Language 2:
Language and Thought

Effects of language on thought

five cases
(1) mechanical relations between objects
(2) mass/count distinction
(3) spatial frames of reference
(4) gender
(5) time

Case 3: Spatial frames of reference
(Levinson)

Tzeltal (Mayan), Guugu Yimithirr (Australian) & 40% of the world’s languages:

Each system has advantages and disadvantages:
English: my left hand; put the fork left of the knife.
Tzeltal: turn north on Charles St.; the box to our east.

Do these different frames of reference have cognitive consequences?
Levinson’s hypotheses:

(1) Speakers of absolute languages must always remain oriented—they can’t say anything unless they know where north is. Speakers of relative languages do not need to maintain their sense of orientation.

Perhaps true: the Dutch vs. Australians (remember navigation).

(2) Speakers gesture differently in the different types of languages.

Example: Australian Guugu Yimithirr speaker’s account of a boat capsizing, videotaped twice, 10 years apart, always gesture the absolute direction the boat was facing.
Problem: language differences or cultural differences?

There may be other reasons why Australians would remain oriented and use their sense of orientation to guide gesturing.

A different research agenda: Find a task that is equally sensible to speakers of the different languages. See if language affects performance on the task.

The object placement task

"Make it the same"

Relative placement

Absolute placement

(Levinson & colleagues)

After 5 trials

Levinson’s findings: Questions

(1) Can’t all speakers use both reference frames? Li & Gleitman. U.S. undergrads tested indoors vs. outdoors.

(2) Are the different preferences an effect of language or culture? Levinson: (a) testing many groups, (b) comparing closely related cultures with different languages. But the cultures aren’t identical. (ex: Tzeltal on hill vs. Mopan in valley).

(3) Are the different preferences an effect of language on thought or an effect of language (broadly construed)?

"Make it the same."

"What does she mean by ‘same’?"
Effects of language on thought

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Case 4: Gender (Boroditsky)

Many of the world’s languages assign gender to all nouns. In many cases, the assignment is arbitrary.

<table>
<thead>
<tr>
<th></th>
<th>Masculine</th>
<th>Feminine</th>
</tr>
</thead>
<tbody>
<tr>
<td>German</td>
<td>moon</td>
<td>sun</td>
</tr>
<tr>
<td></td>
<td>toaster</td>
<td>bridge</td>
</tr>
<tr>
<td>Spanish</td>
<td>sun</td>
<td>moon</td>
</tr>
<tr>
<td></td>
<td>bridge</td>
<td>toaster</td>
</tr>
</tbody>
</table>

Gender affects forms of articles, adjectives, and some verbs:
Ex: French—Le petit chat est venu; la petite vache est venue.
Do these forms influence speakers’ conceptions of the things they talk about?

Exp 2: write down the first three adjectives in English that come to mind when you see pictures of each of these 24 objects.

Example findings:
- German speakers (key = masculine): hard, heavy, jagged, metal, serrated, useful
- Spanish speakers (key = feminine): golden, intricate, little, lovely, shiny, tiny
- German speakers (bridge = feminine): beautiful, elegant, fragile, peaceful, pretty, slender
- Spanish (bridge = masculine): big, dangerous, long, strong, sturdy, towering

The gender assigned by their native language affects speakers’ descriptions of objects, even when they are speaking English.

Case 4:  Gender
Boroditsky’s experiments:
Participants: Stanford & MIT students
Native speakers of German or Spanish (all know English and are tested only in English)

Exp 1: learn English proper names for each of 24 objects (half masculine in Spanish & feminine in German; half the reverse). “This is Patrick/Patricia”

Findings: Better memory if the gender of the name matched the gender of the common noun in subjects’ native language.

The gender assigned by their native language adjusts speakers’ representations of objects, even when they are speaking in English.
Does grammatical gender enhance or hinder memory (relative to a language without gender)?

More on the proper name learning study:
Performance of native speakers of Spanish & German compared to that of native speakers of English, for the same 24 objects:

<table>
<thead>
<tr>
<th></th>
<th>Congruent-Spanish</th>
<th>Congruent-German</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spanish</td>
<td>good</td>
<td>bad</td>
</tr>
<tr>
<td>German</td>
<td>bad</td>
<td>good</td>
</tr>
<tr>
<td>English</td>
<td>good</td>
<td>good</td>
</tr>
</tbody>
</table>

Experience with a language in which bridges are masculine interferes with the ability to conceive of bridges as feminine. In the absence of such experience, adults can conceive of bridges either as masculine or as feminine.

Gender: Summary

Score for weak or for strong Whorf: Native speakers of a language with grammatical gender show influences of that language on representations of the masculinity/femininity of inanimate objects.

But: The nature of this effect is negative, relative to the object representations of speakers of a language without grammatical gender.

--in English, a bridge can be either Patrick or Patricia.
--in German, a bridge can only be Patricia.

Like tight/loose and like speech perception, humans can form gendered representations of objects without language. Acquisition of a gendered language pares down these representations. Therefore, weak Whorf again.

Case 5: Time

Boroditsky: The deepest effect of a language is to suggest metaphors that shape our conceptions of abstract objects and relations. But the metaphors may vary across languages.

Example:
English suggests horizontal spatial metaphors for time:
--We don’t know what lies ahead.
--They moved the meeting forward.
--Monday is before Tuesday

Mandarin suggests vertical spatial metaphors for time:
--We don’t know what lies below.
--They moved the meeting upward.
--Monday is above Tuesday.

Do these metaphors make a difference?

Case 5: Time

A priming study:
Main task = T/F: March comes earlier than April. June comes later than August.

Priming task (comes immediately before):

Horizontal prime:

<table>
<thead>
<tr>
<th>Horse</th>
<th>Cow</th>
</tr>
</thead>
<tbody>
<tr>
<td>T/F: The horse is ahead of the cow.</td>
<td></td>
</tr>
</tbody>
</table>

Vertical prime:

<table>
<thead>
<tr>
<th>Black</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>T/F: The black ball is above the white ball.</td>
<td></td>
</tr>
</tbody>
</table>

How is performance on the temporal task affected by the spatial prime?
Adult Performance on earlier/later task

English speakers’ time judgements benefit from a horizontal prime; Mandarin speakers’ time judgements benefit from a vertical prime.

After a brief training period, English speakers showed the same pattern as Mandarin speakers. The effect of native language is easily changed.

Case 5) Time: Summary

Score for weak Whorf

Speakers use spatial representations to reason about time. The axis on which 1-D temporal relations are measured varies across languages. Even when tested in English, native speakers of different languages preferentially represent time on the axis that their language uses.

But: After a little training, English speakers act like Mandarin speakers. Therefore, weak Whorf.

Language and Thought: Summary

Do speakers of different languages have different concepts? Five cases:

(1) mechanical relations between objects

(2) mass/count distinction

(3) spatial frames of reference

(4) gender

(5) Time

Conclusion: Language can effect our tendency to think one way or another, but so far it does not appear that language can build any new concepts from the ground up.
Deeper effects of language on thought?

Earlier in course, suggested more profound effects of language:

1. Learning number words, quantificational syntax, and a verbal counting routine leads to construction of new number representations. ("seven")

2. Learning spatial language leads to construction of new spatial representations ("left of the blue wall")

Why these effects?
Language has a domain-general lexicon
Language as a combinatorial syntax
Any lexicalized concepts can be combined with any other.

Word Learning: Milestones

6 months: recognizing a few familiar words (Jusczyk)
  "mommy/daddy" at 6 months

9-12 months: first evidence of systematic word learning, relating sound to meaning.
  --production: speaking appropriately (e.g., naming while pointing to object; greetings at appropriate times)
  --comprehension (appropriate responses to speech of others)

Evidence for comprehension: Preferential Looking Studies

"Look at the ball. What a nice ball."
"Look at the bunny. What a nice bunny."

Word Learning: More Milestones

12-18 months: gradual learning of words of a variety of types: names for objects ("ball"), social greetings ("hi"), imperatives/requests ("up!"). Diary studies, up to about 50 words.

18-24 months: two changes

1. A vocabulary spurt (most diarists can’t keep up).

2. Children begin putting words together into phrases.
The Vocabulary Spurt

How rapidly are children learning words?
Best estimates: use dictionary sampling studies to estimate vocabulary size in middle childhood. (Bloom & Markson review):

- 12-16 months: 0.3 words/day
- 16-23 months: 1.8 words/day
- 23-30 months: 8.0 words/day
- 2.5-6 years: 8.3 words/day

Take home exercise: try to learn a language this fast!
Extra-credit exercise: while learning other things that a child is learning (artifact functions, places, people, …).

The Word Learning Explosion: “Fast mapping”

Experimental studies of word learning.
Carey & Bartlett (1978): 2-3 year old children

- “Get me the chromium tray: not the red one, the chromium one”

One week later: test retention of the word: “Give me the chromium tray.”
--variable degrees of learning & interpretation
--learning only in children who already know other color terms.
--for those children, rapid, enduring learning of word meanings: “fast mapping”

More studies of fast mapping

For some kinds of words, occurs in children as young as 14 months.
Lexical contrast not necessary for many kinds of words.
Learning can be remarkably long-lasting.

(Play with 10 objects, one named “the toma.” At test, 10 objects presented, “give me the toma.”)

(Markson & Bloom, 1997)

More studies of fast mapping

Some kinds of terms are easier to learn than others:

Easy tasks: (1) count nouns for novel objects
--“Look: a bicket!”

(2) proper names for people, dolls
--“Look: it’s Koba!”

Harder tasks: verbs, adjectives (“red,” “long”)
Very hard tasks: “six,” “left”
How does the child do it?

The input: Look, a bunny!

Three problems:
(1) identifying phonemes & segmenting word.
(2) focusing on the right part of the world.
(3) determining what the speaker is naming.