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Seeing the blues

Having different words for light and dark blue may change how you see them.

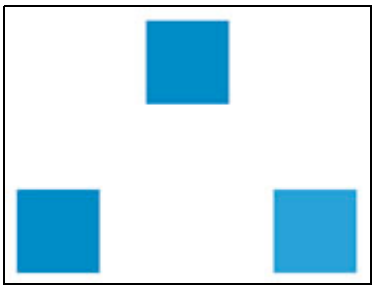
Michael Hopkin

The language you speak may influence how you perceive colours, according to new research. Russian speakers, who have separate words for light and dark blue, are better at discriminating between the two, suggesting that they do indeed perceive them as different colours.

Russian speakers divide what the English language regard as 'blue' into two separate colours, called 'goluboy' (light blue) and 'siniy' (dark blue). And a test now shows that this seems to help them view light and dark blue as distinct.

Researchers led by Jonathan Winawer of Massachusetts Institute of Technology in Cambridge presented Russian and English speakers with sets of three blue squares, two of which were identical shades with a third 'odd one out'. They asked the volunteers to pick out the identical squares.

Russian speakers performed the task more quickly when the two shades straddled their boundary between goluboy and siniy than when all shades fell into one camp. English speakers showed no such distinction.



Which is different? Russians, who have different words for light and dark blue, can hit the answer more quickly.

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What's more, when the researchers interfered with volunteers' verbal abilities by asking them to recite a string of numbers in their head while performing the task, the Russian effect vanished. This shows that linguistic effects genuinely do influence colour perception, they report in *Proceedings of the National Academy of Sciences*[1].

"It could be that there is a pre-existing tendency to divide colours that exists in everyone, and that Russian has exploited but English has not," Winawer says.

Do you see what I see? To English speakers, this is a range of a single colour. But that's not true in other languages.

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I say blue, you say goluboy

The results support a theory called the Whorfian Hypothesis, proposed in the 1930s by American linguist Benjamin Whorf, that our words literally shape how we categorize things we observe in the world around us.

"The critical difference in this case is not that English speakers cannot distinguish between light and dark blues, but rather that Russian speakers cannot avoid distinguishing them: they must do so to speak Russian in a conventional manner," Winawer and his colleagues write.

"Russian is a very interesting test case," comments Angela Brown, who studies colour perception at Ohio State University in Columbus. Only around 5% of languages make a distinction between light and dark blue, she says.

But Brown argues that although Winawer's results are consistent with the theory that language shapes perception, they do not necessarily prove it. The order of cause and effect could be the other way around, she says. Most languages with a range of words for blue tend to be found at high northern latitudes, she points out. Perhaps there is a physiological effect that makes people in these climes more adept at seeing shades of blue.

There is no direct evidence for this. But it is known that many tropical peoples do not distinguish between blue and green — linguists call this combined colour 'grue'. It has been suggested that this is because their lenses are more yellowed, or their retinas damaged, by bright sunlight, Brown says. This implies that physical effects might shape language, rather than language shaping perception.

"The question the researchers will have to answer is whether Russians have a word for light blue because they see it as distinct, or whether it is the other way around," Brown says.

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References

1. Winawer J., *et al*. *Proc. Natl Acad. Sci. USA*, doi:10.1073/pnas.0701644104 (2007).

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