish. Some psychologists argue that these inconsistencies suggest gender is just a meaningless tag. Boroditsky disagrees.

#### LINGUISTIC TREASURE

Number of languages spoken in each region % of total

● Africa ● The Americas ● The Pacific ● Asia ● Europe





important if you are interested in the way people think.”

But critics, including Lila Gleitman from the University of Pennsylvania, are unconvinced. She says the questions that Boroditsky asks her volunteers make no sense, so people just guess at an answer. It's a bit like studies where people are asked: “Which is the better example of an odd number, 7 or 15?” and most people answer “7”. “If you can't make head nor tail of the question,” says Gleitman, “you do the best you can.” Bloom, too, has reservations. He believes that for gender influences to be significant in altering our world views they would have to spill out into other domains. To test whether this does happen, Boroditsky is currently analysing bridge design in countries that speak Spanish or German.

The general consensus is that while the experiments done by Lucy, Boroditsky and others may be intriguing, they are not compelling enough to shift the orthodox view that language does not have a strong bearing on thought or perception. The classic example used by Chomskians to back this up is colour. Over the years, many researchers have tried to discover whether linguistic differences in categorising colours lead to differences in perceiving them. Colours, after all, fall on a continuous spectrum, so we shouldn't be surprised if one person's “red” is another person's “orange”. Yet most studies suggest that people agree on where the boundaries are, regardless of the colour terms used in their own language.

But it's not as simple as that. Some studies – including one of hunter-gatherers from New Guinea called the Berinmo – do suggest that language affects our interpretation of colours. Other findings are open to debate. Besides, Boroditsky and others argue that colour is not the best example to test their idea because it can be observed directly. They believe language may wield its strongest influence in abstract domains, such as concepts of time, love, numbers and political ideas, where sensory information can't really help.

Consider time. Many languages use spatial terms to describe it. In English, we say things like “The best is *ahead* of us” or “We're *behind* schedule” or “Let's move the meeting *forward*”. To English speakers, in other words, time is horizontal and the future lies ahead. In Mandarin, however, time is vertical, springing up from the ground like oil from a well, and this is reflected in the phrases that Mandarin speakers use to talk about it. Point to the future and it's down, not straight out. But does this little distinction matter?

To find out, Boroditsky took Chinese volunteers bilingual in Mandarin and English and had them watch fish swimming on a computer screen – in some cases vertically, and in others horizontally. In English, she asked questions like, “Does March come earlier or ▶

later than April?" She reasoned that if her volunteers were thinking about time vertically, then the fish swimming straight up the screen should speed up those thoughts, and the opposite should be true for other volunteers who spoke only English. This is indeed what she found. Boroditsky sees this as evidence that people think of time in fundamentally different ways depending on their native tongue. But Gleitman is quick to counter that we can be taught very easily to think of time in different ways – and that Boroditsky's own follow-up studies confirm this.

Perhaps more compelling is the idea that the language you speak systematically

visualise events and what we feel about them. We all live in the same objective world, but different languages focus on different aspects of it. In languages such as English, Dutch, Russian, Finnish and Mandarin, for instance, verbs are very expressive in describing the way action takes place. Other languages, such as Spanish, French, Italian, Hebrew and Turkish, tend to use simpler action words, such as "go", then perhaps add a few words to indicate how the subject moved, for instance, "while running". The former languages provide manner "for free", while the latter have to append it – and often don't even bother.

Bilingual people report that news seems

of languages with prosaic verbs compensate somehow, perhaps by mentally embellishing simple words with extra action. To test this idea he gave English and Spanish monolinguals passages to read from Spanish-language novels. English speakers read direct, not literary, translations. So, for example, a passage from Isabel Allende's novel *La Casa de los Espiritus* read in English like this:

*"He picked up his bags and started to walk through the mud and stones of a path that led to the town. He walked for more than ten minutes, grateful that it was not raining, because it was only with difficulty that he was able to advance along the path with his heavy suitcases, and he realised that the rain would have converted it in a few seconds into an impassable mudhole."*

Afterwards, Slobin asked the volunteers to describe the way the protagonist moved – and found the opposite of what he had predicted. The English speakers reported rich mental imagery for the way the character "stumbled" and "trudged" into town. Very few of the Spanish speakers, from Mexico, Chile and Spain, did so. Most of them said nothing at all about the way the protagonist moved and in fact reported seeing "static images".

What's more, Spanish-English bilinguals showed the same dichotomy. After reading the Spanish version, they reported clear images of the man's physical surroundings but said things like, "I don't see any sort of detailed action." Yet a typical response from the very same people, answering the same question about the same passage written in English, was: "I can see more concrete walking and can sort of make out a pace... The story feels different." So, far from embellishing, people using languages like Spanish that lack colourful verbs apparently don't pay much attention to motion. "I find the Allende findings really puzzling," admits Slobin.

For the moment, Slobin and others are scratching their heads trying to understand some of their findings but, if it does turn out that the language we speak influences the way we think, the implications are far-reaching. We already know that each language is unique and provides its own insights into human history and culture, but if they also provide different ways of seeing the world then they are even more valuable than we had assumed. "We need all of this kind of data to understand human nature," says Slobin.

And with at least half of the world's 6000 languages likely to disappear over the next century, scientists are racing to learn what they can about them (see "Windows on other worlds"). When languages become extinct, warns Slobin, so do some of their unique insights. Boroditsky agrees. "Some languages may have invented certain ways of thinking that could be useful to us," she says. "We don't even know what treasures there are." ●

## "Bilingual people report that news seems much more dynamic, full of energy and violent when written in a language like English that has descriptive verbs"

influences your interpretation of events that you don't witness yourself, but only hear about. "Almost everything we know about the world comes through language," Slobin points out. Speech allows us to experience the world vicariously in a way that no other animal can. We tend to assume that a description conveys the same message whatever the language. But if Slobin is correct, the language we use may alter our understanding of everything from current affairs and history to politics and celebrity gossip.

He wanted to know if the way languages convey action could have a bearing on how we

much more dynamic, full of energy and violent when written in a language like English. Examples in newspapers appear to bear that out. Describing a confrontation between Greenpeace and the authorities, one British paper, *The Guardian*, described how French troops "stormed" the boat and "clambered" aboard, and how Greenpeace "breached" the exclusion zone to "power" across the lagoon in dinghies. *Le Figaro*, a French paper, wrote that French authorities "took control" of the vessel and that activists were "crossing the limits" into French territorial waters.

This led Slobin to wonder whether speakers

## WINDOWS ON OTHER WORLDS

In rural Guatemala, B'alam Mateo and Ajb'ee Jiménez were raised speaking native Mayan languages. At home, Mateo spoke Q'anjob'al while Jiménez spoke Mam, but in school they were only taught in Spanish.

Years later, while working with a non-governmental organisation to promote bilingualism, they met linguist Nora England. Jiménez was bemoaning the fact that there were no native Mam speakers studying the language, and that all the literature about it was in English – a language he couldn't read. "There was a real need for more people, more local people, trained to work on the subject," he recalls.

Soon afterwards, England was recruited to lead a ground-breaking project at the University of Texas, Austin. The idea was that instead of sending American or European

linguists to far-flung villages to study exotic lexicons and grammars, they would train native speakers in linguistics, arming them with the tools required to study and preserve their own linguistic heritage. Jiménez and Mateo are now the first students in England's innovative programme.

With half the world's languages set to disappear within a century, England's approach seems to throw some of them a lifeline. Although today's linguists actively try to revitalise the languages they study, academics are rarely native speakers, and too much advocacy on their part reeks of patronising neo-colonialism. To save a dying language, its speakers must want to preserve it, so the logical approach is to leave it to them. But many of the countries where

endangered languages exist are poor. There are scant opportunities for higher learning, let alone specialist training in linguistics.

That's where the University of Texas language programme fits in. "Students can use what they learn how they want," says England. But she and her colleagues hope they will choose to establish language programmes back home and devise new ways to strengthen their own languages. That's what Jiménez and Mateo plan to do once they graduate. If the languages we speak really do influence the way we think, their efforts and those of others hoping to breathe new life into dying languages are more important than ever. At stake is not only a window into different cultures, but the very diversity of human thought. David Wolman