9.916
Attribution and Theory of Mind
Today’s Lecture

Other’s actions are more than spatiotemporal patterns; they reflect, and predict, internal states

How do people infer the causes of others’ actions?

Social Psychology: Attribution Theory

Developmental Psychology: Theory of Mind

Action

Stable

Transient
Attribution Theory

Kelley's ANOVA model:

- Stable
  - External
  - Internal
- Action

Common method: Something about the person? the situation?

Consensus

Consistency distinctiveness

“Jon laughs at the comic tonight.”
Does everyone laugh at the comic?
Does Jon laugh at all comics?
Does Jon always laugh at this comic?
**Attribution Theory**

**Diagram:**
- Action
  - Stable
    - External
    - Internal

**Common method:**
Something about the person? the situation?

**Phenomena:**

**Situation Neglect**
- *a.k.a. Insufficient Discounting, Fundamental Attribution Error*

**Actor-Observer Asymmetries**
- *own failures attributed to external causes*
Flaws:
Assumes lots of data

“External” causes:
“Jon went on vacation to the Caribbean because the weather is hot there.”
Hot weather = external cause
“... but Jon didn’t know it was hot.”
“... but the weather was terrible that week.”
Premack’s “Theory of Mind”

Sarah: Action prediction

Figures removed due to copyright restrictions.
Theory of Mind

The Sally-Anne problem

Action prediction based on false belief is different from the prediction based on reality.

(Wimmer & Perner 1983, Wellman, Cross and Watson 2001)

& African pygmy hunter gatherers

(Avis & Harris 1999, Callaghan et al 2005)

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Theory of Mind

**False Belief**
- Location transfer
- False contents
- 3rd P
- 1st P past
- Prediction
- Explanation

**False Photo**

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Susie parked her sports car in the driveway. In the middle of the night, Nathan moved her car into the garage to make room for his minivan. Susie woke up early in the morning.

She expects to see in the drive a sports car—a minivan.

A volcano erupted on this Caribbean island three months ago. Barren lava rock is all that remains. Satellite photos show the island as it was before the eruption.

In the photos the island is covered in rock vegetation.

(Saxe and Kanwisher 2003, Saxe 2006, etc.)

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**Theory of Mind**

Neural mechanism

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**Belief > Photo**

Individual subjects

Figure by MIT OpenCourseWare.
Theory of Mind
Neural mechanism

Reality Known
Task: Predict where the girl will look.

Results

Lesions in
(1) left lateral frontal
(2) left TPJ

Figure removed due to copyright restrictions.

Theory of Mind
Neural mechanism

Reality Unknown
Task: Indicate where the object is.

Results
Lesions in
(1) left lateral frontal
(2) left TPJ

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False Belief understanding isn’t “having” a Theory of Mind.
(1) Diverse Desires

Which one will the girl choose?
Theory of Mind
Development

(1) Diverse Desires
(2) Diverse Beliefs

Where will the girl look for the dog?
Theory of Mind
Development

(1) Diverse Desires
(2) Diverse Beliefs
(3) Access/Ignorance

Does the girl know what's in the drawer?
Theory of Mind
Development

(1) Diverse Desires
(2) Diverse Beliefs
(3) Access/Ignorance
(4) False Belief

What does the boy think is in the box?
Theory of Mind

Development

(1) Diverse Desires
(2) Diverse Beliefs
(3) Access/Ignorance
(4) False Belief
(5) Hidden Emotion

How does the boy really feel?
Theory of Mind
Development


60/75 Kids: 80%
Replicated longitudinally

(1) Diverse Desires (2) Diverse Beliefs
(3) Access/Ignorance (4) False Belief
(5) Hidden Emotion

Figure by MIT OpenCourseWare.
Theory of Mind
Non-human primates

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Competitive
Not
Cooperative

Santos, Flombaum (IP)
Origins of False Belief understanding
9.916 Special Topics: Social Animals
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