



Assessing Cognitive Abilities in Young Children

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Objectives

- Describe cognitive factors that account for differential classroom performance;
- Describe basic cognitive processes and their relationship to higher-order conceptualization and reasoning.
- Describe assessment of cognitive abilities in young children.

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In Early Childhood Programs, . . .

. . . some children learn the pre-academic skills we present; some children do not.



In Early Childhood Programs, . . .

. . . some children are able to wait their turn; others respond impulsively.





What factors may account for such differential performance?

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Learner's Skills

(Berninger, 2007)

Individual Differences in the Processes
in the Learner's Mind or Brain

Curriculum and
Instructional
Materials

Teachers'
Instruction
(Pedagogy)

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Understanding the Child's Mind

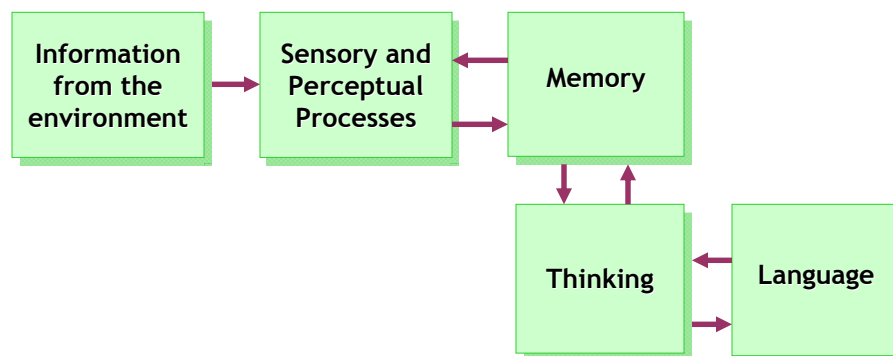
Piaget's Stages of Cognitive Development

- Sensori-motor (Birth to 2 years)
- Pre-operational (2 to 7 years)
- Concrete operational (7 to 11 years)
- Formal operational (11 to 15 years)

(Santrock & Yussen, 1992)

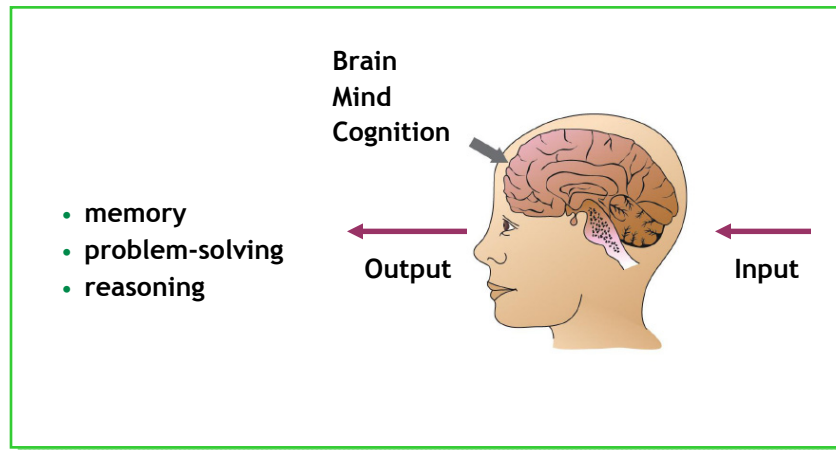
Understanding the Child's Mind

Information Processing



(Santrock & Yussen, 1992)

Information Processing



(Santrock & Yussen, 1992)



What Do We Assess?

(Developmentally Appropriate)

Examples of Assessment

(Examples of test items are not included in handout)

The Process of Learning

- Learning is the process of acquiring information.
- What are the cognitive factors that enable students to show what they know and can do?

How do they receive, perceive, process, and remember information?
(Elliott, 2007)

How do they collect, sort, store, and retrieve information?
(Miller, 2007)

Sensory-Motor Functions and Learning

Input

- Is the child able to see the information? Is visual acuity within normal limits? What about visual discrimination?
- Is the child able to hear the information? Is hearing acuity within normal limits? What about auditory discrimination?

Output

- Is the child able to respond in writing? Are fine motor abilities within normal limits?
- Is the child able to respond orally? Are language production abilities within normal limits?

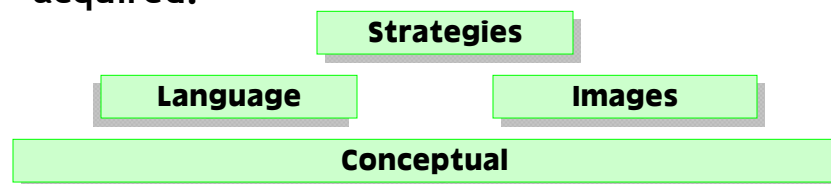
Attention and Learning

Does the child . . .

- selectively attend to certain stimuli while ignoring competing, irrelevant stimuli?
- sustain attentional focus for a prolonged period?
- shift attentional resources from one activity to another?
- respond to more than one task simultaneously - divided attention?

Memory and Learning

- In schools, we expect children to learn and remember information.
- Often, the information is presented visually and/or verbally.
- Some of the information is novel; some is acquired.



(Mather & Goldstein, 2008)

Visual-Spatial Processes and Learning

- Much of what is presented in school has either a visual-spatial or language basis.
- Visual-perceptual skills play a major role in the development of a child's handwriting skills, and fluency in math and reading.
- For example, a student may be able to name individual letters in a word (visual analysis, b-e-d), but she may be unable to integrate the letters to say the word (visual synthesis, bed).

Language and Learning

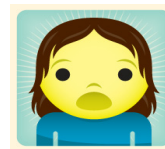
Receptive

Children must understand words and sentences to perceive and process information.



Expressive

They must use words to show they can retrieve information from memory.



Language and Learning

Early development of reading depends critically on whether the receptive phonological component of the *aural* system and the expressive phonological component of the *oral* system are developing in an age-appropriate manner (Berninger, 2007).

Language → Literacy

Process of Learning and Remembering

Encoding	External information is transformed into mental representations or memories and stored in STM.
Consolidation	Information from immediate memory is solidified into long-term memory stores.
Retrieval	Information is brought into conscious awareness.

Delayed

Semantic

Immediate

Working

Executive Functions

- Mental functions associated with ability to engage in behaviors that are:
 - Purposeful
 - Organized
 - Self-regulated
 - Goal-directed
- Internal supervisory guide for learning and performance in the classroom.



Executive Functions and Working Memory

- Many executive function tasks also require working memory—actively holding information in memory during cognitive tasks.
- Children with poor working memory may lose the “thread” and forget parts of the instruction, or even their own intention in the face of competing stimuli.

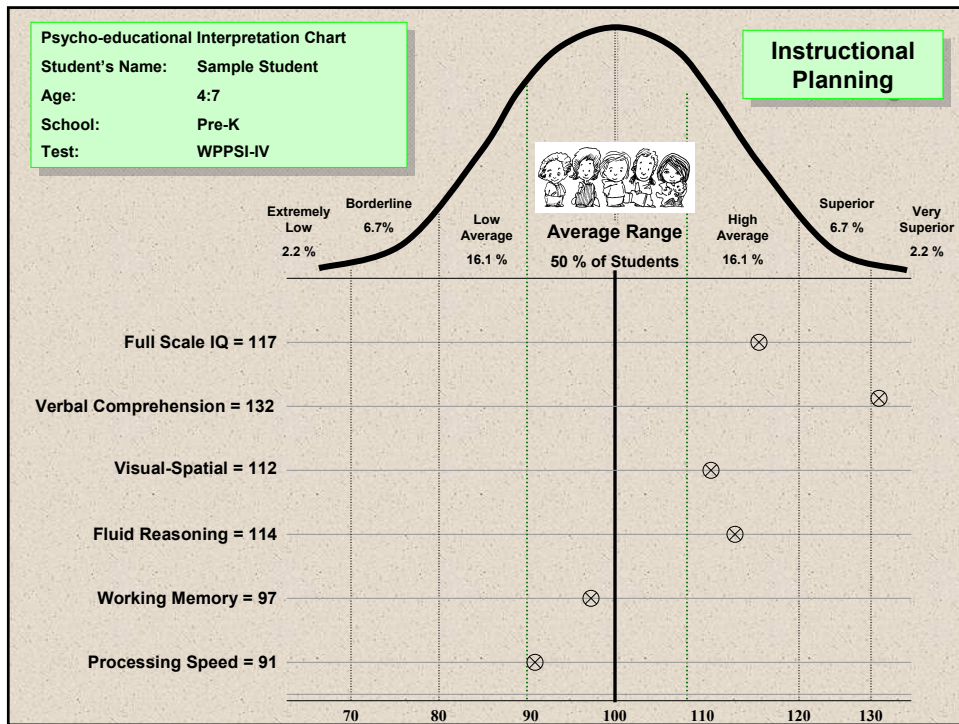
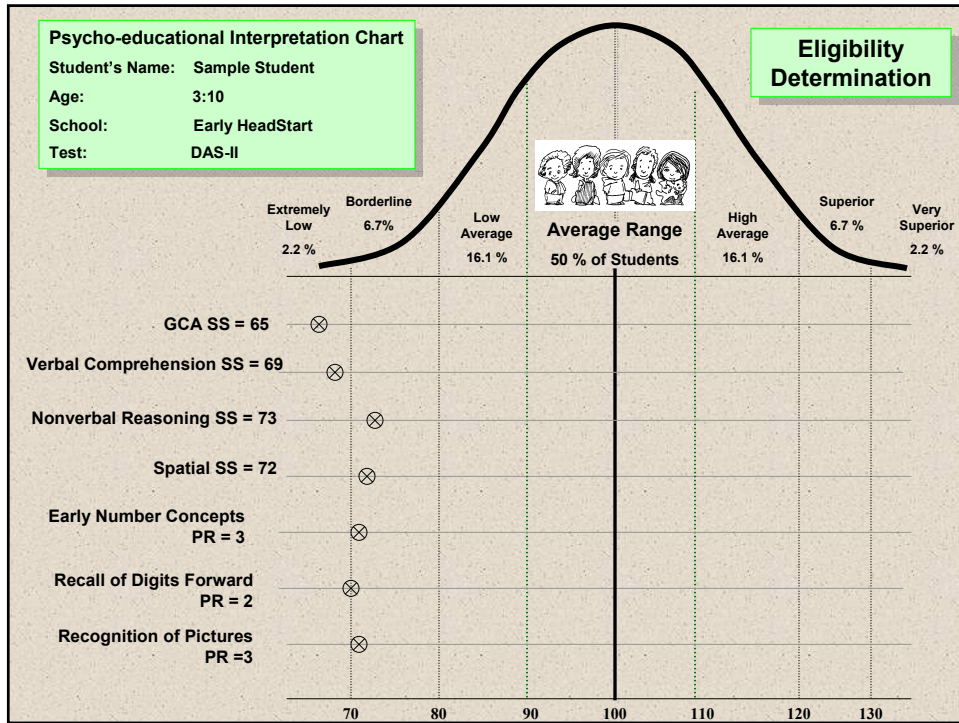
Cognitive Processing Speed and Learning

- The ability to perform automatically with little or no effort-improves dramatically as children get older.
- Automaticity is linked to speed and processing capacity; as an activity is completed faster, it requires less processing capacity.
- As processing capacity increases, it becomes easier to complete tasks that were previously considered to be difficult. (Santrock & Yussen, 1992).



Sample Test Results . . .

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Learning Depends on . . .

- sensory-motor functions,
- attentional processes,
- visual-spatial processing,
- language processes,
- memory and learning processes,
- executive functions, and
- speed and efficiency of cognitive processing.

Summary

- If a child is not performing the grade-level skill, identify the cognitive factors that are necessary for and related to performance of the skill.
- Assess these cognitive factors to determine why the child is struggling with the specific skill.

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Comments and Questions

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