Cognitive and Language Development

An Overview of Child Development

What is Development?

Developmental Issues

Processes and Periods
An Overview of Child Development

Development: The pattern of biological, cognitive, and socioemotional changes that begins at conception and continues through the life span.
Developmental Issues

- Nature-Nurture Issue
- Continuity-Discontinuity Issue
- Early-Later Experience Issue
Cognitive and Language Development

Cognitive Development

The Brain

Vygotsky’s Theory

Piaget’s Theory
Brain Development

- Role of early and later experiences
- Myelination of Neurons with age
- Dramatic changes in synaptic connections
- Prefrontal cortex development into adolescence
- Brain functioning occurs along specific pathways and involves integration of function
Brain and Children’s Education

- Early & later experiences, including educational experiences, influence brain development.
- Development at the highest level of the brain – the prefrontal cortex, continues at least through the adolescent years.
- There is a great deal of hype and hyperbole about brain development & learning in the media.
## Piaget’s Theory – Basic Concepts

<table>
<thead>
<tr>
<th>Concept</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Schemas</td>
<td>Actions or mental representations that organize knowledge</td>
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<tr>
<td>Assimilation</td>
<td>Incorporating new information into existing schemas</td>
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<tr>
<td>Accommodation</td>
<td>Adjusting existing schemas to fit new information and experiences</td>
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<td>Organization</td>
<td>Grouping isolated behaviors and thoughts into a higher-order system</td>
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<td>Equilibration</td>
<td>A shift, a resolution of conflict to reach a balance</td>
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Example of Assimilation & Accommodation

A two year old encounters a man who is bald on the top of his head and has long, frizzy hair growing out from each side. The child gleefully shouts “Clown, clown.”

Dad tells his child that the man is not a clown, even though his hair is like a clown’s. The man was not wearing a funny costume and wasn’t trying to make people laugh.

*Child initially assimilates the man to his concept of a clown. After feedback from Dad the child accommodates his idea of “clown” to the concept’s standard meaning.*
Piaget’s Stage Model

Cognition unfolds in a sequence of four stages.

- Each stage is age-related and distinctive.
- Each stage is discontinuous from and more advanced than the previous.
Piaget’s Four Stages

**SENSORIMOTOR STAGE**
The infant constructs an understanding of the world by coordinating sensory experiences with physical actions. An infant progresses from reflexive, instinctual action at birth to the beginning of symbolic thought toward the end of the stage.

*Birth to 2 Years of Age*

**PREOPERATIONAL STAGE**
The child begins to represent the world with words and images. These words and images reflect increased symbolic thinking and go beyond the connection of sensory information and physical action.

*2 to 7 Years of Age*

**CONCRETE OPERATIONAL STAGE**
The child can now reason logically about concrete events and classify objects into different sets.

*7 to 11 Years of Age*

**FORMAL OPERATIONAL STAGE**
The adolescent reasons in more abstract, idealistic, and logical ways.

*11 Years of Age Through Adulthood*
Coordination of sensory experiences with motor actions. “Thought is Action”

Object permanence involves the realization that objects continue to exist over time.
Piaget’s Preoperational Stage

**Symbolic Thought:** Ability to represent mentally an object that is not present.

**Limitations:**

- **Egocentrism:** The inability to distinguish between one’s own perspective and someone else’s perspective.

Problems with spatial perspective taking
Problems with social perspective taking
The Three Mountain Tasks
Pre-operational Period: Egocentric Speech

Mary: They wiggle sideways when they kiss.

John: (vaguely) What?

Mary: My bunny slippers. They are brown and red and sort of yellow and white.

John: I have a piece of sugar in red pieces of paper. I’m gonna eat it and maybe its for a horse.

Mary: We bought them. My mom did. We couldn’t find the old ones. They were in the trunk.

John: Can’t eat the piece of sugar, not unless you take the paper off.

Mary: And we found Mother Lamb. Oh, she was in Pough-keepsie in the trunk in the house in the woods.

John: Do you like sugar? I do, and so do horses.
Piaget’s Preoperational Stage

More Limitations:

- **Centration**: Focuses on one characteristic to the exclusion of others.

  ![Diagram](image)

  **Lack of Conservation**

  **Classification**: Ability to classify objects according to only one characteristic *at a time*.
Conservation of Liquid

![Diagram showing the conservation of liquid](image-url)
Conservation of Solid Substance: Is there more, less, or same amount of clay?

Conservation of Liquid Substance: Is there more, less, or same amount of blue liquid?

Conservation of Number: Are there more, fewer, or same number of spheres?
Piaget’s Concrete Operational Stage

**Logical reasoning** replaces intuitive reasoning, but only in **concrete** situations.

<table>
<thead>
<tr>
<th>Concept</th>
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<tbody>
<tr>
<td>Conservation</td>
<td>The idea that some characteristics of an object stay the same even though the object might change in appearance.</td>
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<tr>
<td>Classification</td>
<td>Coordinate several characteristics rather than focus on a single property of an object.</td>
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<td>Seriation</td>
<td>Order stimuli along some quantitative dimension.</td>
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<td>Transitivity</td>
<td>Combine relations to understand certain conclusions. If $A &gt; B$, and $B &gt; C$, then $A &gt; C$.</td>
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Understanding Classes & Relations

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<tbody>
<tr>
<td>Triangle</td>
<td>Triangle</td>
<td>Yellow Triangle</td>
</tr>
<tr>
<td>Red Circle</td>
<td>Blue Circle</td>
<td>Yellow Circle</td>
</tr>
<tr>
<td>Red Square</td>
<td>Blue Square</td>
<td>?</td>
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Piaget’s Formal Operational Stage

Abstract reasoning: Think in abstract, idealistic, and logical ways.

Hypothetical-deductive reasoning: Ability to develop hypotheses about ways to solve problems and systematically reach a conclusion.

Metacognition: Ability to reflect on one’s own cognitive activities.

Adolescent egocentrism: Heightened self-consciousness and a sense of personal uniqueness.
1, 2, 3, and 4 contain colorless, odorless liquids.

X contains an “activating solution”.

Some combination of liquids (always including X) will give a YELLOW color.

How can you find the combination that makes YELLOW?
Jean Piaget: Mixing Colors Problem

1+x  1+2+x  1+2+3+x  1+2+3+4+x
2+x  1+3+x  1+2+4+x
3+x  1+4+x  1+3+4+x
4+x  2+3+x  2+3+4+x
2+4+x
3+4+x
Piaget’s Key Contribution

Vision of children as active, constructive thinkers

Criticisms of Piaget’s Theory

- Estimates of children’s competence
- Stages
- Training children to reason at a higher level
- Culture and education
Overall Teaching Recommendations
- Piaget

- Take a constructivist approach
- Facilitate rather than direct learning
- Consider the child’s knowledge and level of thinking
- Turn the classroom into a setting of exploration and discovery