Conceptual Development

How Children Develop
Chapter 7

Concepts
- General ideas or understandings that can be used to group together objects, events, qualities, or abstractions that are similar in some way
- Crucial for helping people make sense of the world

Perspectives on Concepts
- **Nativists** argue that innate understanding of concepts plays a central role in development
- **Empiricists** argue that concepts arise from basic learning mechanisms

Because early development is so crucial, we will focus on development in the first five years.

Over 90 percent of them, when poked, failed to make even rudimentary attempts to defend themselves.
Familiarity vs. Novelty

- Novel
- None
- Familiar

Familiarization time

Habituation/Dishabituation

Object Properties

Baillargeon: 3-month-olds:
- Have object permanence
- Believe objects are solid
- "think" that objects need support

Spelke: 3-month-olds:
- "know" about gravity
- solidity
Developing Understanding of Support Relations

- Physical Causality
  - Piaget's view: No perception of physical causality until 7-8 years
  - At this point, they make animism error

BUT, work with 7-month-old infants suggests that they:

1. perceive events as causal
   - They discriminate launching from delayed or gap noncausal events
2. attribute agency and recipiency to different objects
Causal perception at 4½ months following sticky mittens experience

Dividing Objects into Categories: Categorization of Objects

| TABLE 7.1 |
|---|---|---|---|
| **Object Hierarchies** |
| **Level** | **Type of Object** | **Level** | **Type of Object** |
| Most General | Inanimate Objects | People | Living Things |
| Medium | Objects, Tables . . . | Spanish, French . . . | Cats, Dogs . . . |
| Specific | La-Z-Boy, Armchairs . . . | Picasso, Gernsteins . . . | Lions, Lynx . . . |
Dividing Objects into Categories:
Categorization of Objects

- Category hierarchies often include three main levels:
  - General, the superordinate level
  - Very specific, the subordinate level
  - One in between, the basic level

- Children usually learn the basic level category first.
  - Do you know why?

Categorization in the First Year

- Infants form prototypes for simple shapes and faces.

Which of these should be more familiar if infants have formed a concept for a prototypical triangle?
Mathematically Averaged Caucasian Female Faces

4 Face Composite  8 Face Composite  16 Face Composite  32 Face Composite

Mathematically Averaged Caucasian Male Faces

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Quinn et al. (1993): 3-month-olds familiarized with cats preferred novel dog to novel cat.

There is an asymmetry: why?

Infants sensitive to attribute correlations by 7 to 10 months (Younger and Cohen, 1986)

Attention to correlated attributes
Attention to correlated attributes

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Habituation Events

Consistent Test Event

Switched Test Event

Deductive-like learning?

Habituation Event (A-B)  Habituation Event (B-C)

Consistent Test Trial

Inconsistent Test Trial

Categorization in older children

By 3 years, children:

- believe in “essences”: What makes us who we are is our genes, heart, ancestry, biology
- know that animates grow, are ill, transfer germs, die
- have theories to explain how world works

Study by Keil (1979)

Is it a skunk or raccoon?
Learning about People and Oneself

• Infancy
  • Infants develop a “naive psychology, based on
    • Desires
    • Beliefs
    • Actions

Learning about People and Oneself

• 5-7 months infants understand that hands are goal-directed

Learning about People and Oneself

• Between 1–2 years of age infants learn about intentions
  ◆ They desire to act in a certain way
  ◆ Their behavior becomes more goal directed

• Around 24 months infants recognize themselves in a mirror and in photos

Theory of Mind

• Between the ages of 2 and 5 years, children form a theory of mind.
  ◆ “Theory of mind”

• A child’s theory of mind includes:
  ◆ Knowledge of perceptions
  ◆ Psychological states: goals, beliefs, desires
  ◆ Actions
Theory of Mind: False Belief Problems

- Must understand the connections between others’ desires and their actions.
- Three-year-old children have some understanding of how beliefs and desires affect behaviors.
- But: is limited, as shown in their approach to “false-belief problems”

A False-Belief Problem: The “Smarties” Task

Autism and False Belief Tasks

- Children with autism continue to find false-belief tasks very difficult to solve even when they are teenagers.
- They have impaired “mind reading mechanisms,” and this deficit interferes with many aspects of their social functioning.
- What are these mechanisms?

Where Does Theory of Mind Come From?

- The Theory of Mind Module (TOMM):
  - a brain mechanism is devoted to understanding others and that the TOMM matures over the first five years of life.
  - Supporters say that children with autism have a biologically-impaired TOMM.
- A second theory emphasizes interactions with people;
  - evidence is that older children do better with false-belief tasks than do younger children.
    - Child’s success related to family size
    - Conversation experience
    - Social skills with peers
Where Does Theory of Mind Come From? (continued)

- A third theory: growth of general information-processing skills as essential to understanding other’s minds.
  - Children with autism do not possess the processing skills necessary to keep track of conflicting information, skills found in other children.

Imaginary Companions

- Children with imaginary companions do not differ from those who do not have such fantasy companions with regard to personality or intelligence
  - More likely to be firstborn or only children; to watch relatively little television; to be verbally skillful; and to have advanced theories of mind
  - Imaginary companions are used not only for enjoyment but also to deflect blame

Spatial Representation

- Infants as young as 6 months can use a landmark to find nearby hidden objects.
  - "Dead reckoning": ability to keep track of locations relative to a starting point and retrace one’s steps.
    - Two-year-olds can use dead reckoning a little, but without straightforward landmarks, children as old as 7 find it difficult.

Where is the UC?

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- Early school years: Route mapping – can remember routes as "turn left", "turn right".
  - 10 years: configuration knowledge – integrate landmarks and routes
Self-locomotion and Spatial Representations

Toddlers who locomoted on their own to the open side of the apparatus were more likely to reach for the correct location than were peers who were carried.

Number

- Numerical equality: The realization that all sets of a certain number of objects have something in common (2 dogs, two cups)
- 5 months: a sense of numerical equality as it applies to sets of one, two, or three objects.
- But only at 3 or 4 years of age: show a comparable understanding of larger sets, like four objects.

Infants’ Arithmetic Skills: Wynn’s Doll Task

- 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

Infants’ Arithmetic

- Claim of understanding arithmetic is controversial
  - Not just number: arithmetic
  - A perceptual process known as “subitizing”?