How language shapes the way we think
TED Talk by Lera Boroditsky
(transcript)

So, I'll be speaking to you using language... because I can. This is one these magical abilities that we humans have. We can transmit really complicated thoughts to one another. So what I'm doing right now is, I'm making sounds with my mouth as I'm exhaling. I'm making tones and hisses and puffs, and those are creating air vibrations in the air. Those air vibrations are traveling to you, they're hitting your eardrums, and then your brain takes those vibrations from your eardrums and transforms them into thoughts. I hope.

I hope that's happening. So because of this ability, we humans are able to transmit our ideas across vast reaches of space and time. We're able to transmit knowledge across minds. I can put a bizarre new idea in your mind right now. I could say, "Imagine a jellyfish waltzing in a library while thinking about quantum mechanics." Now, if everything has gone relatively well in your life so far, you probably haven't had that thought before. But now I've just made you think it, through language.

Now of course, there isn't just one language in the world, there are about 7,000 languages spoken around the world. And all the languages differ from one another in all kinds of ways. Some languages have different sounds, they have different vocabularies, and they also have different structures -- very importantly, different structures. That begs the question: Does the language we speak shape the way we think? Now, this is an ancient question. People have been speculating about this question forever. Charlemagne, Holy Roman emperor, said, "To have a second language is to have a second soul" -- strong statement that language crafts reality. But on the other hand, Shakespeare has Juliet say, "What's in a name? A rose by any other name would smell as sweet." Well, that suggests that maybe language doesn't craft reality.

These arguments have gone back and forth for thousands of years. But until recently, there hasn't been any data to help us decide either way. Recently, in my lab and other labs around the world, we've started doing research, and now we have actual scientific data to weigh in on this question.

So let me tell you about some of my favorite examples. I'll start with an example from an Aboriginal community in Australia that I had the chance to work with. These are the Kuuk Thaayorre people. They live in Pormpuraaw at the very west edge of Cape York. What's cool about Kuuk Thaayorre is, in Kuuk Thaayorre, they don't use words like "left" and "right," and instead, everything is in cardinal directions: north, south, east and west. And when I say everything, I really mean everything. You would say something like, "Oh, there's an ant on your southwest leg." Or, "Move your cup to the north-northeast a little bit." In fact, the way that you say "hello" in Kuuk Thaayorre is you say, "Which way are you going?" And the answer should be, "North-northeast in the far distance. How about you?" So imagine as you're walking around your day, every person you greet, you have to report your heading direction. But that would actually get you oriented pretty fast, right? Because you literally

couldn't get past "hello," if you didn't know which way you were going. In fact, people who speak languages like this stay oriented really well. They stay oriented better than we used to think humans could. We used to think that humans were worse than other creatures because of some biological excuse: "Oh, we don't have magnets in our beaks or in our scales." No; if your language and your culture trains you to do it, actually, you can do it. There are humans around the world who stay oriented really well.

And just to get us in agreement about how different this is from the way we do it, I want you all to close your eyes for a second and point southeast. Keep your eyes closed. Point. OK, so you can open your eyes. I see you guys pointing there, there, there, there, there... I don't know which way it is myself – but you have not been a lot of help. So let's just say the accuracy in this room was not very high. This is a big difference in cognitive ability across languages, right? Where one group -- very distinguished group like you guys -- doesn't know which way is which, but in another group, I could ask a five-year-old and they would know.

There are also really big differences in how people think about time. So here I have pictures of my grandfather at different ages. And if I ask an English speaker to organize time, they might lay it out this way, from left to right. This has to do with writing direction. If you were a speaker of Hebrew or Arabic, you might do it going in the opposite direction, from right to left. But how would the Kuuk Thaayorre, this Aboriginal group I just told you about, do it? They don't use words like "left" and "right." Let me give you hint. When we sat people facing south, they organized time from left to right. When we sat them facing north, they organized time from right to left. When we sat them facing east, time came towards the body. What's the pattern? East to west, right? So for them, time doesn't actually get locked on the body at all, it gets locked on the landscape. So for me, if I'm facing this way, then time goes this way, and if I'm facing this way, then time goes this way. I'm facing this way, time goes this way -- very egocentric of me to have the direction of time chase me around every time I turn my body. For the Kuuk Thaayorre, time is locked on the landscape. It's a dramatically different way of thinking about time.

Here's another really smart human trick. Suppose I ask you how many penguins are there. Well, I bet I know how you'd solve that problem if you solved it. You went, "One, two, three, four, five, six, seven, eight." You counted them. You named each one with a number, and the last number you said was the number of penguins. This is a little trick that you're taught to use as kids. You learn the number list and you learn how to apply it. A little linguistic trick. Well, some languages don't do this, because some languages don't have exact number words. They're languages that don't have a word like "seven" or a word like "eight." In fact, people who speak these languages don't count, and they have trouble keeping track of exact quantities. So, for example, if I ask you to match this number of penguins to the same number of ducks, you would be able to do that by counting. But folks who don't have that linguistic trick can't do that.

Languages also differ in how they divide up the color spectrum -- the visual world. Some languages have lots of words for colors, some have only a couple words, "light" and "dark." And languages differ in where they put boundaries between colors. So, for example, in English, there's a word for blue that covers all of the colors that you can see on the screen, but in Russian, there isn't a single word. Instead, Russian speakers have to differentiate

between light blue, "goluboy," and dark blue, "siniy." So Russians have this lifetime of experience of, in language, distinguishing these two colors. When we test people's ability to perceptually discriminate these colors, what we find is that Russian speakers are faster across this linguistic boundary. They're faster to be able to tell the difference between a light and dark blue. And when you look at people's brains as they're looking at colors -- say you have colors shifting slowly from light to dark blue -- the brains of people who use different words for light and dark blue will give a surprised reaction as the colors shift from light to dark, as if, "Ooh, something has categorically changed," whereas the brains of English speakers, for example, that don't make this categorical distinction, don't give that surprise, because nothing is categorically changing.

Languages have all kinds of structural quirks. This is one of my favorites. Lots of languages have grammatical gender; every noun gets assigned a gender, often masculine or feminine. And these genders differ across languages. So, for example, the sun is feminine in German but masculine in Spanish, and the moon, the reverse. Could this actually have any consequence for how people think? Do German speakers think of the sun as somehow more female-like, and the moon somehow more male-like? Actually, it turns out that's the case. So if you ask German and Spanish speakers to, say, describe a bridge, like the one here -- "bridge" happens to be grammatically feminine in German, grammatically masculine in Spanish -- German speakers are more likely to say bridges are "beautiful," "elegant" and stereotypically feminine words. Whereas Spanish speakers will be more likely to say they're "strong" or "long," these masculine words.

Languages also differ in how they describe events, right? You take an event like this, an accident. In English, it's fine to say, "He broke the vase." In a language like Spanish, you might be more likely to say, "The vase broke," or, "The vase broke itself." If it's an accident, you wouldn't say that someone did it. In English, quite weirdly, we can even say things like, "I broke my arm." Now, in lots of languages, you couldn't use that construction unless you are a lunatic and you went out looking to break your arm -- (Laughter) and you succeeded. If it was an accident, you would use a different construction.
Now, this has consequences. So, people who speak different languages will pay attention to different things, depending on what their language usually requires them to do. So we show the same accident to English speakers and Spanish speakers, English speakers will remember who did it, because English requires you to say, "He did it; he broke the vase." Whereas Spanish speakers might be less likely to remember who did it if it's an accident, but they're more likely to remember that it was an accident. They're more likely to remember the intention. So, two people watch the same event, witness the same crime, but end up remembering different things about that event. This has implications, of course, for eyewitness testimony. It also has implications for blame and punishment. So if you take English speakers and I just show you someone breaking a vase, and I say, "He broke the vase," as opposed to "The vase broke," even though you can witness it yourself, you can watch the video, you can watch the crime against the vase, you will punish someone more, you will blame someone more if I just said, "He broke it," as opposed to, "It broke." The language guides our reasoning about events.

Now, I've given you a few examples of how language can profoundly shape the way we think, and it does so in a variety of ways. So language can have big effects, like we saw with space and time, where people can lay out space and time in completely different coordinate frames from each other. Language can also have really deep effects -- that's what we saw with the case of number. Having count words in your language, having number words, opens up the whole world of mathematics. Of course, if you don't count, you can't do algebra, you can't do any of the things that would be required to build a room like this or make this broadcast, right? This little trick of number words gives you a stepping stone into a whole cognitive realm. Language can also have really early effects, what we saw in the case of color. These are really simple, basic, perceptual decisions. We make thousands of them all the time, and yet, language is getting in there and fussing even with these tiny little perceptual decisions that we make. Language can have really broad effects. So the case of grammatical gender may be a little silly, but at the same time, grammatical gender applies to all nouns. That means language can shape how you're thinking about anything that can be named by a noun. That's a lot of stuff. And finally, I gave you an example of how language can shape things that have personal weight to us – ideas like blame and punishment or eyewitness memory.

These are important things in our daily lives.

Now, the beauty of linguistic diversity is that it reveals to us just how ingenious and how flexible the human mind is. Human minds have invented not one cognitive universe, but 7,000 -- there are 7,000 languages spoken around the world. And we can create many more -- languages, of course, are living things, things that we can hone and change to suit our needs. The tragic thing is that we're losing so much of this linguistic diversity all the time. We're losing about one language a week, and by some estimates, half of the world's languages will be gone in the next hundred years. And the even worse news is that right now, almost everything we know about the human mind and human brain is based on studies of usually American English-speaking undergraduates at universities. That excludes almost all humans. Right? So what we know about the human mind is actually incredibly narrow and biased, and our science has to do better.

I want to leave you with this final thought. I've told you about how speakers of different languages think differently, but of course, that's not about how people elsewhere think. It's about how you think. It's how the language that you speak shapes the way that you think. And that gives you the opportunity to ask, "Why do I think the way that I do?" "How could I think differently?" And also, "What thoughts do I wish to create?" Thank you very much.

Notes

"So let me tell you about some of my favorite examples. I'll start with an example from an Aboriginal community in Australia that I had the chance to work with."
Majid, A., Bowerman, M., Kita, S., Haun, D. B. M., & Levinson, S. C. (2004). "Can language restructure cognition? The case for space." Trends in Cognitive Sciences, 8(3), 108-114. doi:10.1016/j.tics.2004.01.003.
Levinson, S. C., & Wilkins, D. P. (Eds.). (2006). Grammars of space: Explorations in cognitive diversity. Cambridge: Cambridge University Press.

"There are also really big differences in how people think about time."
Boroditsky, L. & Gaby, A. (2010). "Remembrances of Times East: Absolute Spatial Representations of Time in an Australian Aboriginal Community." Psychological Science. doi:10.1177/0956797610386621
Boroditsky, L. (2011). "How Languages Construct Time. In Dehaene and Brannon"
(Eds.,) Space, time and number in the brain: Searching for the foundations of mathematical thought. Elsevier. ISBN: 978-0-12-385948-8

"Here's another really smart human trick ..."
MC Frank, DL Everett, E Fedorenko, E Gibson (2008). "Number as a cognitive technology: Evidence from Pirahã language and cognition." Cognition 108 (3), 819-824 06:35 Note
"Languages also differ in how they divide up the color spectrum — the visual world."
Winawer, J., Witthoft, N., Frank, M., Wu, L., Wade, A., and Boroditsky, L. (2007). "Russian blues reveal effects of language on color discrimination." Proceedings of the National Academy of Sciences doi:10.1073/pnas.0701644104
Guillaume Thierry, Panos Athanasopoulos, Alison Wiggett, Benjamin Dering and Jan-Rouke Kuipers (2009). "Unconscious effects of language-specific terminology on preattentive color perception." PNAS March 17, 2009. 106 (11) 4567-4570.

"Languages have all kinds of structural quirks."
Boroditsky, L., Schmidt, L., & Phillips, W. (2003). "Sex, Syntax, and Semantics." In Gentner & Goldin-Meadow (Eds.,) Language in Mind: Advances in the study of Language and Cognition 08:51 Note "Languages also differ in how they describe events."
Fausey, C. & Boroditsky, L. (2011). "Who dunnit? Cross-linguistic differences in eye-witness memory." Psychonomic Bulletin & Review: Volume 18, Issue 1, Pages 150-157. doi:10.3758/s13423-010-0021-5
Fausey, C., Long, B., Inamori, A., & Boroditsky, L. (2010). "Constructing agency: the role of language. Frontiers in Psychology." doi: 10.3389/fpsyg.2010.00162