

9.85 Topics in Infant and Early
Childhood Cognition

Lecture 1

Commonsense

- "Commonsense" supports
 - Categorization
 - Prediction
 - Action
 - Inference
- What is it and where does it come from?
- We'll spend most of the semester on this ...

Today

1. Why commonsense is a hard problem in cognitive science
2. Why commonsense is a hard problem in philosophy
3. What developmental psychology is going to do about it
4. About the class

Commonsense: Why it's a hard problem in cognitive science.

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Please see:

Turing, A. M. "Computing machinery and intelligence."
Mind 59 (1950): 433-460.

Commonsense: Why it's a hard problem in cognitive science.

Turing Test for artificial intelligence ...

- A person and a machine in one room -- a human interrogator in the other. Can the interrogator figure out which is which?

Commonsense: Why it's a hard problem in cognitive science.

- I believe that in about fifty years' time it will be possible to program computers ... to make them play the ... game so well that an average interrogator will not have more than 70 percent chance of making the right identification after five minutes of questioning (Turing, 1950)

Commonsense: Why it's a hard problem in cognitive science.

- Conceptual questions about whether, even if passed, this is a good test of intelligence.
- But, empirically a non-issue.
- In 2004, no one mistook a computer for a human.

The winning entry (most like a human) 2004

- [12:49:43] Judge 1: Do you have a pet?
- [12:49:55] Alice: No but I like cats very much.
- [12:50:15] Judge 1: Why don't you have a cat?
- [12:50:22] Alice: Do I need it?
- [12:50:53] Judge 1: only if you think you do.
- [12:51:02] Alice: I think I do.
- [12:51:30] Judge 1: then get one by god
- [12:51:44] Alice: Good reasoning. Where can I get one by god?

Commonsense: Why it's a hard problem in cognitive science.

- "Do doctors wear underwear?"
- "Is it easier to walk forwards or backwards?"
- "If George Bush is in Washington, is his left knee in Washington?"
- Everything human beings need to know to pass the Turing test we learned before kindergarten.

Commonsense: Why it's a hard problem in cognitive science.

- How do you solve the problem?
 - Lenat: maybe we just have a set of facts about the world.
 - But if it's individual facts, need to know that if Bush is in Washington, so is his eyebrow, his nostril, his spleen ...
 - Dreyfus: "If you got all that knowledge into the computer, you would not know how to retrieve it."

Commonsense: Why it's a hard problem in philosophy.

- Not new ... oldest questions in philosophy ...
- How do we know that objects exist?
- How do we know that other minds exist?
- How do we know what happened in the past or what will happen in the future?
- Ignoring other fascinating questions: how do we know about beauty ... or justice.

Commonsense: Why it's a hard problem in philosophy.

How do we know there are objects in the world?

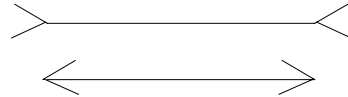
- Naïve realism
- Possibility of a transparent connection between the mind and the world

Commonsense: Why it's a hard problem in philosophy.

- But if we only know about objects through sensory experience then:
- Are beliefs about objects really just beliefs about sensory experiences?
 - Idealism
 - Phenomenalism
- Can physical objects *cause* sensory experiences ("permanent possibilities of sensation" -- John Stuart Mill)?

Commonsense: Why it's a hard problem in philosophy.

- But sensory experience is sometime misleading ...



Can of worms ...

- Why should we think that any particular cognitive process (from perception to science) gets at the truth about the world?
- What processes might, in principle, create accurate representations of the world?
- What processes does the mind use?
- What might it mean to believe that objects cause sensations? What is causation?
- How can the physical world and the mental world interact?
- How can we know the contents of our own minds or other minds?

Many ways to address these questions

- But recently, includes real experiments as well as thought experiments.

For any type of commonsense knowledge

- Objects
- Minds
- Number
- Space
- Causality
- Time

We'd like to understand

- What causes this knowledge to emerge.
- Whether our knowledge changes -- and if so, why.
- How knowledge in one area interacts with knowledge in other areas.

And we've wanted to know for thousands of years

- "Herein lies the difficulty I can never resolve to my satisfaction. **What is knowledge?** Can we answer that question?" Plato -- The Theatetus
- **And where does it come from?**
 - Men. And I am certain that no one ever did teach him.
 - Soc. And yet he has the knowledge?
 - Men. The fact, Socrates, is undeniable.
 - Soc. But if he did not acquire the knowledge in this life, then he must have had and learned it at some other time?
 - Men. Clearly he must. Plato -- Meno

How are we going to find out?

Study cognitive development.
Try to catch knowledge as it's emerging.

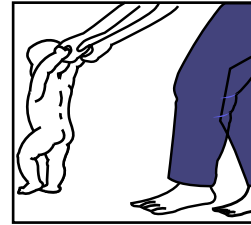


Illustration courtesy of MIT OCW.

Why study babies and children?

- Because much "commonsense knowledge" *is* learned -- it's not commonsense to babies and children.
- Because learning in early childhood (as opposed to learning in graduate school) reveals something about fundamental cognitive processes.

Developmental Psychology

- As applied philosophy: fundamental questions about what knowledge is and where it comes from.
- Attempts to answer some of these questions using methods from:
 - Philosophy
 - Biology
 - Computer science
 - Statistics

In this class we will:

- Introduce philosophical problems that motivate research (Theory)
- Discuss ways of studying these problems (Methods)
- Discuss particular experiments and the interpretation of their results (Evidence)

In particular, we will look at

- How we develop concepts and categories.
- How we understand change and identity.
- How we recognize others as agents.
- How we draw inferences about mental states.
- How we understand causal relations.
- Mechanisms of change.

Commonsense as folk theories

- Commonsense is theory neutral.
- But I will often talk instead about naïve theories, folk theories -- not theory neutral.
- Supposes a particular view of cognitive development.
- Supposes that much of commonsense knowledge makes commitments about causal relationships.

Commonsense as folk theories

- Also supposes that you learn your commonsense theories from evidence.
 - Water will spill
 - Water didn't spill
- Does this change your folk physics?
- Whose theories change faster with evidence, yours or a baby's?

Keep in mind ...

- Development is lifelong
- Development involves loss as well as gain in functions.
- Development involves continuities as well as change.
- Many aspects of development are historically and culturally constructed.
- Development is multiply influenced.
- Development isn't just cognitive.

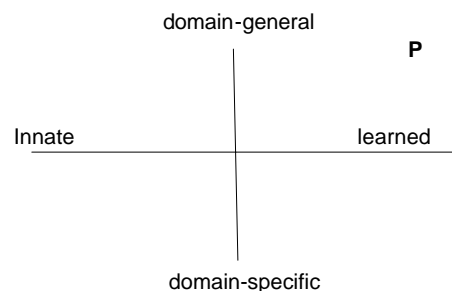
If X is any type of knowledge

- Questions developmental psychologists ask:
 - Is X **innate** or **learned**?
 - If X is learned -- when and how?
 - Are the processes that lead to knowing X **specific** to the **domain** of X or **domain-general**?
 - Does knowledge of X **change** through development or is there **continuity** with adult knowledge?
 - Is knowledge of X **universal** or **culturally specific**?

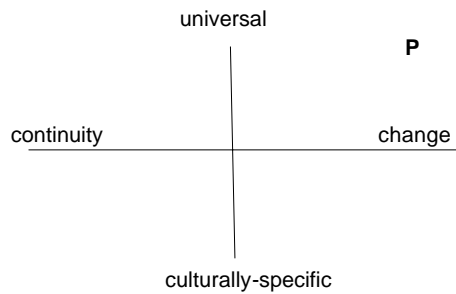
So some key dichotomies

- Innate v. learned
- Domain-general v. domain-specific
- Change v. continuity
- Universal v. culturally specific
- Useful for discussing the theorists ... but better to think of these not as dichotomies but points on a continuum.
- Not necessarily even areas of disagreement so much as areas of emphasis.

Next week: Piaget



Next week: Piaget



Key points on syllabus

- Office hours: Tuesday 3-5 and by appointment.
- Textbook: Flavell, Miller & Miller: Cognitive Development, 4th Edition
- Other readings: on Stellar website
- Detailed description of class assignments on syllabus
- Please try all other methods of reaching me -- office hours, phone, stopping me after class -- before e-mail.

Writing assignments

- As much as possible like what you would write as a professional scientist
- Peer reviews
- Empirical articles

Me too ...

- And I also have difficulty with names.
- Please don't take it personally ...
- Please do prompt me ...