

Education 173
Cognition and Learning
in Educational Settings

Piaget's Theory of
Cognitive Development

Fall Quarter 2007

What is Development?

- Learning vs. Development
- Types of Development
 - Cognitive
 - Physical
 - Social
 - Emotional
 - Moral



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Themes in Development

- Nature vs. Nurture
 - Genetics or experience
- Continuity vs. Discontinuity
 - Ramp or staircase?
- Biological "unfolding"
 - Like a butterfly
- Implications: Readiness to learn



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Jean Piaget

- **Assimilation**
 - Means to *fit* experience to existing cognitive structures
- **Accommodation**
 - Means to *change* cognitive structures in response to experience
 - In order to make internal (cognitive structures) and external (experience, perception) compatible
 - In response to disequilibrium
 - (incompatibility of knowledge with experience)



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Piagetian Stages

- **Sensorimotor (Birth to 2)**
 - “Understanding is rooted in present action”
 - Object permanence as early as one year
- **Preoperational (2 to 7)**
 - Egocentrism
 - Lack of conservation; Irreversibility
- **Concrete Operational (7 to 11)**
 - Reversibility of operations
 - Classification (multi-way); seriation
- **Formal Operational (11 to Adult)**
 - Abstract and hypothetical reasoning



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Neo-Piagetian Theory

- **The American Challenge**
 - *Decalage*: Uneven development
 - Children can sometimes think abstractly
 - Domain specificity of stages
 - Sometimes dependent on knowledge
 - e.g., about dinosaurs
 - Processing constraints are relevant
 - Such as working memory
- **Robbie Case's Theory**
 - WM increases with age/experience
 - Chunking/automaticity important
 - Control processes important



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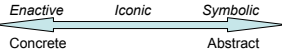
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Jerome Bruner

- Knowledge Representation

- Enactive (motor)
- Iconic (mental images)
- Symbolic (e.g., text, numerals)



- Not a Stage Theory

- Rather, an accumulation of representations

- Bruner's Bold Claim

- Any content can be taught in meaningful fashion to learners of any age
- A bit of a challenge to Piaget

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Cognitive Changes in Development

- Executive Control (Metacognition) Improves
- WM Capacity Increases
- Automaticity Increases
- Specific Knowledge Accumulates

Digit Span

3825
94318
596382
7518546
86851372
163874862
7154856193

Source: www.brown.edu/Research/Memory/Cognition.html

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Socioeconomic Status

- SES Includes Both
 - Family income
 - Parent education levels
- SES is Descriptive, Not Explanatory
 - What are the proximal causes?
 - Computers, books, games, travel
 - Language? Values?
- Are Schools & Classrooms Middle Class Institutions?
- Are Role Models Important for Promoting Social Mobility?



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Other Influences On Development

- Home Environment
 - Not the same as SES
 - Presence of books
 - Question asking
 - Encouragement for exploration
 - Amount of adult-child language
- Peer Influence
- Parental Involvement in Schools



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