The Relation Between Language and Thought

Question: Is the way we think influenced by the language we speak?

One radical answer is provided by the so-called "Sapir-Whorf Hypothesis" (named after Edward Sapir and Benjamin Whorf):

> We dissect nature along lines laid down by our native languages… The world is presented in a kaleidoscopic flux of impressions which has to be organized by our minds—and this means largely by the linguistic systems in our minds. We cut nature up, organize it into concepts, and ascribe significances as we do, largely because we are parties to an agreement to organize it in this way — an agreement that holds throughout our speech community and is codified in the patterns of our language. The agreement is, of course, an implicit and unstated one, *but its terms are absolutely obligatory;* we cannot talk at all except by subscribing to the organization and classification of data which the agreement decrees. -Benjamin Whorf

Two Versions of the Sapir-Whorf Hypothesis:

Strong Version: The language one speaks *determines* the way one thinks.
- Usually associated with the idea that we cannot understand (at least some of) the thoughts of those who speak very different languages

Weak Version: The language one speaks *influences* the way one thinks.

In recent years, psychologists and linguists have sought to test the Sapir-Whorf Hypothesis by looking at terms that vary across languages, and investigating whether this variation results in a corresponding variation in the way speakers of those languages categorize objects. Two domains that have attracted particular attention are *spatial terms* and *color terms*.

First Test Case: Spatial Terms
Three types of spatial description:
1. *Egocentric or Relative Frame of Reference (FoR):* the viewer's perspective is used
2. *Allocentric or Absolute FoR:* Landmarks or coordinates independent of the viewer are used (sometimes called "geocentric")
3. *Intrinsic FoR:* Features of the thing being described are used (these features are independent of both the viewer's perspective and "objective" landmarks or coordinates)

While most languages allow for each sort of description, some languages either lack egocentric spatial vocabulary, or use it extremely sparingly. For example, Tzeltal is spoken in a small

village in Tenejapa, Mexico. The village is situated on the side of the hill. The main form of spatial orientation in the language is based on terms for "uphill" and "downhill".

Q: Does the presence or absence of egocentric terms in a language affect the way its speakers spatially categorize objects?

- How might one try to test this?

Initial work by Levinson and colleagues seemed to suggest that the answer was "Yes" (e.g., Pederson et al. 1998)

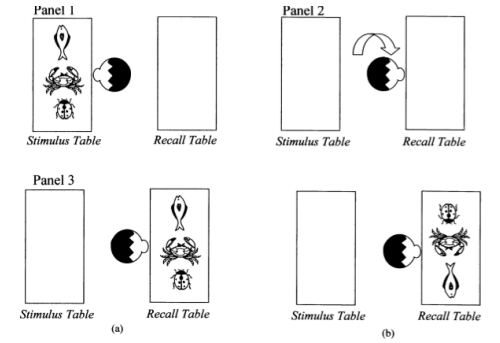
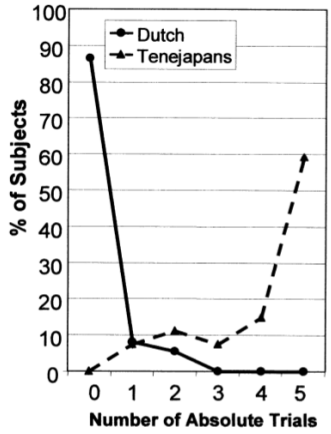


Fig. 1. The Animals in a Row task. Panel 1: Stimulus Table with array of toy animals; Panel 2: rotated 180 degrees at Recall Table; Panel 3a: the "absolute" rearrangement; Panel 3b: the "relative" rearrangement (adapted from Pederson et al., 1998).



Levinson et al.'s results suggest a correlation between the prevalence of egocentric descriptions in a language and speakers' spatial reasoning. Levinson et al. draw a causal conclusion from this correlation: the presence/prevalence of spatial terms in the language affect spatial reasoning.

Li and Gleitman's Work

Li and Gleitman point out a difference in Levinson et al.'s tests on speakers of allocentric vs. egocentric languages. The Tzeltal speakers were tested outdoors on a hill; the Dutch population was tested indoors in a laboratory room.

Li and Gleitman thus repeated the "animals in a row" experiment on English speakers. They used three conditions:

> *Condition 1:* Laboratory room, blinds down (no visible landmarks) – similar to the conditions under which Pederson et al. tested their Dutch subjects

Condition 2: Laboratory room, blinds open (university library visible)
Condition 3: Outdoors

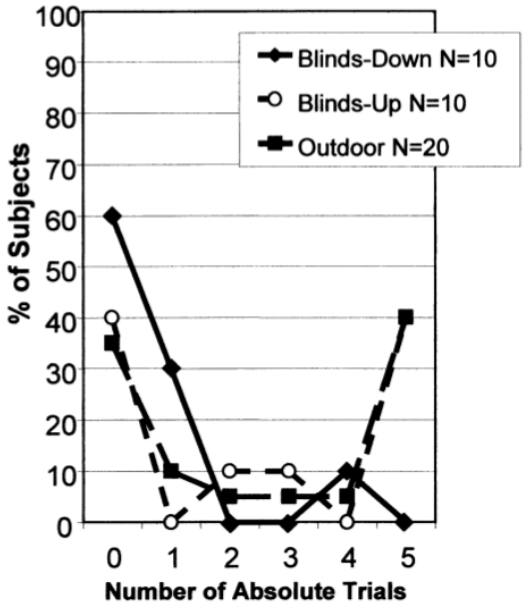


Fig. 7. Proportions of absolute choices in Blinds-Down, Blinds-Up, and Outdoor conditions. Subjects in the Blinds-Down condition predominantly chose the relative response. In the other conditions, subjects were divided in their preference for either all absolute responses or all relative responses.

Li and Gleitman also found that in conditions 1 and 2 (with landmarks visible), many more subjects asked for clarification on the task.

"Landmark" study
Li and Gleitman also report the results of a follow-up experiment, which relied on giving subjects "landmarks" – in this case, a Styrofoam duck toy. Two conditions: in the egocentric/relative condition, the duck was always on the right side of the recall table; in the allocentric/absolute condition, the duck was always on the south side of the table. Position of the duck predicted response – those in egocentric/relative condition gave the "relative" response; those in the allocentric/absolute condition gave the "absolute" response.

Li and Gleitman also relate their results to experimental work on both rats and pre-linguistic infants:

Work on rats: rats were trained to find food at one end of a maze. Then either the rat or the maze would be rotated 90 or 180 degrees. Experimenters were interested in figuring out whether the animal would use an egocentric strategy (e.g. "turn left to get food") or an allocentric strategy (e.g. "turn north to get food").

They found that there was no single right answer – rats will use various cues available to them. In particular, if given stable landmark cues, they'll pursue an allocentric strategy; in the absence of such cues, they'll pursue an egocentric strategy.

Work on infants: Acredolo and Evans tested 9-month-olds in three conditions: unfamiliar landmark-free environments (small laboratory), unfamiliar environments with potential

landmarks (an office with clutter), and a familiar environment with potential landmarks (the child's home). The infants' strategies changed across these conditions: they used mainly egocentric strategies in the unfamiliar environments (first two conditions) and an allocentric strategy in the familiar environment.

"Blicket" Study. English and Japanese speakers given a kidney-bean shaped piece of colored wax, referred to as "this blicket" or "my blicket". Question: would speakers assign *blicket* to the object class (regarding similarly shaped items as "blickets") or the substance class (regarding anything made of the same stuff – colored wax – as blicket)? English speakers were more likely than Japanese speakers to assign blicket to the object class. One explanation for this is that in English count nouns are much more numerous than mass nouns, which explains why English speakers are more inclined to classify "blicket" as a count-noun class.

> Li and Gleitman: "More generally, when subjects are offered ambiguous linguistic descriptions for an ambiguous stimulus… they often fall back on implicitly known form-to-meaning patterns as a clue to the communicative intent of the speaker."

Li and Gleitman interpret the findings re. spatial reasoning as further confirmation of this generalization: when given the ambiguous instruction to "make it the same" (in the animals-in-a-row experiment), speakers often rely on linguistic regularities in their communities to make a guess about the communicative intent of the speaker.

Second Test Case: Color Terms

Languages vary in how they "divide up" the color system. Some languages do not draw color distinctions that are made in English. For example, Yupik (spoken in Siberia) uses a single word for both "green" and "blue." Lele (spoken in Chad) uses a single word for "yellow", "green", and "blue". Other languages draw distinctions that are not made in English. For example, Russian has one word for "dark blue" and another word for "light blue", but no single word corresponding to just "blue". Korean has one word for "green" and another word for "yellow-green."

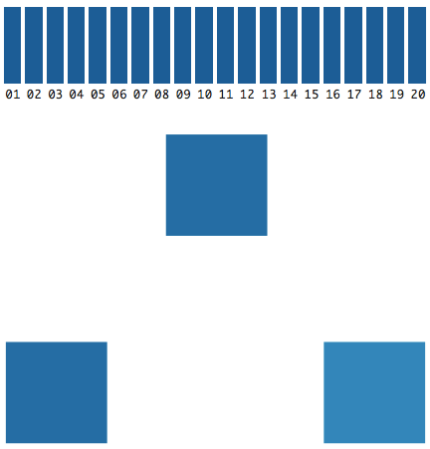
Q: Do the color terms in one's language affect one's color categorization abilities?
-How might one try to test this?

Kay and Kempton (1984)

Kay & Kempton tested whether English speakers would have different color judgments than speakers of Tarahumara – a language spoken in Mexico that uses only word, *siyo'name*, to refer to green and blue. Kay and Kempton picked three neighboring color chips on the Munsell color chart (a chart that arrays colors along the dimensions of hue, brightness, and saturation). Two of the color chips fell in the green range, one of them fell on the blue side. Subjects were told that two of the colors were similar to each other, and one was more distant – the subject's task was to identify the "odd one out". English speakers tended to pick the blue color chip as the odd one out. However, as far as the objective color properties were concerned, the blue chip was no more distant than the others. By contrast, Tarahumara speakers did not exaggerate the distance between colors across the green/blue boundary.

> But does this show that language affects categorization or perception? Can you think of any alternative explanations of this data?

Winawer et al. (2007)
Winawer et al. compared the color identification abilities of English speakers and Russian speakers. In Russian, there are two distinct words for types of blue: *siniy* (dark blue) and *golubuy* (light blue). Participants were presented with three squares whose color was in the blue range. One square appeared on the top of a screen, two on the bottom. Participants were asked to identify which of the two squares on the bottom matched the color of the top square.



Unsurprisingly, both groups of participants took longer to respond if the two bottom squares were very close in color than if they were further apart. But Russian speakers were faster to make the classification if the two bottom colors were on other sides of the *siniy/golubuy* divide.

- Categorical perception (CP) = a sharp peak in discriminability of colors that cross a category boundary (as compared to discriminability within a color category).

- Similarly, Roberson and Hanley (2008) found CP at the boundary between *chorok* (green) and *yeondu* (yellow-green), a distinction that's lexicalized in Korean.

A twist:
Interestingly, the difference in performance between English and Russian speakers vanished when participants were given an extra memory task: just before seeing the color trio, they read an eight digit number that they were told they would have to correctly identify after the color task. Particularly interesting was the fact that a similar spatial memorization task did not erase the difference in performance.

What do you think explains this?