Theories of Cognitive Development: Piaget & Vygotsky

BASIC ASSUMPTIONS

A PERSON . . .

• HAS HEREDITARY ORGANIC REACTIONS
• IS NATURALLY ACTIVE
• IS BORN WITHOUT “MIND”
• NEEDS TO ADAPT TO ENVIRONMENT
• TO ADAPT, ORGANIZES THINKING INTO STRUCTURES (SCHEMAS)
Problem solving increases  
Egocentrism Decreases

<table>
<thead>
<tr>
<th>Stage</th>
<th>Approximate Age</th>
<th>Major Accomplishments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensorimotor</td>
<td>0 – 2 years</td>
<td>Begins to use imitation, memory, and thought: Begins to recognize object permanence. Moves from reflex actions to goal-directed activity.</td>
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<tr>
<td>Preoperational</td>
<td>2 – 7 years</td>
<td>Develops language and the ability to think symbolically. Uses one-way logic. Thinks egocentrically.</td>
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<tr>
<td>Concrete operational</td>
<td>7 – 11 years</td>
<td>Solves concrete problems in logical fashion. Understands laws conservation and uses classification seriation. Understands reversibility.</td>
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<tr>
<td>Formal operational</td>
<td>11 – Adult</td>
<td>Thinking becomes more scientific. Able to solve abstract problems through systematic experimentation. Develops concerns about social issues, identity.</td>
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Sensorimotor (Birth-2 yrs)

- Early on, bundle of reflexes, “wired-in” responses
- Beginning to discriminate between objects
- Begin to develop schemes
- Habits are formed such as “thumb sucking”
- Infants begin to use objects to achieve a goal
- Object permanence develops
- Later on, infants perform miniature experiments with objects
- Later on, physical exploration gives way to mental exploration
Preoperational (2-7 yrs)

- Language
- Egocentrism
- Lack of conservation
- Centration
- Inability to reason about transformations
- Irreversibility
- Symbolic Play
- Transductive reasoning

Concrete Operational (7-11 yrs)

- Differentiation of one’s own perspective from the perspective of others
- Conservation
- Decentration
- Reversibility
- Multiple classification
- Deductive reasoning
- Reasoning about transformations
- Inability to deal with abstract, hypothetical, and contrary-to-fact ideas
Formal Operational (11-adult)

- Ability to deal with abstract, hypothetical, and contrary-to-fact ideas
- Formulation and testing of hypotheses
- Separation and control of variables
- Proportional thought
- Combinatorial thought
- Construction of alternatives to reality
- Metacognition

Constructivism

 Individuals construct their own knowledge during the course of interaction with the environment. Thinking is an active process whereby people organize their perceptions of the world. The environment does not shape the individual.
How is Intelligence is measured?

**Organization**
- Scheme: Patterns of behavior or thinking that children and adults use in dealing with objects in the world. These become increasingly complex

**Adaptation**
- Assimilation: Interpreting new experiences in relation to existing schemes
- Accommodation: Modifying existing schemes to fit new situations
**Equilibration Process**

- **Equilibrium**: Harmony between schemes and experiences
- **Disequilibrium**: When schemes do not fit current experiences, interactions or information. Disequilibrium is not a "pleasant" state. It serves as the impetus for active searching for knowledge (learning!).
- Through "groping" with new schemes and adapting old schemes, equilibrium is again achieved.

\[ \text{Equilibrium} \rightarrow \text{Disequilibrium} \rightarrow \text{Groping} \rightarrow \text{New Equilibrium} \]

**Example of Equilibration Process . . .**

- College freshman comes from a conservative background, people with similar views (**equilibrium**)
- Surprised to find that many people on campus have more liberal views. He engages in discussion with these people and finds that he agrees with some of their views but maintains an allegiance to conservative views (**assimilation**)
- Later in the year there is much debate on campus regarding the changing of a state law. Unsure of his position he listens to students with both conservative and liberal views. He feels conflict when asked to support the conservative side. (**groping**)
- Although not an easy decision he supports the liberal view and upon reflection reconsiders his general approach to politics and now identifies himself more as a liberal (**accommodation** and **new equilibrium**)}
Results of disequilibrium

- Appropriate amount of challenge: groping (ideal learning situation)
- Not enough challenge: Boredom
- Too much challenge: Withdrawal

About Vygotsky . . .

- The "Mozart" of psychology; died early
- Considered a Contextualist; any separation between person and environment is superficial
- Forerunner of metacognition, cooperative learning, reciprocal teaching, & dynamic assessment
- Process more important than product
- Social Constructivist -- development cannot be separated from its social context
- Children construct knowledge
Zone of Proximal Development

"the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers."

Vygotsky, 1935

Scaffolding

Assistance that allows individuals to complete tasks they are not able to complete independently
Examples of Instructional Scaffolding

**Modeling**
An art teacher demonstrates drawing with two-point perspective before asking students to try a new drawing on their own.

Examples of Instructional Scaffolding

**Think Aloud**
A physics teacher verbalizes her thinking as she solves momentum problems at the chalkboard.
Examples of Instructional Scaffolding

Questions
After modeling and thinking aloud, the same physics teacher “walks” students through several problems, asking them questions at critical junctures.

Adapting Instructional Materials
An elementary physical education teacher lowers the basket while teaching shooting techniques and then raises it as students become proficient.
Why Do You Need to Know This?

• You are doing your students a disservice by not challenging them (e.g. disequilibrium). Part of being a good educator is knowing the appropriate amount of challenge.
• New knowledge is interpreted in light of previous knowledge. The extent to which something “makes sense” or is “organized” depends upon what kinds of experiences and knowledge your students possess.

Why Do You Need to Know This?

• It is important to shape your curriculum so that it fits with an appropriate developmental level and also capitalizes on students’ natural curiosities to learn
• Students are capable of accomplishing certain things in interaction with others that they could not accomplish by themselves. Working with a more competent peer or adult over an extended period of time can facilitate cognitive or emotional development that cannot be gained in any other setting