**Language 1:**
Language and Thought

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**Foundations of Mind**

- Innate Knowledge = (in general) modular knowledge
- So we are looking for innate modules
- Modules have:
  - **Dedicated input analyzers** that use only specific content (e.g. Reorientation using geometry; Depth via ocular disparity)
  - **Unconscious computations performed on this input** (e.g. Depth-Berkeley; Number-Analog Magnitudes)
  - **Rely on specific neural circuits to do this computation** (e.g. Navigation-the PPA)
  - **Should be shared across different species** (e.g. Number-Analog Magnitudes, Depth-visual cliff, Object-object permanence, Navigation-view dependent scene recognition in bees and humans)
- **Should stay constant and unchanged across development** (e.g. Number-4-item limit of object-based attention, Depth perception-the sharp onset of stereo-vision)

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**Foundations of Mind**

- The mind must begin from something, before learning occurs
- What is this starting state?
- In what ways do we go beyond this starting state?
- Cases so far:
  - Depth
  - Objects
  - Number
  - Navigation
  - Language

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**Foundations of Mind**

- How do we go beyond the modules?
- One way perhaps: Language
Effects of language on thought

Cases so far:
--seven (language as a quantificational system)
--left of the blue wall (language as a combinatorial system)

Now, we will look at our “Language faculty” as one of our possibly innate core knowledge systems, AND how language might help us go beyond core knowledge.

One attempt to study the effect of language on thought has been Whorfian effects.

languages vary in their vocabulary and syntax.

Does this variation have effects on speakers’ concepts and cognitive processes?

i.e., Do speakers of different languages think different thoughts?

Effects of language on thought

Benjamin Lee Whorf (1897-1941)

“users of markedly different grammars are pointed by their grammars toward different types of observations…and hence are not equivalent as observers, but must arrive at somewhat different views of the world.”

Language learning obviously is affected by conceptual development

But are there influences in the other direction: effects of language learning on our concepts?

Effects of language on thought

Today&Tomorrow: five cases

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

1. English: **ON**
2. Japanese: **UE**
3. Dutch: **OP**
4. Beter: **X**
5. Spanish: **EN**

Fig. 16.2 Some cross-linguistic differences in categorizing static spatial relationships.

Support, Containment, and Tightness of Fit:

**Loose-in**

**Loose-on**

**Tight-in**

**Tight-on**

Korean distinction

Similarity judgments by English-speaking adults

Korean Distinction

English Distinction

*p < .05*
Support, Containment, and Tightness of Fit: Studies of adults

Conclusions:

Adult speakers of English fail to recognize the categories of tight vs. loose fit (when not instructed to look for this distinction).

Adult speakers of Korean easily recognize this distinction in the same task with the same stimuli.

Support, Containment, and Tightness of Fit: Studies of infants

Habituation Events:

A. Loose-in
B. Tight-in
C. Loose-on
D. Tight-on

How do these differences develop?

Two possibilities:

1. Empiricist (Whorfian): Children learn these concepts. Children are not initially sensitive to these distinctions, but over the course of learning a language, children construct the relevant concepts.

2. Innate with atrophy: Children have these concepts innately but if you don’t use it you lose it. Children are initially sensitive to all the concepts that are captured by all languages. Over the course of language learning, they lose sensitivity to the concepts that aren’t captured by their native language (like speech perception).

Not worth considering: Babies who will grow up to speak English have genetic English concepts, Korean babies have genetic Korean concepts.

To distinguish these possibilities: test for sensitivity to all these mechanical relationships in infancy.
Case 1: Mechanical Relations Among Objects

Score a point for weak Whorf

- Korean adults find it easy to recognize TIGHT/LOOSE and hard to recognize IN/ON
- For English speaking adults it is the opposite
- But:
  - In the absence of any experience with Korean, all infants are sensitive to the TIGHT/LOOSE distinction and to the IN/ON distinction.
  - Adults can find these distinctions if you tell them to look for them
- Therefore, score a point for “Weak Whorf”. Language can affect our tendencies to think certain thoughts but can not build concepts from scratch.

Question For Later: Is the loss of perceptual category distinctions similar to the loss of conceptual category distinctions?

Case 2: The mass-count distinction

English makes a grammatical, quantificational distinction between names for things and stuff:

- Count nouns: a bottle, one bottle, another bottle, three bottles.
- Mass nouns: water, some water, more water, a glass of water.
- *more bottle, *a water are ill-formed

Some languages do not make this distinction:
- Ex: Japanese (classifier language: one square of table, three round of water; no singular-plural or mass-count distinction for inanimate things & materials).

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
A Whorfian question: Are speakers of a language with a mass-count distinction more sensitive to the distinction between objects and stuff?

Reasons to think no: Children honor the things/stuff distinction before they learn mass/count syntax.

Soja, Carey & Spelke (1991): “This is my blicket. Can you give me the blicket?”

<table>
<thead>
<tr>
<th>Named Stimulus</th>
<th>Object trial</th>
<th>Substance trial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="image1" alt="Object" /></td>
<td><img src="image2" alt="Substance" /></td>
</tr>
<tr>
<td>Test Stimuli</td>
<td><img src="image3" alt="Object" /></td>
<td><img src="image4" alt="Substance" /></td>
</tr>
</tbody>
</table>

Things and stuff: more studies

Once children learn a language, does the presence or absence of mass-count syntax within the language influence their interpretations of new words?

Imai & Gentner (1990s): English vs. Japanese children on a modified Soja task with complex objects, simple objects, & non-solid substances.

<table>
<thead>
<tr>
<th>Complex objects</th>
<th>simple objects</th>
<th>non-solid substances</th>
</tr>
</thead>
</table>

2-year-old children (Soja, Carey & Spelke)

Children distinguish things from stuff in their word learning, before their learning is affected by mass/count syntax.

4-year-old children, Neutral Syntax  
(Imai & Gentner)

<table>
<thead>
<tr>
<th></th>
<th>American</th>
<th>Japanese</th>
</tr>
</thead>
<tbody>
<tr>
<td>complex</td>
<td>90%</td>
<td>85%</td>
</tr>
<tr>
<td>simple</td>
<td>75%</td>
<td>70%</td>
</tr>
<tr>
<td>non-solid</td>
<td>55%</td>
<td>50%</td>
</tr>
</tbody>
</table>

After Language, Japanese and U.S. children still show similar patterns. But, Japanese children’s generalization by substance is more pronounced. Adults show this pattern too.

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Things and stuff: summary

Although the things/stuff distinction seems to be innate & universal, children are more attentive to substance properties if their language focuses on those properties.

A score for weak Whorf.

But:  (1) Children distinguish things from stuff before they learn the relevant syntax.
(2) Speakers of Japanese make the same distinction between things and stuff, even though it lacks syntactic support.

Again, the same conceptual distinctions seem to be available to everyone both before and after language. Language influences the prominence or use of these distinctions.

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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

Slide 28

Case 3: Spatial frames of reference

(Levinson)

English:  my left hand; put the fork left of the knife.
 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.