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Language affects memory, but does it affect perception?

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Does the language you speak affect the way you perceive the world? The strong Linguistic Determinism view — the idea that all aspects of thought (even low-level perceptual abilities) are determined by language — is most closely associated with the writings of Benjamin Lee Whorf (1956). Whorf's ideas have generated much interest and controversy, with much of the empirical work focusing on color perception.

Different languages divide the color spectrum differently; does this lead speakers of different languages to actually perceive colors differently? Early studies claimed no differences in color perception (Heider, 1972), but recent cross-linguistic studies (Davidoff et al., 1999) as well as studies of categorical learning (Goldstone, 1994) have claimed that linguistically learned categories can indeed affect people's perception of shapes and colors.

Although it would be exciting to discover effects of language in domains as low-level as the perception of color, we should be careful in establishing what counts as a test of perception. The studies mentioned above may best be characterized as tests of memory, rather than tests of perception. In these studies, subjects were shown a color sample, and then after a delay asked to either select the same color from a pair of alternatives, or to indicate whether a new color sample is the same or different from the one presented previously. Since these tasks rely heavily on subjects' ability to remember the color over a delay, they may tell us more about the ability of language to interfere with color memory than color perception. Further, since language may interfere with color memory in trivial ways (e.g., it could act as a secondary code in memory, and thus affect memory performance without altering the actual perceptual memory trace) (Lucy & Shweder, 1979), more research is necessary to establish whether linguistic information is indeed capable of affecting color perception or even perceptual memories.

We have set out to distinguish the effects of linguistically learned distinctions on memory from effects on perception. In one study, we created a continuum of blue color samples, and taught subjects a categorical boundary in the middle of this space of

blues (a boundary corresponding to the *goluboy/siniy* distinction made in Russian). Another group of subjects received comparable exposure to the color samples, but were not taught the categorical boundary.

In the test phase, participants saw pairs of color samples on a screen at the same time and were asked to determine whether the two colors were exactly the same or different as quickly as possible. We were interested in whether learning a category boundary would make people faster to say that two colors are different if they fell in different categories, or slower to say they are different if the two colors were from the same category. Unlike the earlier studies, this task does not rely on subjects' color memory since both samples necessary for comparison were presented at the same time. We found no difference in performance between subjects taught the *goluboy/siniy* distinction and the control group. These preliminary results suggest that color perception may indeed be immune to modification by language. That is, while language may affect color memory, its ability to affect color perception is somewhat doubtful.

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References

- Davidoff, J., Davies, I., & Roberson, D. (1999). Colour categories in a stone-age tribe. *Nature*, 398, 203-204.
- Goldstone, R. L. (1994). Influences of categorization on perceptual discrimination. *JEP: General*, 123(2), 178-200.
- Heider, E. R. (1972). Universals in color naming and memory. *JEP*, 93, 1, 10-20.
- Lucy, J. A., & Shweder, R. A. (1979). Whorf and his critics: linguistic and nonlinguistic influences on color memory. *American Anthropologist*, 81, 581-615.
- Whorf, B. L. (1956). *Language, thought, and reality: selected writings of . . .* Carroll, J. B. (Ed.). Cambridge, MA: Technology Press of MIT.