Cognitive Development: Building a Foundation for Language

Chapter 3

Language <-> Cognition

Language

Thought

Piaget's Theory of Cognitive Development

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Terms
- **Schema (schemata)** - a concept, mental category, or cognitive structure
- **Assimilation** - cognitive process whereby a person includes a new stimulus into an existing schema
- **Accommodation** - developing new schemata to allow for organization of stimuli that do not fit into existing schemata
- **Equilibrium** - desire to maintain balance between assimilation and accommodation

Stages of Cognitive Development

**Sensorimotor stage**

**Infancy**

In this period (which has 6 substages), intelligence is demonstrated through motor activity without the use of symbols.

Knowledge of the world is limited because it is based on physical interactions/experiences.
Stages of Cognitive Development

Sensorimotor stage
Infancy

Children acquire object permanence at about 7 months of age.

Physical development (mobility) allows the child to begin developing new intellectual abilities.

Some symbolic (language) abilities are developed at the end of this stage.
Stages of Cognitive Development

Pre-operational stage (Toddler and Early Childhood)

Intelligence demonstrated through the use of symbols, language use matures, and memory and imagination are developed.

Thinking is done in a nonlogical, nonreversible manner.

Egocentric thinking predominates.
Stages of Cognitive Development

Concrete operational stage
Elementary and early adolescence

This stage is characterized by 7 types of conservation: number, length, liquid, mass, weight, area, and volume.

Intelligence is demonstrated through logical and systematic manipulation of symbols related to concrete objects.

Operational thinking develops (mental actions that are reversible).
Stages of Cognitive Development

Concrete operational stage
Elementary and early adolescence

Egocentric thought diminishes.

Formal operational stage
Adolescence and adulthood

Intelligence is demonstrated through the logical manipulation of symbols related to abstract concepts.

Early in this period there is a return to egocentric thought.
Piaget identified four stages in cognitive development:

- **Formal operational stage** (Adolescence and adulthood)
  
  Many adults never attain this stage.

# Research Studies

Piaget's research methods were based primarily on case studies [they were descriptive].

While some of his ideas have been supported through more correlational and experimental methodologies, others have not.

For example, Piaget believed that biological development drives the movement from one cognitive stage to the next.

Data from cross-sectional studies of children in a variety of western cultures seem to support this assertion for the stages of sensorimotor, preoperational, and concrete operations.
However, data from similar cross-sectional studies of adolescents do not support the assertion that all individuals will automatically move to the next cognitive stage as they biologically mature.

For formal operations, it appears that maturation establishes the basis, but a special environment is required for most adolescents and adults to attain this stage.
Research Studies

Although research does not support all of Piaget’s descriptive theory, it is still influential for parent’s and educators.

Children’s Cognitive Development: Alternatives to Piaget

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Outline:

• Brief review of Piaget’s theory
• The role of culture - implications for Piaget’s theory
• The theory of Vygotsky
• The theory of Bruner
A new generation

- Jakobson, Piaget and Vygotsky, all born in Europe in 1896, each tended to see his own discipline, psychology or linguistics, as the centre of the universe. Piaget and Vygotsky were focussed on the mind, and saw language as a crucial means for getting evidence about it. Jakobson thought that language itself contained a structure which, if we could understand it, would explain every other facet of human existence.
- Bruner and Chomsky, both born in 20th-century America, see language and mind as equally central and inextricably linked. Still, Bruner's route into the language-mind nexus is the classic psychological one of observing what children and caretakers do and say, while Chomsky's is the classic linguistic one of analysing grammar.

Summary of Piaget

- Stage theory of development - older children think qualitatively differently to younger children
- 4 stages:
  - Stage 1: Sensorimotor Period (0-2 years)
  - Stage 2: Pre-operational stage (2-7 years)
  - Stage 3: Concrete Operational Stage (7-11 years)
  - Stage 4: Formal Operational Stage (11+ years)
- Development is the combined result of:
  - maturation of the brain and nervous system
  - experiences that help children adapt to new environments - adaption: an organism's ability to fit in with it's environment.

Summary of Piaget: Criticisms

- But Piaget:
  - underestimated the importance of knowledge
    - Gagné: Complex skills can be acquired easily once simpler prerequisite skills have been learned. Development is based on LEARNING new skills - continuous not discontinuous.
  - underestimated the ability of children
    - Tasks were methodologically flawed.
  - underestimated the impact of CULTURE:
    - Piaget’s tasks are culturally biased
    - Schooling and literacy affect rates of development
    - Formal operational thinking is not universal
Alternative to Piaget: 1: Lev Vygotsky

- 1896 - 1934
- Work remained little known because it was banned by Stalin after Vygotsky's death
- Collapse of the Soviet Union meant:
  - greater dialogue between the West and Russia
  - Vygotsky's work translated into English

Vygotsky's Theory: The role of culture/social interaction (1)

- Sociocultural environment ALL IMPORTANT for cognitive development
- Different contexts create different forms of development
- Cognitive processes (language, thought, reasoning) develop THROUGH social interaction
- Development is a product of CULTURE

Vygotsky's Theory: The role of culture/social interaction (2)

- Vygotsky emphasised the role of:
  - social interaction
  - instruction
- Central idea:
  - Zone of Proximal Development (ZPD):
    - the difference between the level of actual development and potential development
Zone of Proximal Development

Example from Seifert, Hoffnung & Hoffnung

- Parent: Here are four books for you and the same for your brother
- Child: The same? (He investigates his brother’s pile of books.) No, he has more (spoken with annoyance).
- Parent: No, really, they’re the same. Take another look.
- Child: He does have more.
- Parent: Try laying his out in a row. Then lay yours out too. Then compare
- Child: (Does as suggested) One two three four. One two three four. The same! (He looks satisfied)

Summary of the role of social interaction

1. Confirm existing knowledge
2. Add new information

Instruction most effective when:
- it builds on previous knowledge and skills (e.g. counting)
- it provides a ‘sensible’ challenge - there’s no point pushing children beyond their potential
Vygotsky's theory: The role of language

- Piaget's view: Language is just another representational system. Underdeveloped until 6/7 years of age.
- Vygotsky's view: Language is social and communicative. Essential for cognitive development.
- Why did Vygotsky think this?
  - Private speech - children talk to themselves.

Vygotsky suggested:

- Adults give instructions to children (social speech).
- Children start to use parent's instructions to direct their own behaviour (private speech).
- Private speech becomes internalised as thought processes (silent statements).
- Children use this 'internalised' speech to plan and organise behaviour => cognitive development.

Summary of Vygotsky

- Culture and social interaction very important in cognitive development.
- Social interaction with knowledgeable others moves development forward - ZPD.
- Language is central to cognitive development:
  - Social speech => Private speech => Thought.
Alternative to Piaget
2: Jerome Bruner
- Very influenced by Piaget's and Vygotsky's work
- Responsible for introducing Vygotsky's work to the non-Soviet world
- LASS (language acquisition support system)

Bruner's Theory:
Similarities with Piaget
- Socio-Cognitive Stage Theory:
  - Enactive Mode
  - Iconic Mode
  - Symbolic Mode
  - Abstract thinking develops out of concrete thinking

Bruner's Theory:
Similarities with Vygotsky
- Interpersonal communication necessary for development - socio-cognitive theory
- Development relies on active intervention of expert others:
  - SCAFFOLDING
  - Contingency Rule (Wood, 1980)
Bruner’s Theory:
The role of language
- Language important:
  - without language, thought is limited
  - language forms the basis of understanding:
    - pre-linguistic thought - games and rituals
    - rituals gradually replaced as adult adds information
    - rituals replaced by linguistic modes of communication

Summary of Bruner
- Socio-cognitive stage theory
- Based on interaction with adults
- Relies on adults developing reciprocal behaviour with the child

Alternative to Piaget 3: Noam Chomsky
- Countered behaviorists
- Looked at language from negative prospective (what cannot be said)
- Introduced LAD (Language Acquisition Device)

Chomsky’s Theory
- LAD is activated by exposure to language
- Universal rule system
- Children able to determine what can and cannot take place in a language
- Transformational grammar
Bruner and Chomsky

- Bruner has shifted over the years in his position toward Chomsky’s nativism. He has been constant in his assertion that the LAD must be accompanied by a LASS (language acquisition support system). But whereas in the 1960s he claimed that the LASS could explain all the facts of language acquisition by itself, he has subsequently come to the view that both LAD and LASS are needed.
- Meanwhile, Chomsky’s own position has shifted rather dramatically. He has always insisted that interaction between children and caretakers plays only the relatively trivial role of ‘setting parameters’ that are themselves innate. However, recent versions of his theory assume that our innate linguistic knowledge is in fact very ‘minimal’, leaving nearly all our linguistic knowledge to be acquired by experience — i.e., in interaction with caretakers.

Alternative to Piaget

4: Benjamin Lee Whorf

- Language provides a structure for cognitive thought
- A greater descriptive language system provides basis for cultural awareness
- Built on previous work of Sapir (Sapir-Whorf Hypothesis)

Overall Conclusion

- Piaget underestimated the importance of culture and social interaction (Cognitive determinism)
- Vygotsky:
  - social interaction and language necessary for cognitive development
- Bruner:
  - Stage theory but emphasised role of social interaction and language
- Chomsky:
  - Nativism
- Whorf:
  - Linguistic determinism
Language <--> Cognition

Language

Thought

Central to Cognitive Development

- Concepts
  - Object Permanence
  - Causality
  - Means-ends
- Behaviors
  - Imitation
  - Play
  - Communication

Review Questions

- Complete All
- Consider carefully
  - 2, 3, 5, 6, 12, 13