

Your native language affects what you can and can't see



By [Emma Young](#)

The idea that the language that you speak influences how you think about and experience the world (the so-called [Sapir-Whorf hypothesis](#)) has a long and storied history. A lot of research into the issue has focused on colour perception, and evidence has accumulated that people whose native languages have different colour categories don't see the world in quite the same way.

Now in a [new paper](#), published in *Psychological Science*, Martin Maier and Rasha Abdel Rahman at the Humboldt University of Berlin report that by affecting visual processing at an early stage, such linguistic differences can even determine whether someone will see a coloured shape – or they won't. “Our native language is thus one of the forces that determine what we consciously perceive,” they write.

The wavelengths of light that we perceive as colours form a smooth continuum, but crucially, the colour categories that people use to divide up this spectrum [vary between languages](#). Maier and Abdel-Rahman studied native Greek-, Russian- and German-speakers for whom these categories differ.

In both Greek and Russian, there is a dedicated category-word for “light blue” and another for “dark blue” but no specific word for “blue” as a broader category. In German (as in English), people can use qualifiers to refer to “light blue”, “navy blue” or “sky blue”, and so on, but there are no dedicated category words for these shades. On the other hand, in German (also as in English) there is a dedicated word “blue” (blau in German) to cover all the shades of blue. However, Russian, Greek and German alike have a dedicated category word for referring to all shades of “green”, just as we do in English.

Earlier work already showed that having a category term for something – whether it's an object or a colour – speeds up a person's ability to identify that item among a host of others. Russian-speakers are faster at discriminating between light and dark blue colour patches than English-

speakers, for example. Maier and Abdel-Rahman wanted to go further and see whether linguistic colour categories would influence the likelihood of speakers of different languages becoming conscious of something at all.

Maier and Abdel-Rahman first tested 28 native Greek-speakers. In each trial, they were presented with a rapid series of 13 coloured stimuli, made up of geometric shapes against a differently-coloured background. The participants were asked to look out for a grey semi-circle, which always appeared at some point on every trial. The grey semi-circle was simply there to grab the participant's attention – to make it more touch-and-go as to whether they'd notice any ensuing triangle at all. The critical test was whether participants spotted a coloured triangle when it appeared (which it did in 80 per cent of trials) and whether that varied according to its colour relative to the background.

Crucially, the triangle was either light blue against a dark blue background circle; light green against a dark green circle; or light or dark blue against either a light or dark green background circle. At the end of each trial, the participants were asked “how much” of a triangle they had seen – nothing at all, a slight or strong impression, or a “complete” triangle.

Maier and Abdel-Rahman found that, as they'd expected, the Greek-speakers were more likely to see a triangle when it was light against dark blue (or vice versa) than when it was light green against dark green (or vice versa). This is consistent with the idea that having fundamental linguistic categories for the two types of blue made it more likely that these triangles made it into the participants' conscious perception.

When the researchers repeated the study with 29 German speakers, they found no difference in detection rates for blue against blue versus green against green triangles. But when they next ran the study on native Russian-speakers (who share the same colour categories as Greek-speakers), they replicated the hit rate pattern they had observed for the Greek-speakers – the Russian-speakers were more likely to perceive the triangle in the blue contrast condition compared with the green contrast condition, just as the researchers expected.

For the studies on Greek- and German-speakers, Maier and Abdel-Rahman also used electroencephalography (EEG) to compare their participants' brain activity during the visual tasks. The EEG results supported the idea that native language influences a very early, automatic stage of visual processing – an idea that some other researchers have disputed in the past.

“The present results show for the first time that ... our native language – and the color categories we apply within it – can influence whether we consciously perceive a stimulus or not,” the researchers write.

The differences in blue vs. green detection rates between Greek/Russian and German participants were not big in statistical terms. Still, “language... seems to play an active role in perception and helps to optimise it in the long run,” the researchers concluded.

—[Native Language Promotes Access to Visual Consciousness](#)

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