Development

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Intro to Cognitive Science
Embryogenesis

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
5. Screen drops...
6. Revealing 2 objects

Or (b) Impossible Outcome
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
5. Screen drops...
6. Revealing 1 object

Or (b) Impossible Outcome
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.

Beer  30  7-up  18

Griggs & Cox, 82
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