Chapter 10: Cognitive Development In Early Childhood

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From Papalia, Olds, and Feldman
Piagetian Approach: The Preoperational Child

- Symbolic function
- Understanding objects in space
- Understanding causality
- Understanding of identities and categorization
- Number

Immature Aspects of Preoperational Thought
- Egocentrism
- Conservation
- Irreversibility
Cognitive Advances During Early Childhood*

- Use of symbols
- Understanding of identities
- Understanding of cause and effect
- Ability to classify
- Understanding of number
- Theory of mind
Immature Aspects of Preoperational Thought (according to Piaget)

- Centration (inability to decenter)
- Irreversibility
- Focus on states rather than on transformations
- Transductive reasoning
- Egocentrism
- Animism
Symbolic Function

• Ability to use symbols or mental representations that has attached meaning
  – Words
  – Numbers
  – Images

• Symbols allow us to:
  – Communicate verbally
  – Make change
  – Read maps
  – Treasure photos of distant loved ones
  – Think about something without having the person or thing present
• Symbolic function demonstrated by:
  – Deferred imitation
  – Pretend play (fantasy play, dramatic play, imaginary play)
  – Language
Understanding of Objects in Space

- Older preschoolers can now use simple maps
  - 60% of 4-year-olds can use a simple map to find or place an object at the corresponding location in a similarly shaped but much larger space
  - 90% of 5-year-olds can perform the same task
Understanding Causality

• Piaget said children not yet able to reason logically about cause and effect
  – Not sure what caused the effect

• Transductive thought
  – Link two events whether there is a causal relationship
    • Particularly if the events were close in time
      – Boy, Trix, the flu
Understanding Identities and Categorization

• Identities: people and things are basically the same even if they change in form, size or appearance

• Categorization (classification): child must be able to identify similarities and differences
  – By age 4, many can classify by two criteria
    • Color
    • Shape
  – Living/non-living things

• Animism: attribute life to objects that are not alive

• Preschoolers know that plants and animals grow, decay, get injured, heal
  – Culture affects beliefs
    • Japanese view stones as if alive with feelings
Two Years of Age

Categorizing Animals: Age 2

Categorizing Food: Age 2
Three Years of Age

Categorizing Food and Animals: Age 3

Categorizing Food: Age 3
Four Years of Age

Categorizing Food: Age 4

Categorizing Pictures: Age 4
Seven Years of Age

Categorizing Food: Age 7
Number

• Karen Wynn suggests infants as young as 4/5 months have rudimentary concept of number
• Ordinality: comparing quantities
  • More
  • Less
  • Begins 12 – 18 months
    • Limited to very few objects
• Age 4: words for comparing quantities
  • Bigger tree
  • More juice (volume)
  • More cookies (numbers)
  • Fewer cookies
  • Which is more: 6 apples or 4 apples
    • Up to 9 objects

Figure 7.2 Sequence of events for the $1 + 1 = 2$ (possible) outcome and the $1 + 1 = 1$ (impossible) outcome from the experiment by Wynn (1992). From Bjorklund, 2000.
Number

• Cardinality principle:
  • The last number counted is the number of objects
  • Under 3.5 years recites number-names but not how many (6)
  • By 5 years, most children can count to 20 and know the relative sizes of the number 1 - 10
Number

• By kindergarten, children have “number sense”
  • Counting
  • Number knowledge (ordinality)
  • Number transformations (simple addition and subtraction)
  • Estimation (more or less than 5)
  • Recognition of number patterns
    • \(2 + 2 = 4\)
    • \(3 + 1 = 4\)

• SES and preschool experience affect how rapidly children advance in math
Key Elements of Number Sense in Young Children*

– Counting
  • Rote, one-to-one correspondence, knowing stable order and cardinality principles, knowing the count sequence

– Number knowledge
  • Discriminating and coordinating quantities
  • Making numerical magnitude comparisons

– Number transformation
  • Simple addition, simple subtraction, calculating story problems, calculating “in the head”

– Estimation
  • Approximating or estimating set sizes, using reference points

– Number patterns
  • Copying, extending number patterns, discerning numerical relationships
Immature Aspects of Preoperational Thought

• Egocentrism
  • Form of centration
    • Focus on one aspect of a situation and neglect others
  • Three-mountain task

Piaget's Mountain Task
Conservation

• Classic example of concentration if failure to understand conservation
  
  • Conservation: two things that are equal remain equal even if their appearance is altered, as long as nothing is added or taken away

• Lack of conservation of liquid: Charlene Age 3
Conservation

Lack of Conservation of Mass: Caroline, 3 years
Lack of Conservation of Mass: Josh, 4 years
## Conservation

<table>
<thead>
<tr>
<th>Lack of Conservation Liquid:</th>
<th>Lack of Conservation Number:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Josh 4 years</td>
<td>Josh 4 years</td>
</tr>
</tbody>
</table>
Lack of Conservation Number, Liquid, Mass: Bradley, 4 years
Do Young Children Have Theories of Mind?

• Piaget concluded that children younger than 6 cannot distinguish between thoughts or dreams and real physical entities and have no theory of mind

• More recent research indicates between 2 and 5 (especially around 4) children’s knowledge about mental processes grows dramatically
  – Piaget’s questions were abstract
False Beliefs

- 3-year-old Madeline shown box of candy
  - She thinks candy is in it
    - When she opens the box, crayons are in it
  - When asked what others will think is in the box, she says crayons
    - She thinks others know what she knows
    - She also says she knew crayons were in it
  - 3-year-olds have difficulty understanding that their beliefs can be false
Deception

- Deception requires a deliberate attempt to plant a false belief and requires suppression of impulse to be truthful
  - Some research indicates a child may be able to deceive at 2 or 3 years
  - Other research indicates a child is not capable of deception until 4 or 5 years
Distinguishing between Fantasy and Reality

• The line between fantasy and reality is blurred at times
  – Preferred holding a box with an imaginary bunny instead of box holding an imaginary monster
• Magical thinking is a way to explain events that do not have an obvious realistic explanation
  – Declines at end of preschool period
Influences on Individual Differences in Theory-of-Mind Development

- Social competence contributes to understanding of thoughts and emotions
- Language development contributes to understanding of thoughts and emotions
- Families who encourage pretend play stimulate development of theory of mind
- Bilingual children are more flexible in their thinking and have better attentional control
Information-Processing Approach: Memory Development

- Basic Processes and Capacities
- Recognition and Recall
- Forming and Retaining Childhood Memories
Basic Processes and Capacities

• Memory is like a filing system with 3 steps
  1. Encoding
  2. Storage
  3. Retrieval

• Brain has 3 “storehouses”
  1. Sensory memory
  2. Working memory (prefrontal cortex, permits executive function – conscious control of thoughts, emotions, actions, allows us to carry out goals)
  3. Long-term memory (unlimited capacity, uses the central executive control to transfer from working memory, allows transferring verbal information to visual/spatial image)
Recognition and Recall

- Two types of retrieval:
  1. Recognition
     - Pick out the correct answer
  2. Recall
     - Reproduce knowledge from memory

- We all are better at recognition memory
  - Both types of memory improve with age
  - Younger children don’t use strategies to remember unless reminded
  - Older children use learned strategies spontaneously
Forming and Retaining Childhood Memories

*Early Memories: Three Types*

- **Generic memory**
  - Around 2 years, produces a script or general outline of a familiar, repeated event without details of time or place
  - Routines, situations that repeat (the way home)

- **Episodic memory**
  - A particular event or episode that occurred at a specific time and place
  - Temporary memories, few weeks or months

- **Autobiographical memory**
  - Forms your life’s story, around 3 – 4 years but becomes more continuous around 4.5 years
  - Possibly after self-concept develops
Forming and Retaining Childhood Memories: *Influences on Memory Retention*

- Uniqueness of event
- Children’s active participation in event or retelling or reenactment
  - Preschoolers better at remembering things they did than things they saw
- Talking about event
  - Jointly handling objects and talking produces better recall
- The way adults talk about event
  - Repetitive: repeats question in different ways, parent looking for correct answer, not as productive
  - Elaborative: remember better, parent looking for mutually rewarding conversation, after the event (not before)
  - Autonomy-supportive parents
Forming and Retaining Childhood Memories

Constructing Shared Memories: The Role of Culture

• Conversation helps children remember
• Conversation may be crucial to memory formation
• Vygotsky’s sociocultural theory supports social interaction model
  – Parent and child reminisce together
  – Adults initiate and guide conversations
  – Adults questions prompt children to include important information
    • Descriptors, who was there
• Culture: US children are chief characters of stories
Intelligence: Psychometric Approaches

- Traditional Psychometric Measures
- Influences on Measured Intelligence
- Testing and Teaching Based on Vygotsky’s Theory
Traditional Psychometric Measures

- Easier to test than infants/toddlers
  - Still need to be tested individually, not in groups
- Verbal items included in intelligence tests
- Two most commonly used tests for preschoolers:
     - For 2 years and up
     - American version
     - Takes 45 – 60 minutes
     - Define words, string beads, build with blocks, identify missing parts of a picture, trace mazes, show understanding of numbers
  2. Wechsler Preschool and Primary Scale of Intelligence, Revised (WPPSI-III)
     - 30 – 60 minutes, verbal and performance scores
- Not reliable or predictable of success until age 5
Influences on Measured Intelligence

• IQ score is not a fixed number of inborn intelligence
  – Merely measures what a child can do with certain tasks on a particular day

• IQ influenced by:
  – Temperament
  – Social and emotional maturity
  – Ease in testing situation
  – Pre-literacy or literacy skills
  – SES
  – Ethnicity or culture
  – Match between child’s cognitive style and tasks posed
  – Family life (strongest influence in early childhood)
Testing and Teaching Based on Vygotsky’s Theory

• Dynamic tests measure ZPD
  – Interactive learning in the ZPD
  – Scaffolding helps adult to efficiently guide children’s cognitive progress
    • Aurora and counting objects, understanding the last number counted is the number of objects

• Adult helps child take responsibility for their learning
Language Development

• Vocabulary
• Grammar and Syntax
• Pragmatics and Social Speech
• Delayed Language Development
• Preparation for Literacy
Vocabulary

- 3 years: 900 – 1,000 words
- 6 years:
  - Expressive language 2,600 words
  - Receptive language 20,000 words
    - Formal schooling will quadruple to 80,000 by 14 years
- Fast mapping: rapid expansion of vocabulary after hearing word one to two times in conversation
  - Understands from context
  - Nouns easier than verbs
Grammar and Syntax

• 3 years: use plurals, possessives, past tense, I, you, we, overregularize (don’t know exception to rules), can answer what and where questions
  – Why and how are difficult to answer
• 4 – 5 years: 4 – 5 word sentences, declarative, negative, interrogative, imperative, complex sentences, comprehension immature, 2-step requests need to be placed in order
• 5 – 7: adultlike speech
Pragmatics and Social Speech

- Pragmatics: how to ask for things, tell a joke, begin a conversation, adjust comments to listener’s perspective
  - All part of social speech
    - Speech intended to be understood by a listener
- Private speech: no intent to communicate with others
  - Vygotsky versus Piaget
Delayed Language Development

• 5 – 8% of preschool children show speech and language delays
  – Hearing problems
  – Head and facial abnormalities
  – Premature birth
  – Family history (heredity is major role)
  – SES
  – Developmental delays
  – Boys more likely than girls

• 40 – 60% language delays have cognitive, social, emotional consequences if left untreated
Preparation for Literacy

• Emergent literacy
  – Development of skills for literacy
• Oral language skills:
  – Vocabulary, syntax, narrative structure, understand language is to communicate
• Specific skills to decode printed words
  – Phonemic awareness
    » Words are phonemes or sounds
    » Phoneme-grapheme correspondence
Promotion of Emergent Literacy

• Heredity influences literacy
  – Correlation or causation?
• Social interaction
  – Conversational challenges
  – Rich vocabulary
  – Dinner-table talk centered on day’s activities, mutually remembered past events or questions about why people do things or how things work
• Reading to children (one of most effective paths)
• Moderate exposure to educational television with parents talking about what is happening
Early Childhood Education

- Goals and Types of Preschools
- Compensatory Preschool Programs
- The Child in Kindergarten
Goals and Types of Preschools

- US preschools: child-centered philosophy
  - Stressing social and emotional growth
  - Based on theories of Piaget or Montessori
Montessori Preschools

- Montessori: independent learning, at child’s pace, developmentally appropriate materials, self-chosen tasks, teachers are guides
  - Better prepared for school in reading and math
Compensatory Preschool Programs

• Head Start
  – Federally funded
  – Began in 1965
  – Enhance cognitive skills, improve physical health, foster self-confidence, foster relationships with others, social responsibility, sense of dignity and self-worth for child and family
  – Provides medical, dental, mental health care, social services, nutrition
Head Start Outcomes

• Better cognitive and language skills
• Do better in school
• Gains in vocabulary, letter recognition, early writing, early math
  – Readiness skills remain far below average
  – Advantage on intelligence tests disappears after school begins
• Less likely to be placed in special education, less likely to repeat grade, more likely to finish high school
Head Start Outcomes

• Outcomes best when:
  – Begun earlier
  – Services provided longer
  – More parent participation
  – Better trained teachers
  – Low staff-to-child ratios
  – Longer days
  – More weeks
  – More extensive services
• 1995 Early Head Start
  – Pregnant women – 3 years
• Children scored higher on developmental and vocabulary tests
• Children less at risk of slow development
• Less aggressive by age 3
• More attentive to play things, more positively engaged with parents by age 3
• Combination programs better outcomes
  – Center-base services and home visits
Most Effective Approach to Early Education

• Systematic program
  – Prekindergarten through third grade:
    • Prekindergarten to all 3- and 4-year-olds
    • Require full-day kindergarten
    • Coordinate and align educational experiences and expectations from prekindergarten through third grade
      – Sequenced curriculum based on children’s developmental needs and abilities
      – Taught by skilled professionals

• State-funded prekindergarten is national trend
  – Universal (for all) is not common
The Child in Kindergarten

- Most 5-year-olds attend kindergarten
  - 60% are full day
    - Do better later in primary grades
    - By 3rd grade, amount of time spent in kindergarten makes no substantial difference in reading, math, science

- Preparation before kindergarten has best outcomes

- Most important skills before entering kindergarten:
  - Sit still
  - Follow directions
  - Wait your turn
  - Regulate your own learning

- Repeating doesn’t “catch up”
"The first thing required of a teacher is that she/he be rightly disposed for his task."

_Maria Montessori_