

# Language and Time

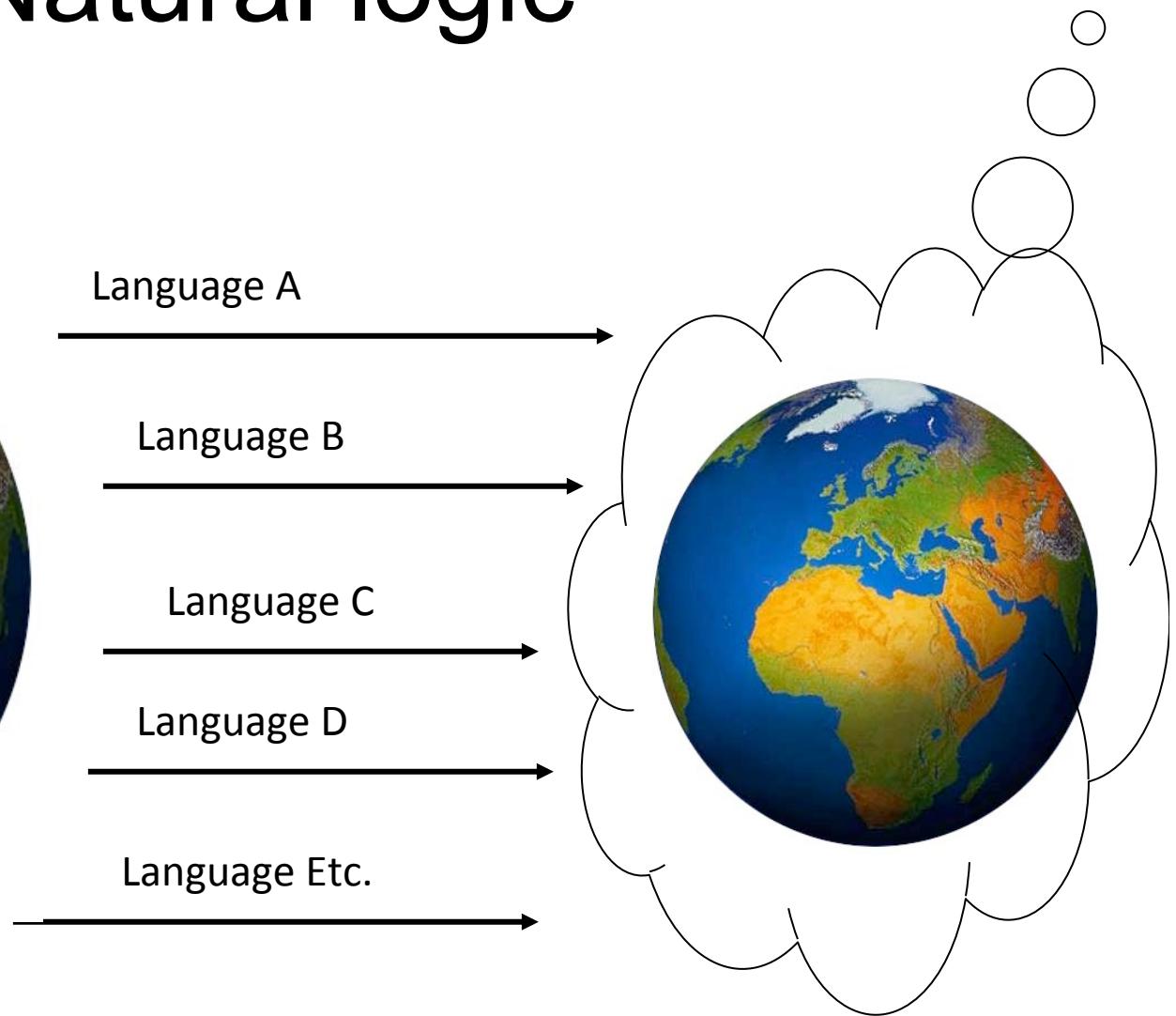
COGS 200

November 4, 2014

# Road map for today

- The Sapir-Whorf Hypothesis, aka Linguistic Relativity
  - Plurals and nouns
  - Time and tense
- Experimental evidence
- Note on translation

# “Natural logic”



According to Whorf, “natural logic” is flawed.

# What if everything were blue?

- Couldn't recognize “blueness”
- *Flatland* and three dimensions; gravity
- For us (monolinguals), everything is English; English is simply background
- When you study/know another language, you can see the Englishness (= blueness)
- “When linguists became able to examine critically and scientifically a large number of languages of widely different patterns, their base of reference was expanded; **they experienced an interruption of phenomena hitherto held universal...**”

# What if everything were blue?

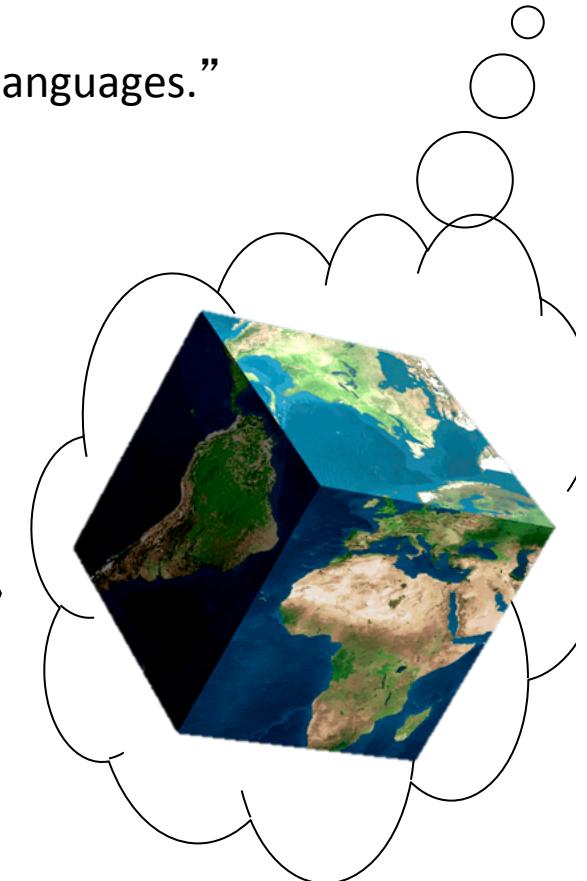
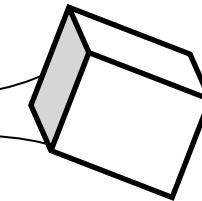
- Realize that “the categories and types that we isolate from the world...we do not find there because they stare every observer in the face”
- And “Concepts of ‘time’ and ‘matter’ are not given in substantially the same form by experience to all men but depend upon the nature of the language...through the use of which they have been developed.”
- Instead of “natural logic”...

# Whorf's view

“We dissect nature along lines laid down by our native languages.”



Language A

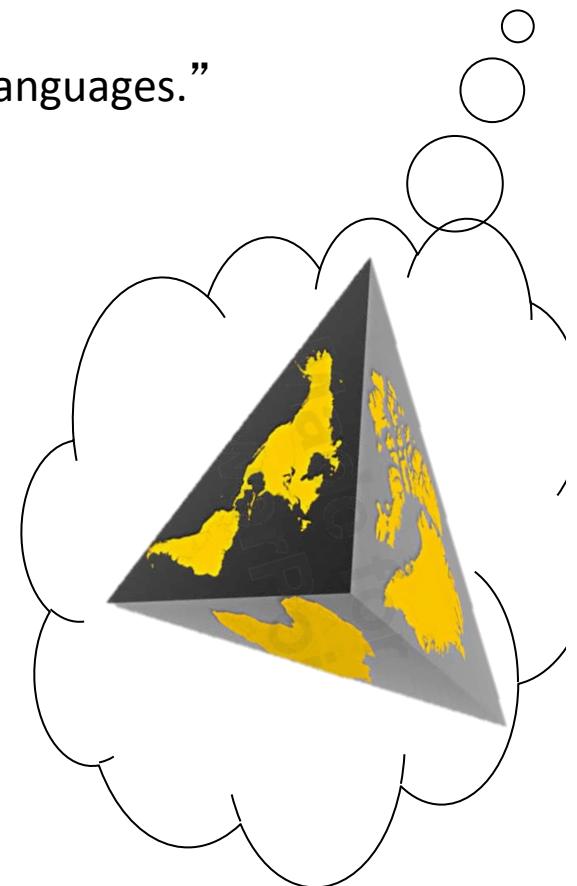


# Whorf's view

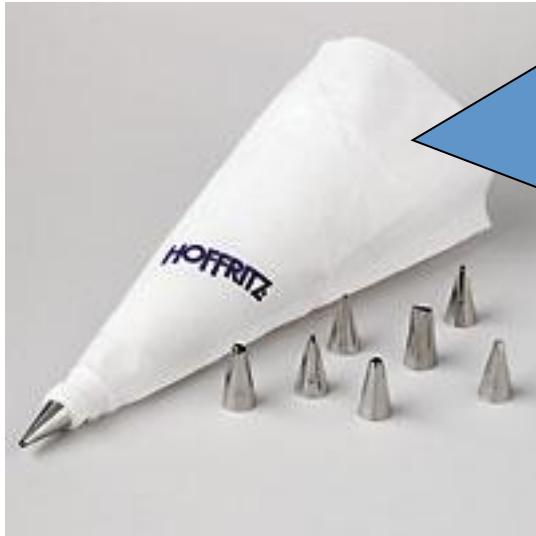
“We dissect nature along lines laid down by our native languages.”



Language B



“The world” goes in here



“Thinking”



Different “shaped” thoughts



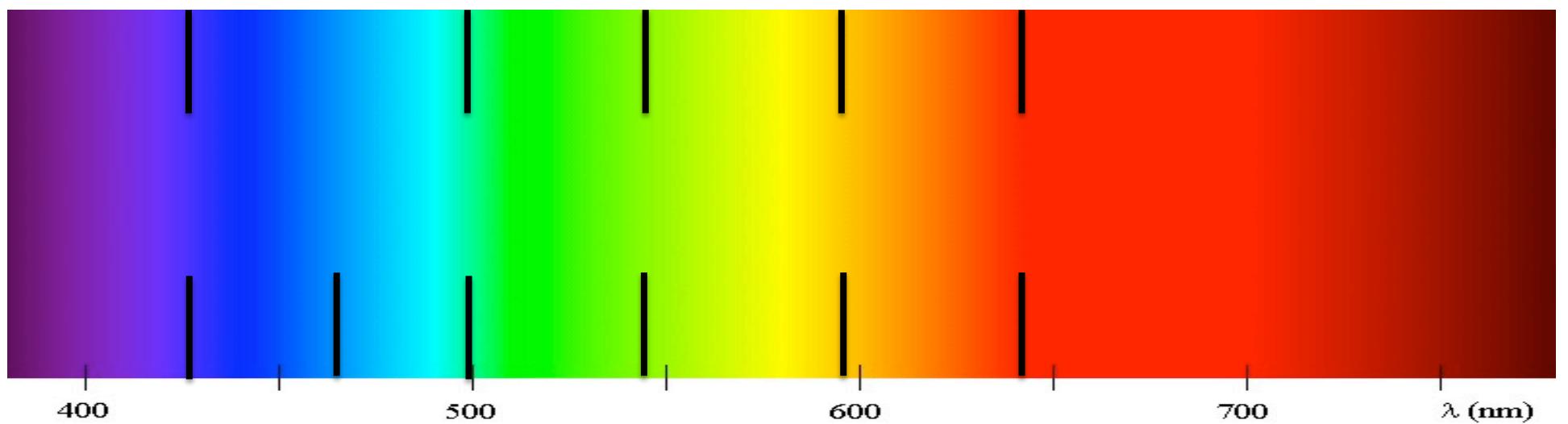
Different languages

# Whorf's view

“We dissect nature along lines laid down by our native languages.”

**English:**

purple      blue      green      yellow      orange      red



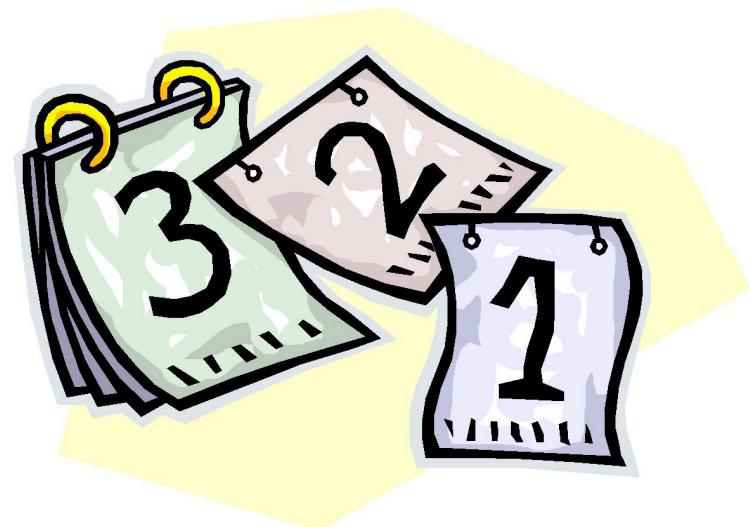
purple      dark      light      green      yellow      orange      red

blue      blue

:Russian

# Multiples of stuff: “plural” is a way of organizing the universe

- *13 players* can be experienced all at once as an aggregate
- *10 days* cannot be experienced all at once, only progressively, one at a time



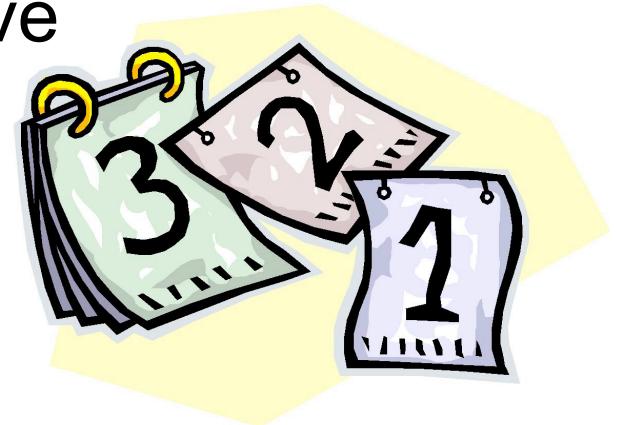
# Plural, in English

- Structure
  - Noun + /s/ =  $N_{\text{plural}}$  (that is, add /s/ to noun)
  - “Noun” may be...
    - *player – players*
    - *day – days*
  - Counting: *one player/day; two players/days, three players/days*, etc.
- English plural does not distinguish aggregate *vs.* progressive experience



# Plural, in Hopi

- “Noun”...
  - May be *person* (and, *9 persons* is OK)
  - May NOT be *day* (but, *10 days* *in not* OK)
- Plural endings only used with aggregates, not with progression
  - Can’t pluralize *day* because there is no word *day*
- In Hopi, the essence of time is “becoming later”—not something you can have multiples of

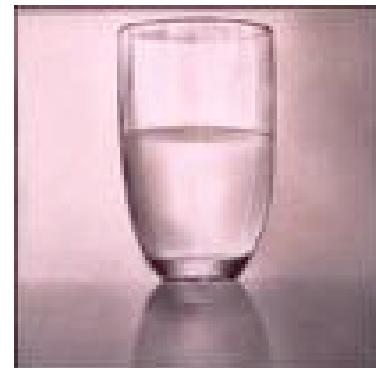


# Count/mass nouns, in English

- Count nouns: *stones, books, lamps*
  - Can be pluralized
- Mass nouns: *water, sand, rice*
  - Need a “container” word to pluralize  
*cups of water, buckets of sand,  
bowls of rice*

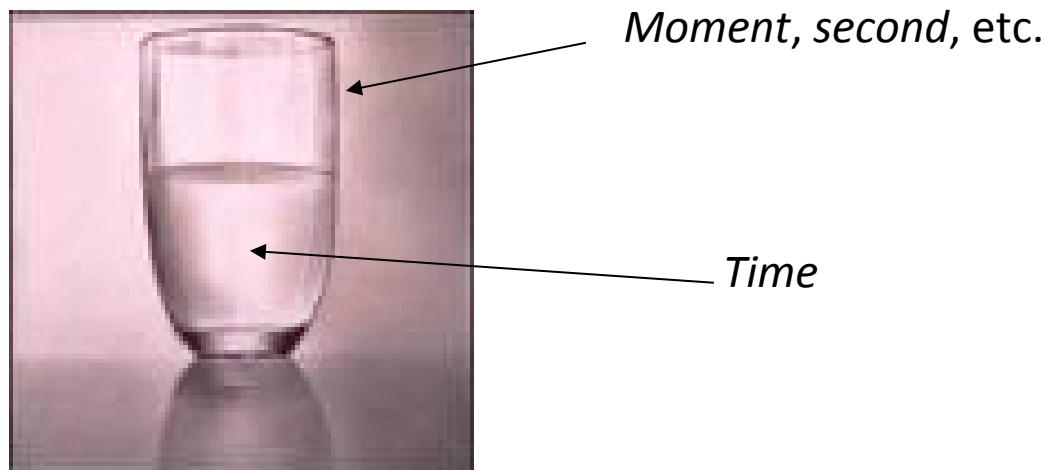


- Container (*cup*) containing mass substance (*water*)



# Time: mass and count, in English

- Count
  - *at sunset* = *at the corner*
  - *two sunsets*
- Mass noun *time* with “containers” to express phases
  - *a moment of time, three summers of time*



# Time, in Hopi

- No nouns for words like *summer* or *morning*
  - Instead, “while summering is occurring”
- No *summer is hot*; no objectification
- Meaning for time words is **getting later; durating**
- **Time...**
  - recognizes duration
  - varies with each observer
  - does not allow simultaneity
  - has zero dimensions (can't be given a number larger than 1)

# Time in English and Hopi: (maybe) a useful analogy

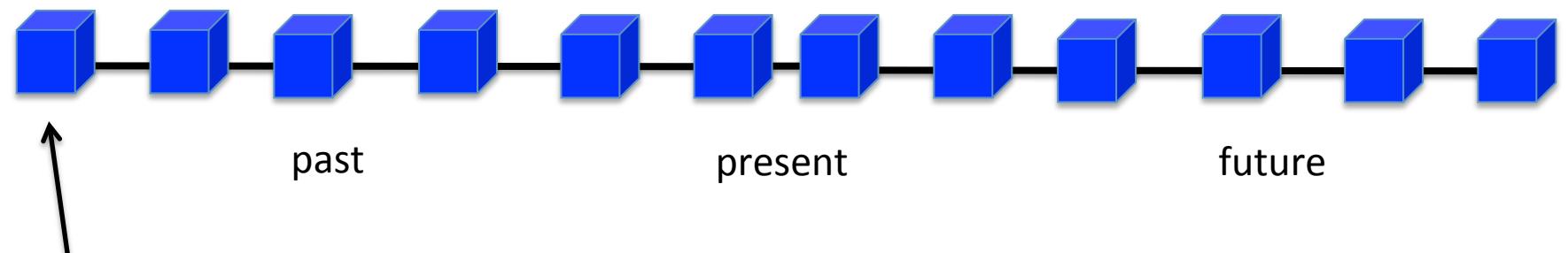
- English: Time ≈ counting a number of different people (remember the soccer team)
  - “Tomorrow is a new day”
  - Tomorrow can be relatively unaffected by today, the way people are self-contained and different
- Hopi: Time ≈ the successive reappearance of the same person
  - Alter tomorrow by working on today, since tomorrow is just today all over again: emphasis on preparation
  - Time is more like “duration,” the successive appearance of day-ness

# Time and its description: “Actual”

- Everything is in consciousness
  - Sensuous: what we see, hear and touch
  - What we don't sense
- Everything exists in consciousness together (nothing “before,” nothing “after”)

# Time and its description: English

- Time in consciousness is divided:
  - Sensuous: what we see, hear and touch = “present”
  - What we don’t sense
    - Remembered = “past”
    - Imagined = “future”



Days, months, eras (historical, archeological, academic), seasons (summer, flu, baseball),...

# Time and its description: English

- Temporal forms of verbs in English
  - Cut consciousness into past, present, future
  - Standing time units in a (spatial) row
- Metaphors of spatial extension to describe duration
  - *long, short, great, much, quick, slow*: *It lasted a long time.*
- Non-metaphors
  - A “handful”: *early, late, soon, intense, very*
- English **objectifies** time, duration, intensity, etc.

# Time and its description: Hopi

- **Validity forms** (not tenses)
  - “I-know-because-I-saw-it”
    - English present and past
  - “I-expect-it”
    - English future
  - **Modes** connecting clauses express later/earlier
- Duration
  - Expressed without use of spatial metaphors
  - Expressed by a large class of “**tensors**” as well as modes and aspects (of verbs)

OBJECTIVE FIELD	SPEAKER (SENDER)	HEARER (RECEIVER)	HANDLING OF TOPIC, RUNNING OF THIRD PERSON
SITUATION 1a.  OBJECTIVE FIELD BLANK DEVOID OF RUNNING			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  OBJECTIVE FIELD BLANK			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)

# So what? Talking about time

(Boroditsky, 2001)

- English
  - Spatial terms: horizontal
    - Front/back terms: *ahead, behind*
    - (A few vertical: *hand down knowledge; a class coming up*)
    - (A few non-spatial: *early, late*)
- Mandarin
  - Spatial terms: horizontal and vertical
    - Front/back terms: *qián* (“front”), *hòu* (“back”)
    - Up/down terms: *shàng* (“up”), *xià* (“down”)

## Some Mandarin examples: *before/after*

- Space
  - zài zhuōzi qián-bian zhàn-zhe yī ge xuésheng
  - “There is a student standing **in front of** the desk.”
- Time
  - hǔ nián de qián yī nián shì shénme nián?
  - “What is the year **before** the year of the tiger?”

# Some Mandarin examples: *up/down*

- Space
    - māo shàng shù
    - “cats climb trees”
  - Time
    - shàng ge yuè
    - “last month”
- 
- Space
    - tā xià le shān méi yǒu?
    - “has she descended the mountain or not?”
  - Time
    - xià ge yuè
    - “next month”
- Up
- Down

# Research questions

- Language differences
  - English speakers: “horizontal thinkers”?
    - Using horizontal metaphors in speech might make them “grow to think about time horizontally”
  - Mandarin speakers: “vertical thinkers”?
    - Using vertical metaphors in speech might make them “grow to think about time vertically”
- Testing effects of language on understanding of time
  - “Online”: priming
  - Long-term: tapping habitual thought

# Experiment 1: Online and long-term processing

- Tested native English speakers and Mandarin speakers in English
  - Will Mandarin speakers still use vertical metaphors even though they are thinking in English?
- All Mandarin speakers started learning English after age 6

# Experiment 1: Online and long-term processing

- First, answered questions containing primes
  - Horizontal prime: strictly spatial



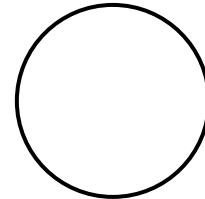
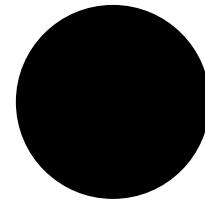
The black worm is ahead of the white worm.

- “true” or “false”

and...

# Experiment 1: Online and long-term processing

- Vertical prime



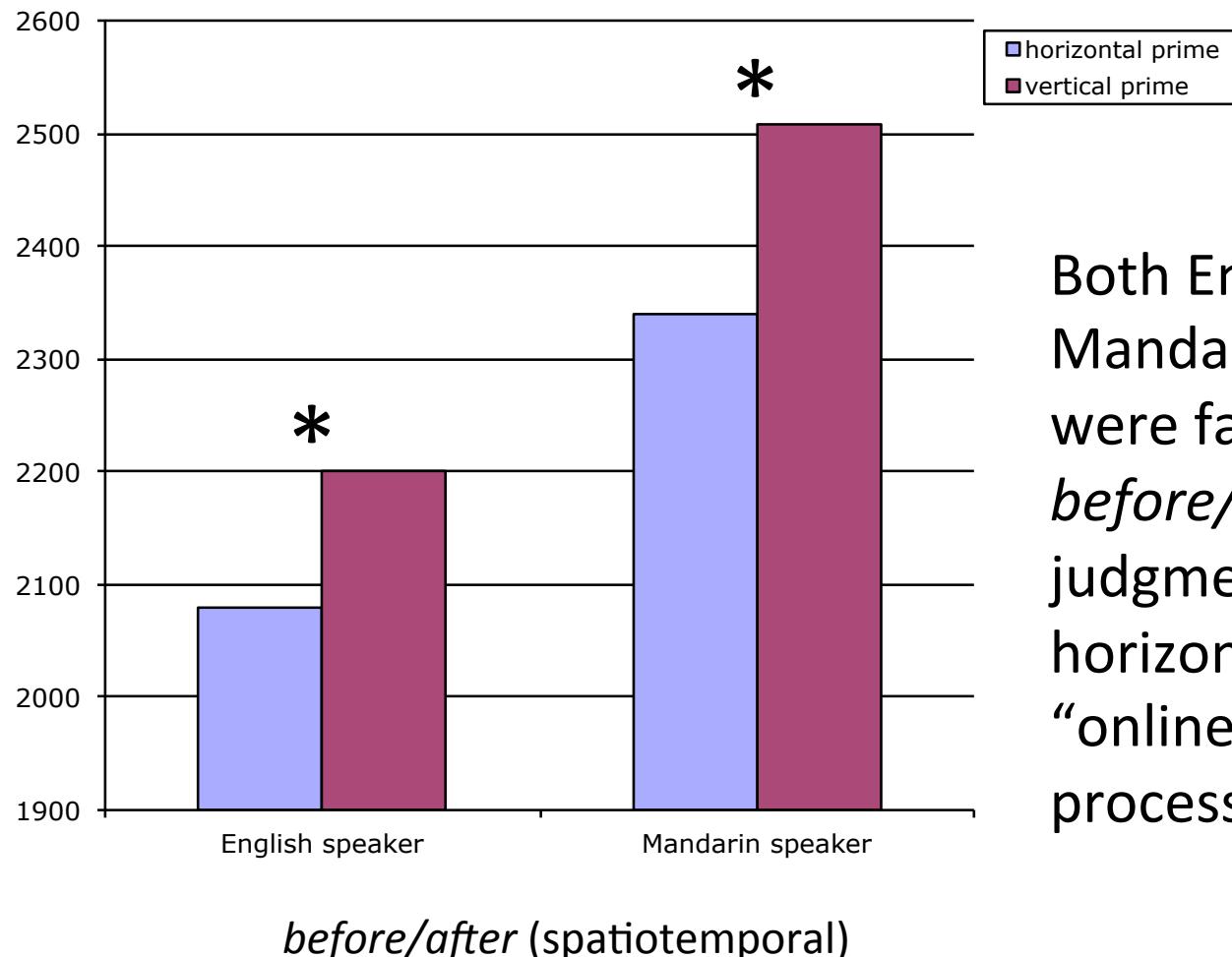
The black ball is above the white ball.

- “true” or “false”

# Experiment 1: Online and long-term processing

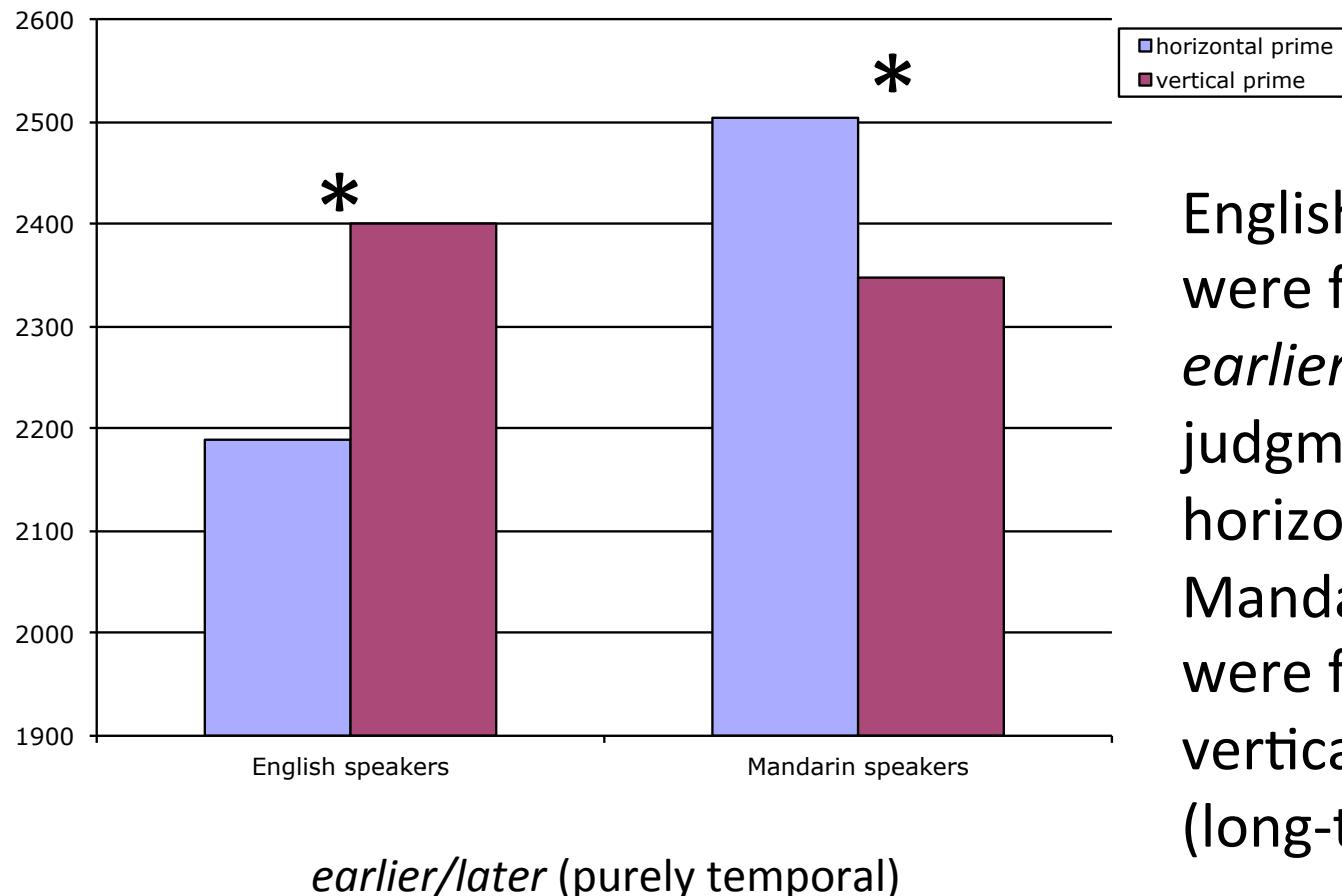
- Then, target questions:
  - Horizontal spatiotemporal terms
    - “March comes *before* April.” -- TRUE/FALSE
    - Prediction: faster after seeing a horizontal prime (for both English and Mandarin speakers)
    - Tests online processing
  - Purely temporal terms (no spatial reference)
    - “March comes *earlier* than April.” -- TRUE/FALSE
    - Tests long-term language influence on thought
      - Prediction: English speakers will be faster after horizontal prime
      - Prediction: Mandarin speakers will be faster after vertical prime

# Experiment 1 results: Reaction time



Both English and Mandarin speakers were faster with *before/after* judgments after a horizontal prime “online processing”.

# Experiment 1 results: Reaction time



English speakers  
were faster with  
*earlier/later*  
judgments after a  
horizontal prime.  
Mandarin speakers  
were faster after a  
vertical prime.  
(long-term)

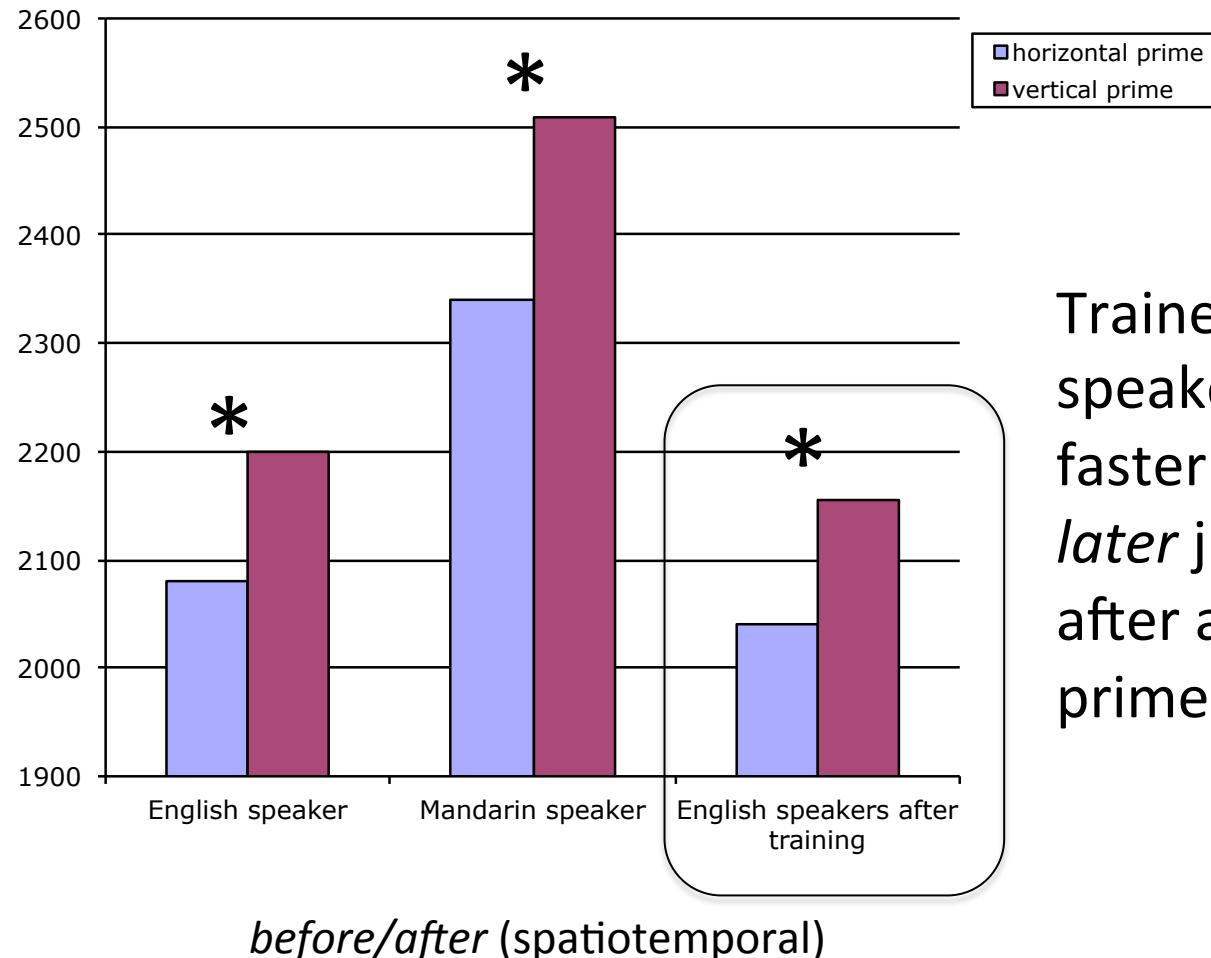
# Online and long-term processing

- Everyone was tested in English, yet the effects were different for English and Mandarin speakers
  - **Online:** Prime horizontal dimension → faster reaction time on sentences using horizontal time terms (*before/after*)
  - **Long-term:** With purely temporal sentences (*earlier/later*)
    - Mandarin speakers were faster with vertical prime
    - English speakers were faster with horizontal prime
- “Habits in language encourage habits in thought”
- Long-term effects: show up even in thinking in another language

# Experiment 3: Effects of training

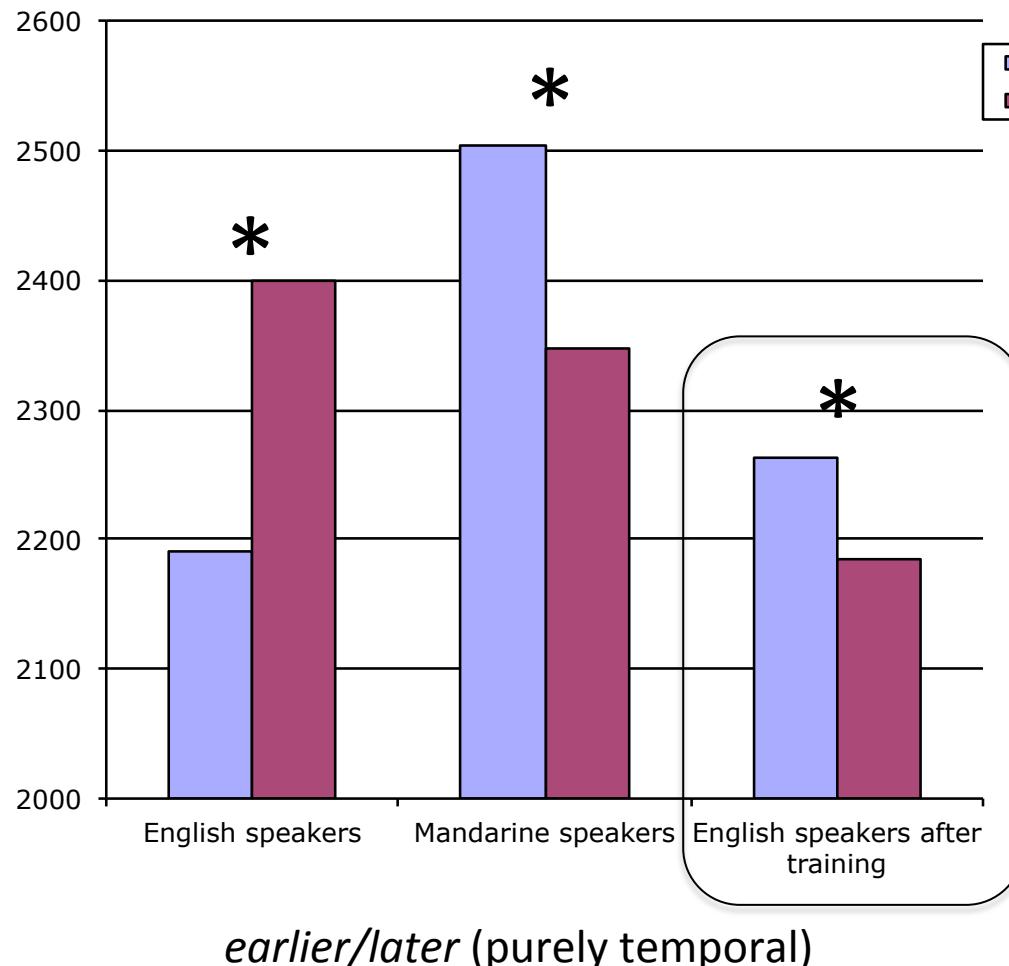
- English speakers are **trained** to talk about time vertically
  - *Higher than/lower than*
    - *Wednesday is lower than Tuesday*
  - *Above/below*
    - *Monday is above Tuesday*
- Then tested as in Experiment 1

# Experiment 3: Effects of training



Trained English speakers were still faster with *earlier/later* judgments after a horizontal prime.

# Experiment 3: Effects of training



Trained English speakers perform like Mandarin speakers on *earlier/later*. i.e., faster after **vertical** prime.  
Differences in ways of talking led to differences in ways of thinking.

## Conclusions (Boroditsky, 2001)

- “One’s native language appears to exert a strong influence over how one thinks about abstract domains like time.”
- Language shapes habitual thought
- Abstract domains may be more language-dependent

# Note on “impossible” translation

- Style differences may make translation impossible
- Translation may also be considered impossible if languages represent the world in incompatible ways
  - Solution 1: aim for formal or functional equivalence: recognize that aspects of meaning are inferred by the reader, not encoded in the text, and that form carries meaning
  - Solution 2: recognize distinction between strong and weak forms of both Linguistic Relativity and Linguistic Determinism

# Linguistic Relativity and Determinism

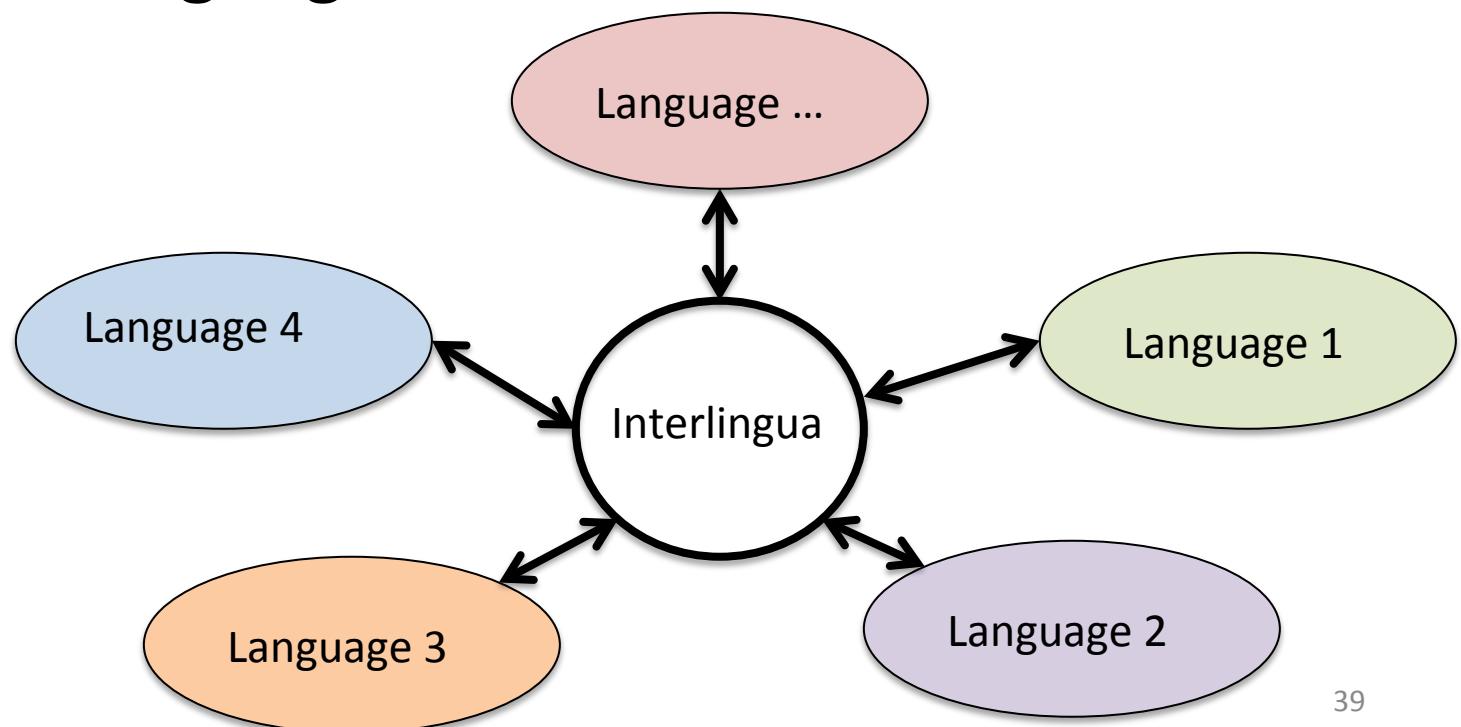
- Strong Relativity
  - Your language expresses concepts impossible to express in other languages
- Weak Relativity
  - Your language expresses concepts that require unfamiliar explanations in other languages
- Strong Determinism
  - Your language determines how you see the world
- Weak Determinism
  - Your language strongly influences how you see the world

# Example

- Spanish speakers describe bridges as “big, dangerous, long, strong, sturdy and towering”
  - *bridge* in Spanish has masculine gender
- German speakers describe bridges as “beautiful, elegant, fragile, peaceful, pretty, and slender”
  - *bridge* in German has feminine gender
- What conclusions do we draw from that?

# An interlingual approach?

- Does an interlingual approach help with the (Whorfian) problem of incompatibility between languages?



# Back to Whorf's main points

“We cut up nature, 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.”

# Road map for today

- The Sapir-Whorf Hypothesis, aka Linguistic Relativity: we see the world the way we do because of the language we use to learn and think about it
  - Plurals and nouns
  - Time and tense
    - Fundamentally different in English and in Hopi
- Experimental evidence
  - Mandarin and English differences in talking about time affect response to sentences about time
- Note on translation
  - Recognize and accept nuances of relativity and determinism as challenges to thoughtful translation
- For you to think about
  - If language does affect our thinking about the world, then the nature of language “in our heads” matters...