Development Through the Lifespan

Chapter 5
Cognitive Development in Infancy and Toddlerhood

Piaget’s Theory: Schemes

Psychological structures
- organized ways of making sense of experience

Change with age
- action-based sensorimotor patterns
- later move to “thinking before acting” pattern—creative and deliberate

Building Schemes

Adaptation
- building schemes through direct interaction with environment

Assimilation
- using current schemes to interpret external world

Accommodation
- adjusting old schemes and creating new ones to better fit environment

Using Assimilation and Accommodation

Equilibrium and disequilibrium
- use assimilation during equilibrium
- disequilibrium prompts accommodation

Organization
- internal rearranging and linking schemes
Sensorimotor Stage

Birth to 2 years
Building schemes through sensory and motor exploration
Circular reactions

Sensorimotor Substages

<table>
<thead>
<tr>
<th>Reflexive schemes</th>
<th>Birth–1 month</th>
<th>Newborn reflexes</th>
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<tbody>
<tr>
<td>Primary circular reactions</td>
<td>1–4 months</td>
<td>Simple motor habits centered around own body</td>
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<tr>
<td>Secondary circular reactions</td>
<td>4–8 months</td>
<td>Repeat interesting effects in surroundings</td>
</tr>
<tr>
<td>Coordination of secondary circular reactions</td>
<td>8–12 months</td>
<td>Intentional, goal-directed behavior; object permanence</td>
</tr>
<tr>
<td>Tertiary circular reactions</td>
<td>12–18 months</td>
<td>Explore properties of objects through novel actions</td>
</tr>
<tr>
<td>Mental representation</td>
<td>18 months–2 years</td>
<td>Internal depictions of objects or events; deferred imitation</td>
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</tbody>
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Object Permanence

Understanding that objects continue to exist when out of sight
- Piaget: develops in Substage 4
Not yet complete
- A-not-B search error

Modern Studies of Object Permanence

Baillargeon
- Babies as young as 4 months show clear signs of object permanence.
Recent theories
- Development of object permanence is more of a process of elaboration than of discovery.
Mental Representations

Internal, mental depictions of objects, people, events, information

- can manipulate with mind
- permits deferred imitation and make-believe play

Deferred Imitation

Piaget: Develops about 18 months

Newer research:

- 6 weeks – facial imitation
- 6–9 months – copy actions with objects
- 12–14 months – imitate rationally
- 18 months – imitate intended, but not completed, actions
Invisible Displacement
Finding a toy moved while out of sight

Evaluation of the Sensorimotor Stage

<table>
<thead>
<tr>
<th>Develop when Piaget suggested</th>
<th>Develop earlier than Piaget suggested</th>
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<tbody>
<tr>
<td>• Object search</td>
<td>• Object permanence</td>
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<tr>
<td>• A-not-B</td>
<td>• Deferred imitation</td>
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<tr>
<td>• Make-believe play</td>
<td>• Categorization</td>
</tr>
<tr>
<td></td>
<td>• Problem solving by analogy</td>
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Some suggest infants are born with core knowledge in several domains of thought.

Challenge to Piaget’s View

- Piaget underestimates the cognitive capacity of infants.
- He may have wrongly equated the infant’s lack of physical ability with lack of cognitive understanding.

Core Knowledge Perspective

Born with innate, special-purpose knowledge systems
- core domains of thought
  - Physical
  - Linguistic
  - Psychological
  - Numerical

Core domains allow quick grasp of related information
Support rapid early development
Testing Babies’ Numerical Knowledge

Infants may be able to:
- discriminate quantities up to 3
- do simple arithmetic

Findings are controversial

Infants’ Numerical Knowledge

Model of Information Processing

Information-Processing Improvements

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<tr>
<th>Attention</th>
<th>Efficiency, ability to shift focus improves</th>
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<tr>
<td></td>
<td>Less attraction to novelty, better sustained attention after first year</td>
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<table>
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<tr>
<th>Memory</th>
<th>Retention intervals lengthen</th>
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<td></td>
<td>Recall appears by first year; excellent in second year</td>
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<table>
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<tr>
<th>Categorization</th>
<th>Impressive perceptual categorization in first year</th>
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<tbody>
<tr>
<td></td>
<td>Conceptual categorization in second year</td>
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Babies as young as 3 months can remember specific objects and their own actions for as long as a week.

**Categories**
- By 7 months infants actively use categories to process information.
- Cannot process levels of categories
- Babies respond differently to animals and furniture but not to dogs and birds.

Hierarchical categories appear by 2 years.

**Development of Categorization**

**Perceptual**
- Based on similar overall appearance or prominent part

**Conceptual**
- Based on common function or behavior
- Later add event categories

**Testing Verbal and Nonverbal Memories**
Vygotsky’s Sociocultural Theory

Social contexts
- other people contribute to cognitive development

Zone of proximal development
- tasks child cannot do alone but can learn with help of more skilled partners

Toddler/Infant Intelligence Tests

Bayley Scales
- Cognitive
- Language
- Motor
- Social-Emotional
- Adaptive Behavior

HOME
- Home Observation for Measurement of the Environment

Meaning of Different IQ Scores

Intelligence quotient: measurements against typical performance for age
- standardization
- reflects SES, diversity

Normal distribution
- bell-shaped
Best used for screening

Three Theories of Language Development

<table>
<thead>
<tr>
<th>Behaviorist</th>
<th>Nativist</th>
<th>Interactionist</th>
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</table>
| Learned through
  - operant conditioning (reinforcement)
  - imitation
| Language Acquisition Device (LAD)
  - biologically prepares infants to learn rules of language
| inner capacities and environment work together
  - social context is important

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### The Beginnings of Language

#### The Behaviorist View
- B. F. Skinner
  - Begins with babbling, which the parents reinforce
  - Responds to grammatical use of words with reinforcement
  - Withholds reinforcement for nongrammatical words
  - Correct grammar is reinforced and becomes more frequent.

#### The Nativist View
- Noam Chomsky
  - Children make rule-governed grammatical errors.
  - LAD – Language Acquisition Device
    - An innate language processor which contains the basic grammatical structure of all human language
    - Infants prefer speech in a particular pattern – *motherese* or infant-directed speech.

#### The Constructivist View
- Language development is part of a broader process of cognitive development.
- Language is used to express only those meanings the child has already formulated.
- New words are learned when they help to communicate thoughts and ideas.

### Sounds, Gestures, and Word Meanings

#### Birth – 1 month
- Crying is the predominant sound

#### 1 – 2 months
- Laughing and cooing sounds (aaaaaa)

#### 6 – 7 months
- Babbling: repetitive vowel–consonant combinations
**Getting Ready to Talk**

First speech sounds
- cooing
- babbling

Becoming a communicator
- joint attention
- give-and-take
- preverbal gestures

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**Starting to Talk**

First words
- underextension
- overextension

Two-word utterances
- telegraphic speech

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**Sounds, Gestures, and Word Meanings**

**Receptive language**

The ability to understand words

- 8 months — begin to store words in memory
- 9 – 10 months — can understand 20 – 30 words.
- 13 months — 100 words

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**The First Words**

**Expressive language**

The ability to produce words

- 12 months — babies begin to say first words
- Words are learned slowly in context with specific situations and cues.
Language Style

Referential
- Refer to objects
- Exploratory
- Often advanced in understanding adult language

Expressive
- Pronouns
- Social formulas
- E.g. "I want it" "thank you"
- Sociable