

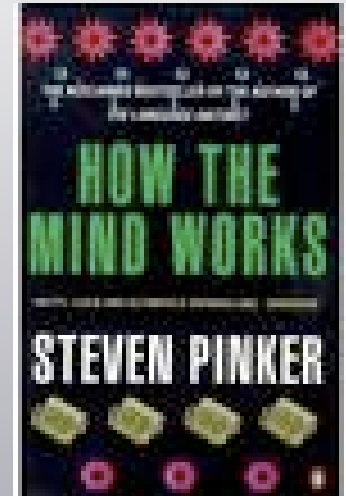
# Language & Thought

Introduction to Cognitive Science

May 12, 2009

# Language as a Window on the Mind

- A central question of cognitive science is
- Ways studying language might help:
  - Provide clues as to what is innate & what is learned (Chomsky & Pinker)
  - Exemplify two fundamentally different modes of thought, principle-based vs. exemplar-based (Pinker)
  - Illuminate how non-linguistic thought is influenced by language (today's lecture)



# Is Language Necessary for Thought?

- People occasionally claim it is, but...
  - People experience mental images they cannot verbalize;
  - Other animals appear to be thinking;
  - Pre-linguistic infants appear to be thinking;
  - And there is considerable experimental evidence about the mental activity of both

But language does **influence** thinking.

## Examples?

- The Tversky-Kahneman studies
- Marketing, e.g. *facial quality* toilet paper
- Political language, e.g. *regime* vs. *administration*
- Others?

# A Stronger Connection?

- Some have claimed speakers of different languages think very differently
- Best-known proponents of this view:



Edward Sapir  
1884-1939



Benjamin Lee Whorf  
1897-1941

# The Sapir-Whorf Hypothesis

- Two components:
  - Linguistic Relativity: Different languages can have radically different ways of cutting up the world.
  - Linguistic Determinism: How we think is largely determined by the language we speak
- Logically independent, but often go together

# Sapir's Formulation

Human beings do not live in the objective world alone, nor alone in the world of social activity as ordinarily understood, but are very much at the mercy of the particular language which has become the medium of expression for their society. It is quite an illusion to imagine that one adjusts to reality essentially without the use of language and that language is merely an incidental means of solving specific problems of communication or reflection. The fact of the matter is that **the "real world" is to a large extent unconsciously built upon the language habits of the group.** No two languages are ever sufficiently similar to be considered as representing the same social reality. The worlds in which different societies live are distinct worlds, not merely the same world with different labels attached ... We see and hear and otherwise experience very largely as we do because the language habits of our community predispose certain choices of interpretation.

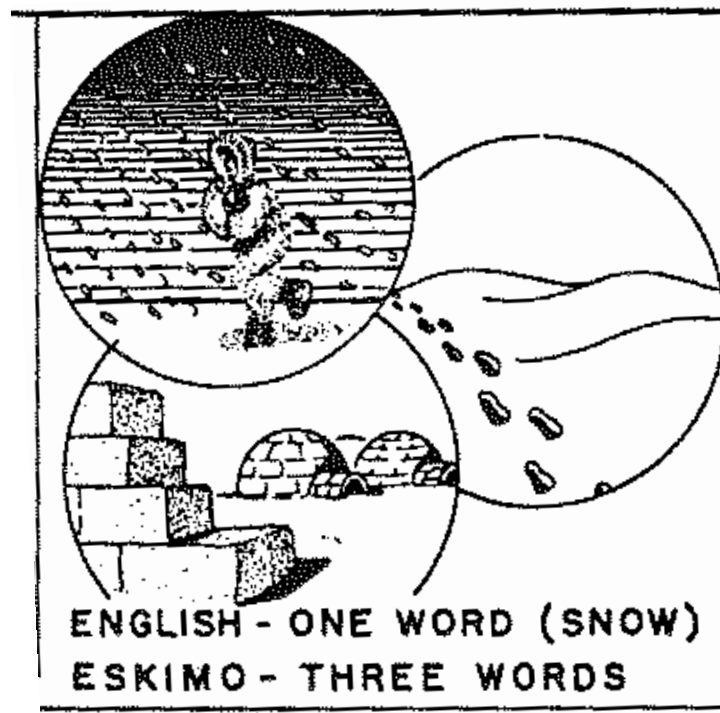
“The Status of Linguistics as a Science” (1929)

# Whorf's Formulation

We dissect nature along lines laid down by our native language. The categories and types that we isolate from the world of phenomena we do not find there because they stare every observer in the face; on the contrary, **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 of 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 [...] all observers are not led by the same physical evidence to the same picture of the universe, unless their linguistic backgrounds are similar, or can in some way be calibrated.

“Science and Linguistics” (1940)

# Whorf's Most Famous Example

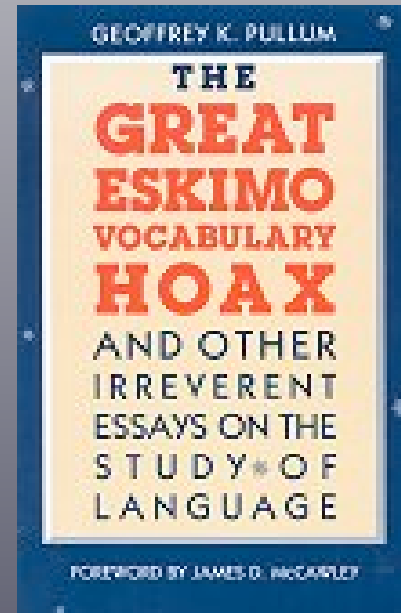


“Languages classify items of experience differently. The class corresponding to one word and one thought in language A may be regarded by language B as two or more classes corresponding to two or more words and thoughts.”















“Science and Linguistics” (1940)

# What's wrong with the snow example?

- Subsequent research indicates that Eskimo has no more words for snow than more familiar (and less northern) languages
- And so what if it did?
- Having different vocabularies doesn't by itself show that languages embody different world views.



# A More Interesting Example: Time

OBJECTIVE FIELD	SPEAKER (SENDER)	HEARER (RECEIVER)	HANDLING OF TOPIC, RUNNING OF THIRD PERSON
SITUATION 1a. 			ENGLISH... "HE IS RUNNING" HOPI... "WARI" (RUNNING, STATEMENT OF FACT)
SITUATION 1b. OBJECTIVE FIELD BLANK DEVOID OF RUNNING			ENGLISH... "HE RAN" HOPI... "WARI" (RUNNING, STATEMENT OF FACT)
SITUATION 2 			ENGLISH... "HE IS RUNNING" HOPI... "WARI" (RUNNING, STATEMENT OF FACT)
SITUATION 3 OBJECTIVE FIELD BLANK			ENGLISH... "HE RAN" HOPI... "ERA WARI" (RUNNING, STATEMENT OF FACT FROM MEMORY)
SITUATION 4 OBJECTIVE FIELD BLANK			ENGLISH... "HE WILL RUN" HOPI... "WARIKNI" (RUNNING, STATEMENT OF EXPECTATION)
SITUATION 5 OBJECTIVE FIELD BLANK			ENGLISH... "HE RUNS" (E.G. ON THE TRACK TEAM) HOPI... "WARIKNGWE" (RUNNING, STATEMENT OF LAW)

- Whorf claimed the Hopi language has no notion of 'time' distinct from space
- So the question of whether two events remote in space occur simultaneously could not even arise

Figure 11. Contrast between a "temporal" language (English) and a "timeless" language (Hopi). What are to English differences of time are to Hopi differences in the kind of validity.

# A General Criticism of Whorf

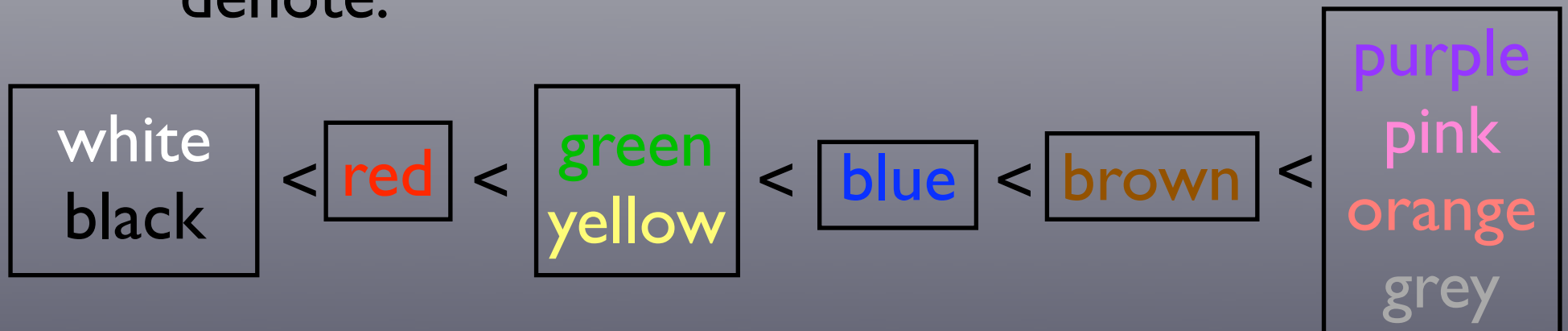
- His arguments have the following form:
  - Native American language A uses forms that look very exotic to speakers of European languages
  - Therefore speakers of A must think very differently from speakers of SAE (“Standard Average European”)
- What’s wrong with this form of argument?

# Testing the Sapir-Whorf Hypothesis

- Various studies in the 1950s & 1960s looked for correlations between linguistic structure and non-linguistic cognitive tasks
- A favorite domain for these: color terms
- Why?
  - Color is objectively measurable (in terms of such physical properties as wavelength)
  - Color space is continuous, without inherent regions or boundaries

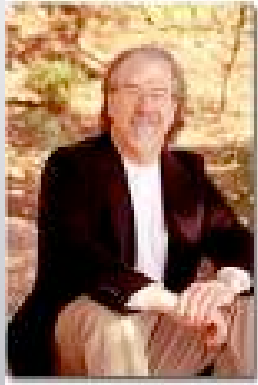
# Berlin & Kay's *Basic Color Terms* (1968)

- Tested 20 languages, asking speakers to pick out **best** exemplars for each color term of their language
- Considerable consistency across languages
- Number of basic color terms in a language largely predicted what colors they would denote:



# Influence of Berlin & Kay's Work

Brent  
Berlin

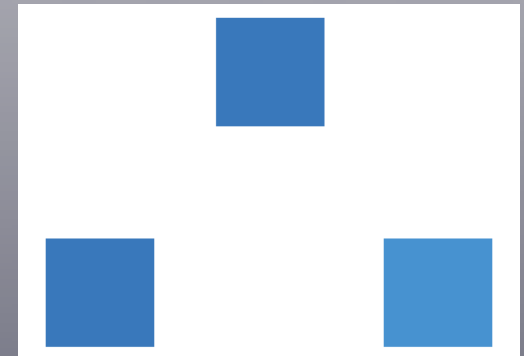


Paul  
Kay

- Spurred work on linguistic & cultural universals
- Whorfian ideas out of fashion for a generation
- Kay has continued working on color terms, improving methodology of original study
- Reading for today shows situation considerably more complex
- But bottom line is still basically anti-Whorfian

# Russian Blues

- What we call 'blue' is divided in Russian into *goluboy* (lighter blue) and *siniy* (darker blue)
- Recent study by Winawer, et al, asked Russian & English speakers to pick which of two color samples matched a third:
- Russians were faster when the two bottom samples had different color names
- English speakers showed no such effect



# Color Terms Maybe Not Best Testbed

- Why not?
- Human perceptual apparatus the same species-wide
- Vocabulary for perceptual categories likely to reflect this
- What would be better aspects of language to test for linguistic relativity and linguistic determinism?

# Spatial Language

- SAE allows spatial reference to be either relative (*left, in front of*, etc.) or absolute (*north, uphill*, etc.)
- Tzeltal has only absolute spatial terms
- Levinson had people look at an arrow, then rotate 180°, and say which of two arrows was “like the one they saw before”
- Tzeltal speakers consistently used absolute direction to decide
- English & Dutch speakers used both absolute and relative, depending on context

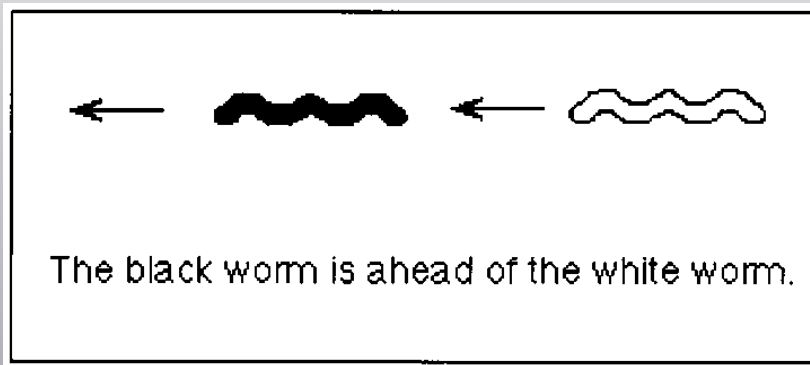
# Temporal Language

- Languages tend to use spatial metaphors to talk about time
- In English, they're mostly horizontal (the future lies ahead, the past behind)
- In Mandarin, they're mostly vertical (earlier is up, later down)
- Lera Boroditsky tested whether this affects thinking.

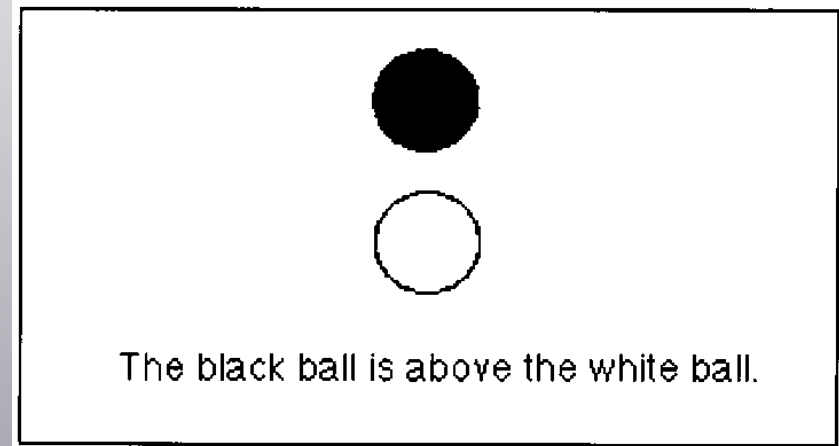


# Boroditsky's Study

- Participants primed with a spatial picture, e.g.

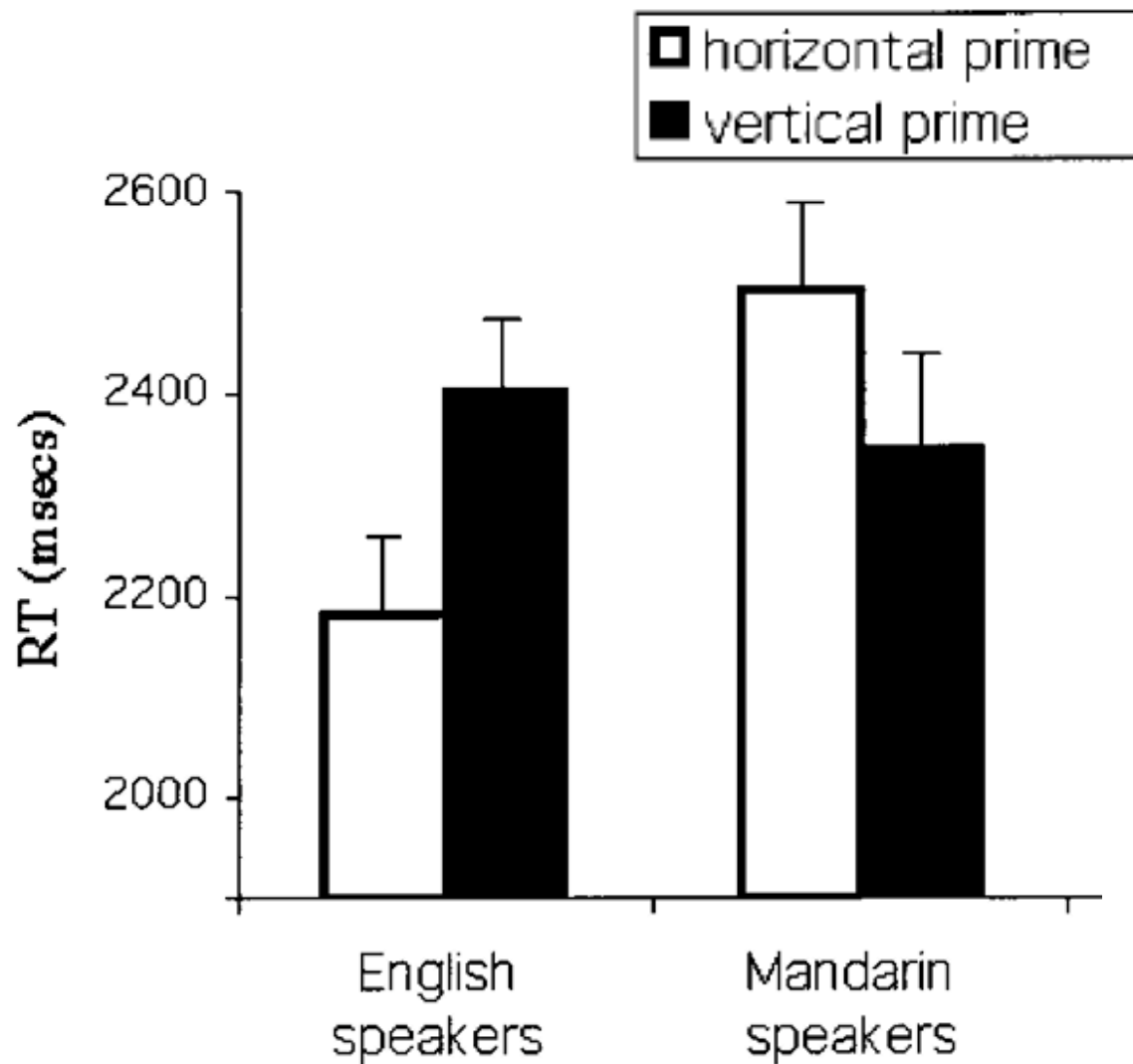


or



- Then they're given T/F test on purely temporal sentences, e.g. "March comes earlier than April"
- English speakers answer faster after horizontal picture; Mandarin speakers answer faster after a vertical picture.

# Boroditsky's Results



# Boroditsky, Schmidt, & Phillips

- Other studies all involve basic perceptual or conceptual categories and different expression across languages
- Others all involve linguistic stimuli
- This looks at an arbitrary grammatical distinction to see whether it affects non-linguistic cognition
- This correlates differences between native languages of participants with performance on a non-linguistic task

# Concluding Remarks, quoting Boroditsky

- The “strong Whorfian view -- that thought and action are entirely determined by language -- has long been abandoned”
- “Languages appear to influence many aspects of human cognition”
- “the private mental lives of people who speak different languages may differ much more than previously thought”
- “what we normally call ‘thinking’ is in fact a complex set of collaborations between linguistic and nonlinguistic representations and processes”