Cognitive Development in Early Childhood

- Piaget's Preoperational Stage of Development
- Vygotsky's Theory of Development
- Information Processing
Piaget’s Preoperational Stage of Development

- **Operations – Internalized mental “actions” that are reversible and obey the rules of logic.**
- **Capacity for Mental Representation**
Preoperational Period: Key Developments

- Symbolic Capacity – Emerges at the end of the Sensorimotor period
- Sensorimotor Play vs. Preoperational Play
- Use of symbols to represent Objects
- Language spurt
Piaget

What is conservation?
Understand changing appearance does not change amount /quantity
Egocentrism

- Egocentrism is the inability to distinguish between one’s own perspective and someone else’s perspective.
Perception Bound

- Young Children confuse the appearance of something with reality.
Other Characteristics

- Animism is the belief that inanimate objects have “lifelike” qualities and are capable of action.
- A child may believe that the sidewalk “made” him trip and fall down.
- Magical and transductive thinking
Concrete Operations

- Master logical operations
- Seriation – arrange items in order mentally
- Class Inclusion=

- Identity: It’s the same clay.
- Reversibility: You can roll it back into a ball.
- Reciprocity: The ball is small and thick; the pancake is large and thin.
### Tests of Various Types of Conservation

<table>
<thead>
<tr>
<th>Type of conservation</th>
<th>Initial presentation</th>
<th>Transformation</th>
<th>Question</th>
<th>Preoperational child’s answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquids</td>
<td>Two equal glasses of liquid.</td>
<td>Pour one into a taller, narrower glass.</td>
<td>Which glass contains more?</td>
<td>The taller one.</td>
</tr>
<tr>
<td>Number</td>
<td>Two equal lines of checkers.</td>
<td>Increase spacing of checkers in one line.</td>
<td>Which line has more checkers?</td>
<td>The longer one.</td>
</tr>
<tr>
<td>Matter</td>
<td>Two equal balls of clay.</td>
<td>Squeeze one ball into a long, thin shape.</td>
<td>Which piece has more clay?</td>
<td>The long one.</td>
</tr>
<tr>
<td>Length</td>
<td>Two sticks of equal length.</td>
<td>Move one stick.</td>
<td>Which stick is longer?</td>
<td>The one that is farther to the right.</td>
</tr>
</tbody>
</table>
Formal Operations

- Mental actions on ideas
  - Hypothetical and abstract thinking
  - Systematic and scientific thinking
- Coexists with earlier forms of reasoning
- Adolescent egocentrism
  - Idealism
  - Imaginary audience
  - Personal fable
A pendulum is made by hanging a weight at the end of a string fixed at the other end. If released from A it swings at a regular rate.

The child is shown how four factors can be varied.

<table>
<thead>
<tr>
<th></th>
<th>Length of string</th>
<th>Weight</th>
<th>Point of release</th>
<th>Amount of impetus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2 3 4 5</td>
<td>A B C</td>
<td></td>
</tr>
</tbody>
</table>

Find out which of these factors makes the pendulum go faster or slower.
Vygotsky’s Theory of Development

- The Zone of Proximal Development: The range of ability between observed level of ability and person’s basic capacity at each stage of development.
- Inter-subjectivity – shared understanding based on a common focus of attention/common goal
- Scaffolding in Cognitive Development
Vygotsky’s View of Language and Thought

- Language serves the following functions
  1. social communication
  2. planning, guiding, and monitoring behavior in a self-regulatory fashion.
- Language used for this purpose is called inner speech or private speech.
- Researchers have found support for Vygotsky’s view of the positive role of private speech in development.
VYGOTSKY’S VIEW OF

Thought

Language

Cooing, babbling
First words

Age (years)
Piaget and Language

• For Piaget, private speech is egocentric and immature, but for Vygotsky it is an important tool of thought during early childhood..
• For Piaget, egocentric speech simply reflects children’s thinking at the preoperational level.
INFORMATION PROCESSING

**HARDWARE:** the *mind* as an information processing system

**SOFTWARE:** *cognition* as applying cognitive processes

**DATA:** *learning* as knowledge acquisition
Information Processing

• IP theories have contributed to new understandings about the processes involved in learning.

• Let’s examine some of the important ones.
METACOGNITION

- Thinking about one’s thinking
- Exerting DELIBERATE CONTROL over one’s cognitive activities
Metacognition—Awareness of

- PRIOR KNOWLEDGE—what do we know—what don’t we know?
  - cognizant of what one knows and does not know
- TIME required to comprehend
- EFFORT required to comprehend
- LEARNING STRATEGIES available
- CRITICAL CONCEPTS
- UNDERSTANDING
- POOR OR MISUNDERSTANDING
How can we become better problem-solvers?

Learn to think *nonroutinely*.

- preparation
- incubation
- illumination
- elaboration

1. Avoid *one-shot thinking*.

2. *Attend*. Learn to *identify the problem*

3. *Metacognize*
Newer IP Views

- Continue to use computer analogy, but a more active focus
- Bridge between Constructivism and Learning Theories
- Actively select, organize, and integrate experience with existing knowledge – (Sounds like Piaget???)
Theory of Mind

- A commonsense understanding of how the mind works (Uta Frith clip)
- Suggests these mental processes (emerge at about 4 years)
  - false belief understanding
  - origins of knowledge
  - appearance-reality distinction
1. Maxi places ball in cupboard.
1 Sally places her marble in basket

2 Exit Sally

3 Anne transfers Sally's marble to box

4 Re-enter Sally

Where will Sally look for her marble?