Brain Development in Early Childhood

Brain growth increases
- hemispheres begin to lateralize
- Frontal lobe areas for planning/organization develop
- Left hemisphere active
  - language skills
  - handedness
- Linking areas of the brain develop
  - cerebellum, reticular formation, hippocampus, corpus callosum

Figure 7.2

Handedness

Reflects dominant cerebral hemisphere
- right-handed (90%)—left hemisphere
- left-handed (10%)—both hemispheres

May be genetic basis, but affected by experience
- position in uterus, practice

Few left-handers show developmental problems
- left hemisphere damage may link left-handedness and some mental problems
Piaget’s Preoperational Stage
Ages 2 to 7
Gains in mental representation
- make-believe play
- symbol–real-world relations
Limitations in thinking
- egocentrism
- conservation
- hierarchical classification

Early Childhood Development of Make-Believe
With age, make-believe gradually becomes:
- more detached from real-life conditions
- less self-centered
- more complex
- sociodramatic play

Benefits of Make-Believe Play
- Practice representational schemes
- Reflect on thinking, control behavior, and take another’s perspective
- Gain in social, language, and literacy skills
- Improve attention, memory, and logical reasoning
- Strengthen imagination and creativity
Dual Representation

Viewing a symbolic object as both an object and a symbol
Mastered around age 3

Adult teaching can help
- maps, photos, drawings, and make-believe play supports experience with symbols
- point out similarities to real world

Limitations of Preoperational Thought

Cannot perform mental operations
Egocentrism and animistic thinking
Cannot conserve
Lack hierarchical classification

Egocentrism

Failure to distinguish others’ views from one’s own
Follow-ups

Borke (1975) used the character Grover from Sesame Street. 3 and 4 YO children watched him ride in a fire engine and were asked how the scene would look at various stops on the ride. 79% of 3 year olds and 93% of 4 year olds were correctly able to solve this task, in comparison with 42% of 3 year olds and 67% of 4 year olds who were given Piaget's three mountains.

Non-egocentricity?

Egocentricity can be manipulated by changing the complexity of cues, familiarity of materials used, differences between perspectives, clarity of the context and mode of response.

Four year olds understand that a secret is shared by those who have seen an event but not by those whose eyes were shut (Mossler, Marvin and Greenburg, 1976)

Two year olds have been found to adjust what they say and how they say it depending on who they are addressing (Menig-Peterson 1975)

Children can orient pictures so that others can see them (Lempers, Flavell and Flavell, 1975)

A child who has worn rose-coloured glasses or opaque goggles is able to appreciate the difficulties experienced by another who is wearing such spectacles (Novey 1975, Liben 1978).

Animistic Thinking

Belief that inanimate objects have lifelike qualities
Limits on Conservation

- **Centration**: focus on one aspect and neglect others
- **Irreversibility**: cannot mentally reverse a set of steps

Piagetian Class Inclusion Problem

Follow-Up Research on Preoperational Thought

<table>
<thead>
<tr>
<th>Thought Type</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egocentric</td>
<td>Can adjust language to others, take others' perspectives in simple situations</td>
</tr>
<tr>
<td></td>
<td>Animistic thinking comes from incomplete knowledge of objects</td>
</tr>
<tr>
<td>Ilogical</td>
<td>Can do simplified conservation</td>
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<tr>
<td></td>
<td>Can reason by analogy</td>
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<tr>
<td>Categorization</td>
<td>Everyday knowledge is categorized</td>
</tr>
<tr>
<td>Appearance vs. reality</td>
<td>Can solve appearance-reality tasks in nonverbal ways</td>
</tr>
</tbody>
</table>
Evaluation of Piaget

Many experts refute preoperational stage idea
Piaget’s stages too strict
  ■ need flexible stage approach
Piaget assumes abrupt change
  ■ most experts believe change is gradual

Educational Principles Derived from Piaget’s Theory

Discovery learning
Sensitivity to children’s readiness to learn
  ■ developmentally appropriate practices
Acceptance of individual differences

Vygotsky and Education

Assisted discovery
  ■ Teacher:
    ■ guides learning
    ■ tailors help to zone of proximal development
Peer collaboration
Children’s Private Speech

Piaget called this “egocentric speech”
Vygotsky viewed it as foundation for all higher cognitive processes
Helps guide behavior
- used more when tasks are difficult, after errors, or when confused
Gradually becomes more silent

Evaluation of Vygotsky’s Theory

Helps explain cultural diversity in cognition
Emphasizes importance of teaching
Focus on language deemphasizes observation, other learning methods
Says little about biological contributions to cognition
Vague in explanation of change

Improvements in Information Processing

Attention
- inhibition
- planning
Memory
- memory strategies
- everyday experiences
Theory of mind
- metacognition
Emerging literacy
Mathematical reasoning
- ordinality, counting, and cardinality
Improvements in Inhibiting Impulses

![Graph showing improvements in inhibiting impulses over age in years.]

Recognition and Recall

**Recognition**
Noticing that a stimulus is identical or similar to one previously experienced
Easier than recall

**Recall**
Generating a mental representation of an absent stimulus
More difficult than recognition

Memory Strategies

Preschoolers do not use:
- rehearsal
- organization
- elaboration

Preschoolers use:
- scripts
- greater elaboration with age
Autobiographical Memory
Long-lasting representations of one-time events
Improves with cognitive, conversational skills
Parents help develop narrative
- elaborative
- repetitive

Metacognition
Awareness and understanding of various aspects of thought
Develops with theory of mind

Development of Theory of Mind
Awareness of mental life
- infancy through age 3
Mastery of false beliefs
- around age 4
- influence of cultural and social factors
Early Childhood Mathematical Reasoning

Ordinality

- relationships between quantities
- 14 to 16 months

Cardinality

- when counting, last number is the total
- 3½ to 4 years

Language Development in Early Childhood

Vocabulary

- fast-mapping

Grammar

- overregularization

Conversation

- pragmatics

Supporting language development

- recasts, expansions

Vocabulary Development

Fast-mapping

- objects
- verbs
- modifiers

Coin new words

Metaphors
Learning Grammar

Basic rules
- subject–verb–object structure by age 4
- plurals
- to be

Overregularization

Complex structures
- questions
- not complete until middle childhood

Pragmatics

2-year-olds can have effective conversations
By 4, adjust to fit age, sex, social status of listener

Difficult situations
- Telephone

Supporting Early Childhood Language

Direct feedback
Recasts
Expansions