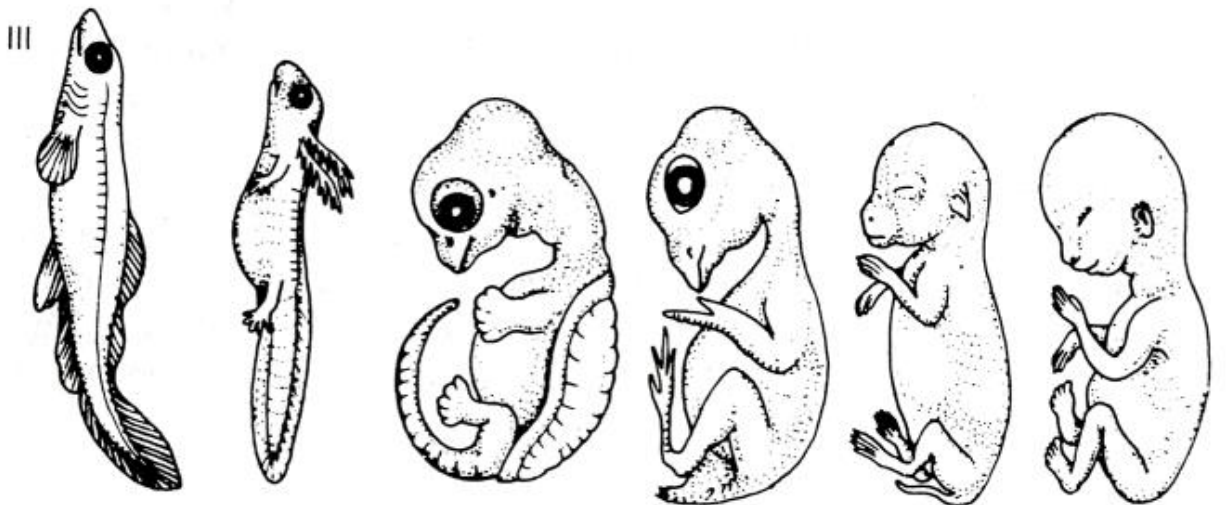
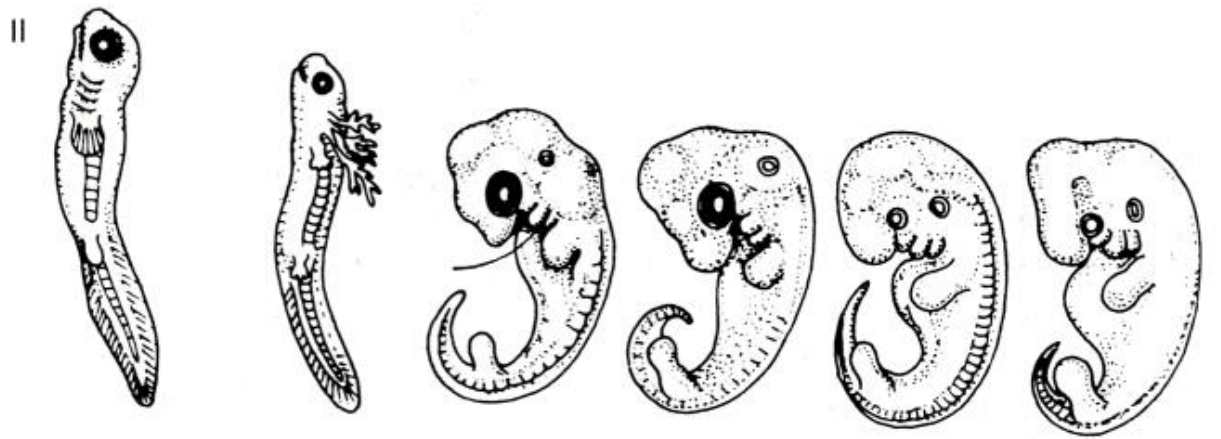
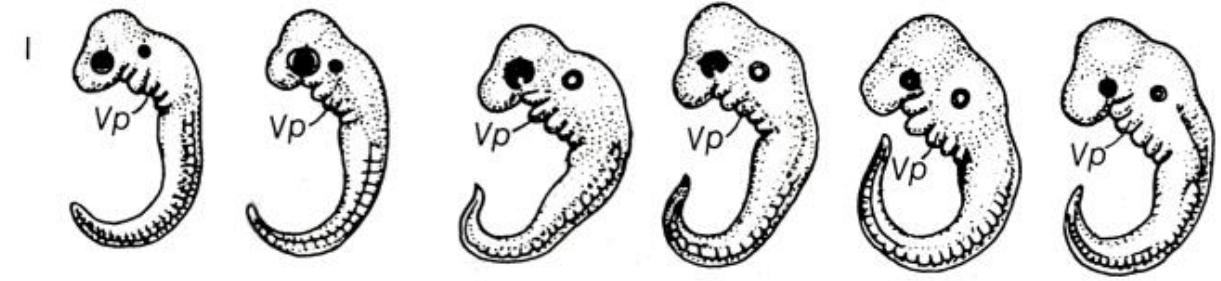


Development

Amitabha Mukerjee
Intro to Cognitive Science

Embryogenesis



FISH SALAMANDER TORTOISE CHICK RABBIT HUMAN

haeckel 1874

"Ontogeny recapitulates phylogeny"

debate:

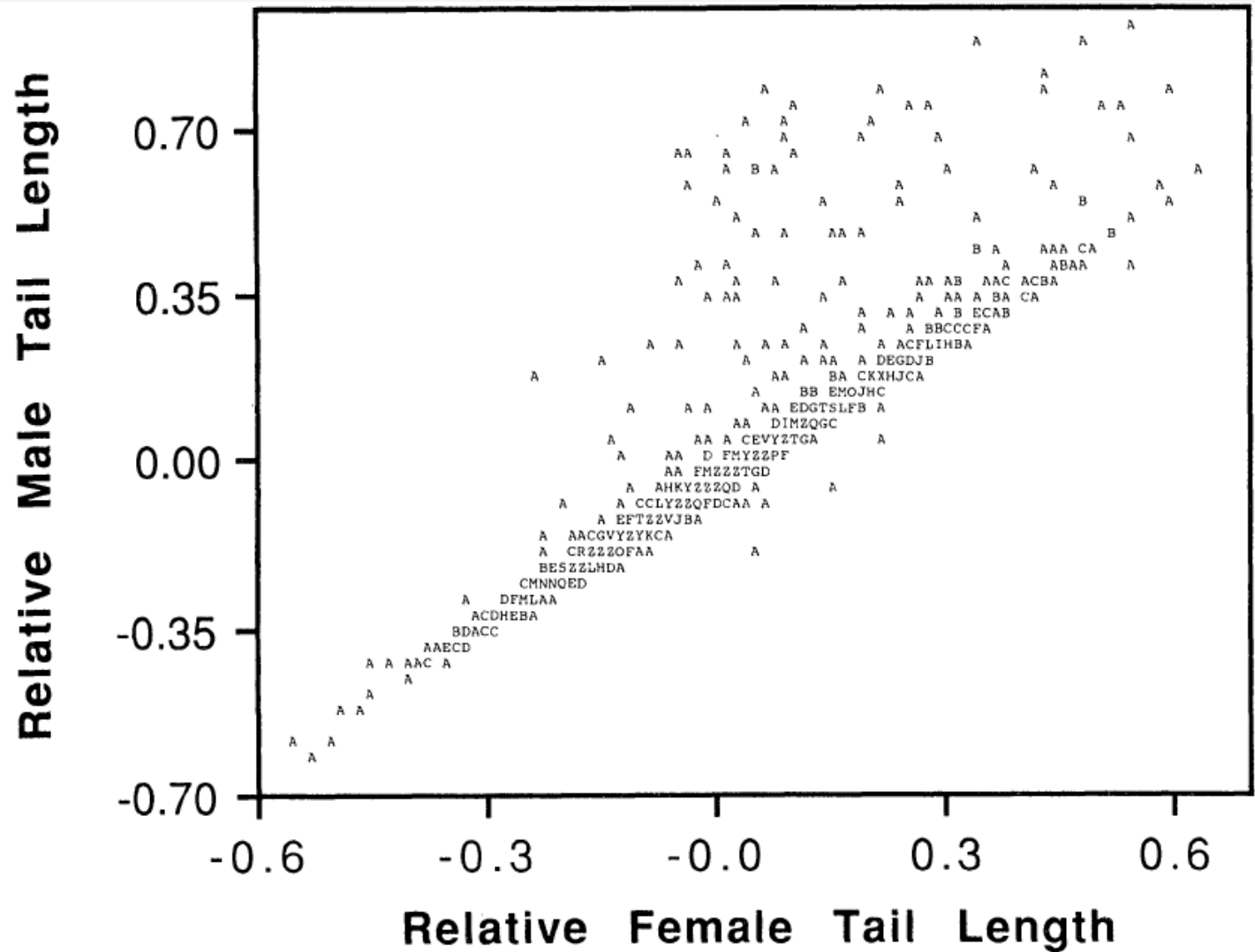
sketches oversimplified
- fudged - to emphasize
similarity.

However, Richardson 98:
on a fundamental level,
Haeckel was correct

Evolution vs Life History

- phylogeny (evolutionary theory) : origins and development of species
- ontogeny (**life history** theory) : unfolding of important life events such as growth and reproduction in a species.

Sexual Selection : Dimorphism



Emphasis on Consciousness

1. Consciousness as the cause of our thoughts and actions - Plato, Descartes, James, ancient spiritual thought.
 - John Locke, B. F. Skinner, John B Watson
vs
Rousseau, Piaget, Chomsky, Spelke
 - What is the child's innate ability?
 - How does the environment impact on development?
 - How do innate ability and environment interact?

Issues in development

1. The nature-nurture debate:

– John Locke, B. F. Skinner, John B Watson

vs

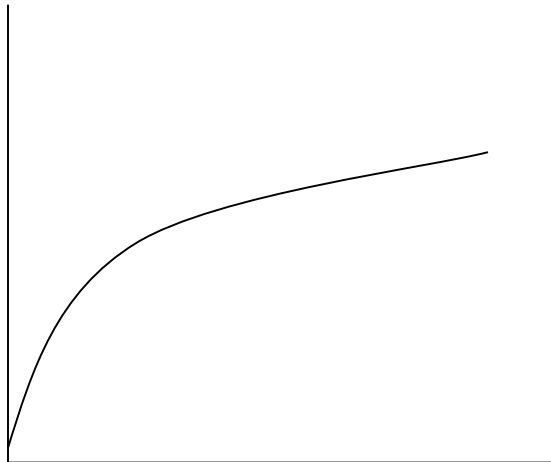
Rousseau, Piaget, Chomsky, Spelke

- What is the child's innate ability?
- How does the environment impact on development?
- How do innate ability and environment interact?

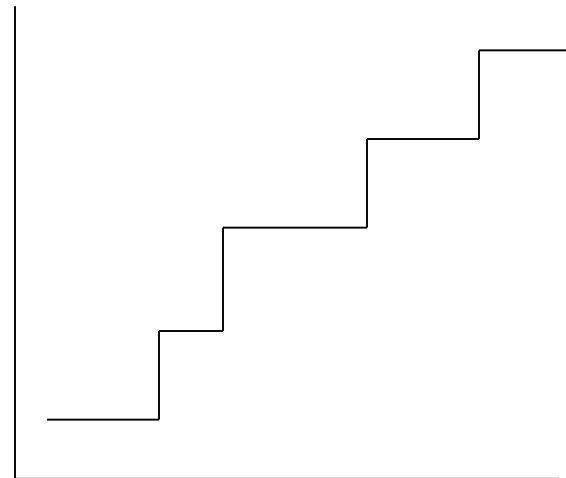
Issues in development

2. The course of acquisition:

- a. Continuous function:
 - e.g. weight gain



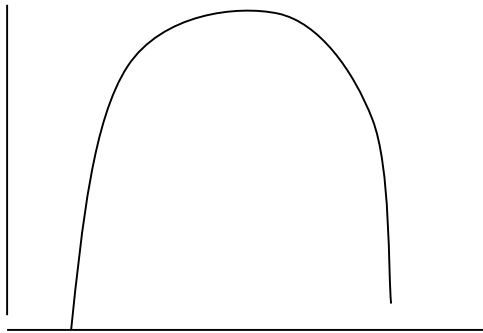
- b. Discontinuous or step function
 - e.g. physical mobility



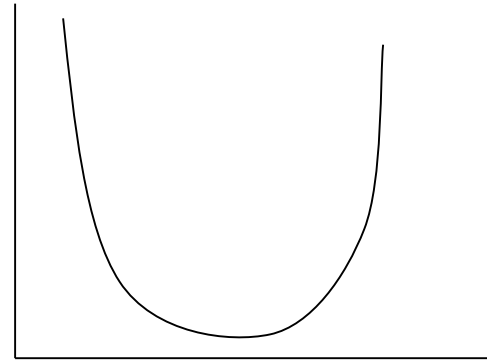
Issues in development

2. The course of acquisition:

- c. Inverted-U function
 - e.g. visual acuity over lifespan



- d. U-shaped learning:
 - e.g. stepping reflex



Issues in development

3. Domain-general or domain-specific learning

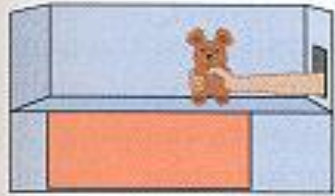
- Domain-general - all domains develop as result of universal cognitive growth (e.g. Piaget)
- Domain-specific - different domains develop at different rates (e.g. Fodor)

Reasoning:

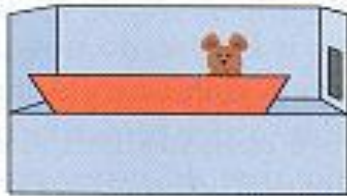
Centralized vs Embodied

Sequence of events: $1 + 1 = 1$ or 2

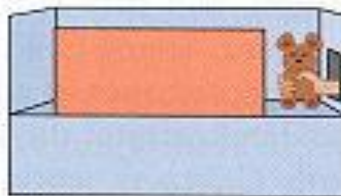
1. Object placed in case



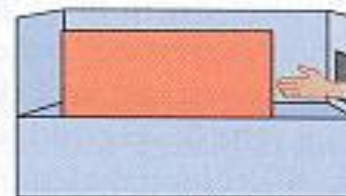
2. Screen comes up



3. Second object added



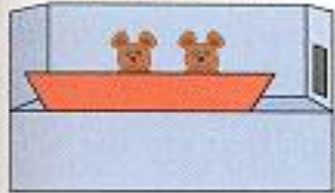
4. Hand leaves empty



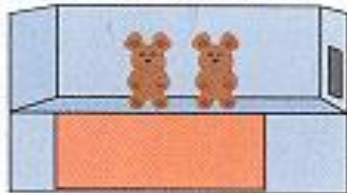
Then either: (a) Possible Outcome

Or (b) Impossible Outcome

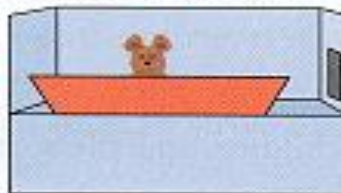
5. screen drops . . .



6. revealing 2 objects



5. screen drops . . .



6. revealing 1 object

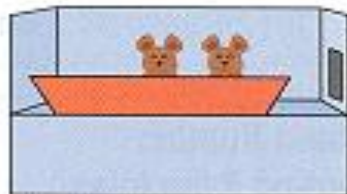


Sequence of events: $2 - 1 = 1$ or 2

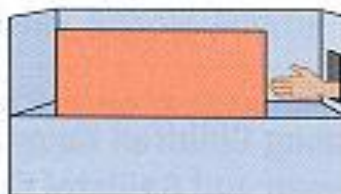
1. Objects placed in case



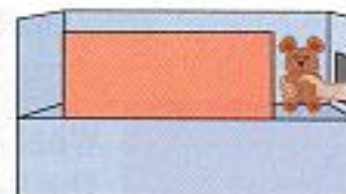
2. Screen comes up



3. Empty hand enters



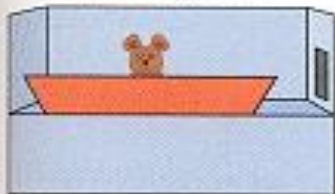
4. One object removed



Then either: (a) Possible Outcome

Or (b) Impossible Outcome

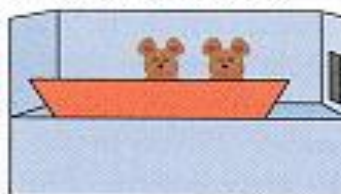
5. screen drops . . .



6. revealing 1 object



5. screen drops . . .



6. revealing two objects



Wynn 92: 5-mo infants look longer at incorrect arithmetic

Wason Selection Task

- ‘If there is an A on one side of the card then there is a 3 on the other side of the card’
 - Indicate those cards that need to be turned over to determine whether the rule is true or false.

A

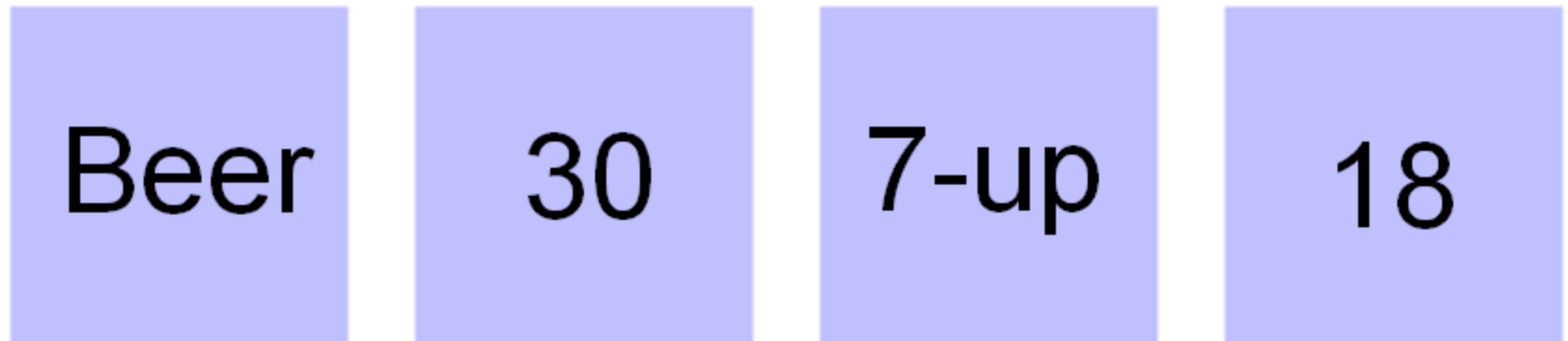
J

3

7

Wason Selection Task

- You have to be 25 years to be served alcohol
 - Indicate those cards that need to be turned over to determine whether the rule is true or false.

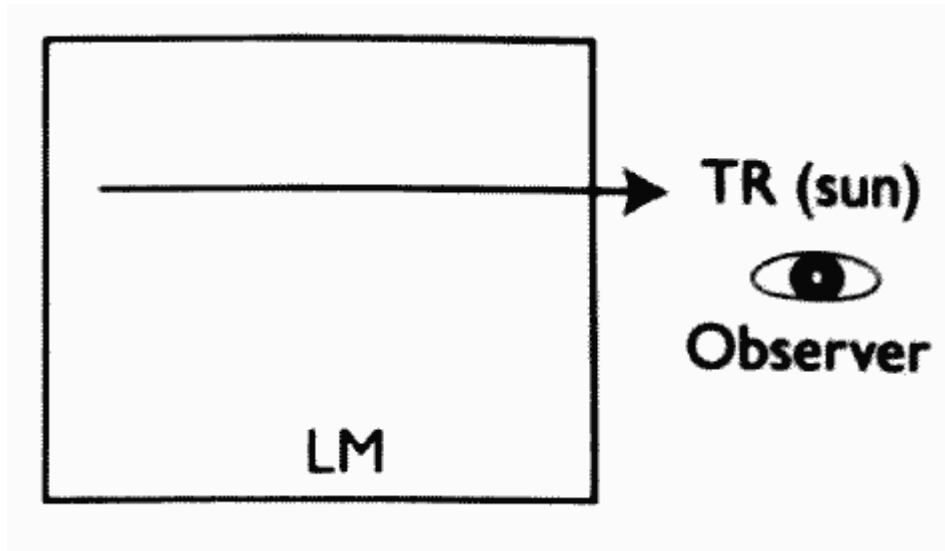


Spatiality and Abstraction

Concepts of Distance

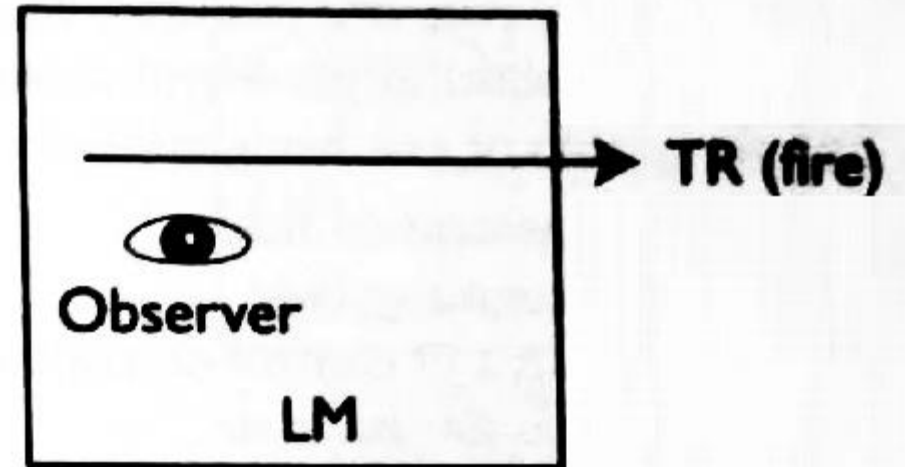
- Visual or Motor?

Spatial Aspects in Language



The sun came out.

The fire went out.



More than language?

Lakoff: Many associations acquired in development become rooted in cognition

BIG *is* IMPORTANT (size)

Tomorrow is a big day

AFFECTION *is* WARMTH

They greeted me warmly

More than language?

- Time is motion: after her arrival, the days flew
- Help is Support: Support your local charities
- Knowing Is Seeing: I see what you mean
- Happy Is up: I am feeling up today
- Understanding Is Grasping: I just can't grasp transfinite numbers.

Subjectivity, Truth and Reality

Is there a single “Truth”?

- Your concept of the world is different from mine
- But is there a single “concept” that is RIGHT?
 - Facts vs beliefs
 - Contradictory: “Absolute truth does not exist”
- Relativism: That all truths are relative
- Morality : Culture-specific : Normative

Linguistic Relativism: Shapir-Whorf Hypothesis

- a) **Linguistic determinism**: to some extent, our language determines how we view and think about the world.

- b) **Linguistic relativity**: people speaking different languages think differently about the world.

Grounding Meaning

Searle's Chinese Room

