

## Introduction

*Insight* is a group-administered test of cognitive abilities for students, based upon the Cattell-Horn-Carroll (CHC) theory of cognitive abilities. Probably the best known and most widely accepted theory of intellectual factors, John Carroll has described this model as appearing to offer “the most well-founded and reasonable approach to an acceptable theory of the structure of cognitive abilities” (1993).

*Insight* represents a significant advance in the development of group-administered ability tests for students, breaking free from the existing cadre of such tests. It is the first group-administered test to utilize completely the CHC theory of human cognitive abilities.

### CHC Theory, The Model of Human Cognitive Functioning

CHC theory is derived from the concept that there are three strata of human cognitive abilities that differ in breadth and generality.

<p><b>Stratum 3</b></p>	<p><b><i>g</i></b></p> <p>The broadest, and most general level of ability, referred to as “<i>g</i>” (little <i>g</i>), a global representation of cognitive ability. <b><i>g</i></b> represents a general level of intellectual ability which a person can demonstrate in most areas of endeavor.</p>										
<p><b>Stratum 2</b></p>	<p><b>Broad Abilities</b></p> <p>Ten broad abilities at this level are each distinct from the others.</p> <table border="0"> <tr> <td><b><i>Gf</i></b> Fluid Reasoning</td> <td><b><i>Gv</i></b> Visual Processing</td> </tr> <tr> <td><b><i>Gq</i></b> Quantitative Reasoning</td> <td><b><i>Ga</i></b> Auditory Processing</td> </tr> <tr> <td><b><i>Gc</i></b> Crystallized Intelligence</td> <td><b><i>Glr</i></b> Long-term Memory Retrieval</td> </tr> <tr> <td><b><i>Grw</i></b> Reading and Writing</td> <td><b><i>Gs</i></b> Processing Speed</td> </tr> <tr> <td><b><i>Gsm</i></b> Short-term Memory</td> <td><b><i>GDS</i></b> Correct Decision Speed</td> </tr> </table>	<b><i>Gf</i></b> Fluid Reasoning	<b><i>Gv</i></b> Visual Processing	<b><i>Gq</i></b> Quantitative Reasoning	<b><i>Ga</i></b> Auditory Processing	<b><i>Gc</i></b> Crystallized Intelligence	<b><i>Glr</i></b> Long-term Memory Retrieval	<b><i>Grw</i></b> Reading and Writing	<b><i>Gs</i></b> Processing Speed	<b><i>Gsm</i></b> Short-term Memory	<b><i>GDS</i></b> Correct Decision Speed
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<p><b>Stratum 1</b></p>	<p><b>Narrow Abilities</b></p> <p>Narrow abilities are exemplars within each broad ability. Examples of narrow abilities within Crystallized Knowledge (<i>Gc</i>): Language Development, Lexical Knowledge, Listening Ability.</p>										

## Links between CHC Broad Abilities and Academic Skills

Research has showed how certain broad CHC abilities link to the development of specific academic skills. Flanagan and Mascolo (2005, page 535) provide a helpful chart summarizing these findings. A good example is that Auditory Processing (Ga), and specifically the narrow ability of Phonetic Coding, is closely linked to developing reading skills and written language skills during the elementary school years. In contrast, there is not a strong link between Auditory Processing (Ga) and mathematics skills.

Today nearly every intelligence test developer acknowledges the importance of CHC theory in defining and interpreting cognitive ability constructs (Alfonso, Flanagan & Radwan, 2005, p. 188). Yet, few tests include measures of all seven commonly accepted abilities in a single test. Since *Insight* measures each of the seven important broad abilities, it provides educators with guidance on a student's cognitive strengths and needs. For more specific information, see *The Importance of Insight-measured Abilities for Learning in School* at [www.ctcinsight.com](http://www.ctcinsight.com).

## *Insight*, A CHC Theory-based Measure

Resting on the CHC theory of cognitive abilities, *Insight* provides measures of the seven broad cognitive abilities that are most related to learning.

CHC Broad Ability	<i>Insight</i> Subtest
Fluid Reasoning (Gf)	Fluid Reasoning
Crystallized Intelligence (Gc)	Crystallized Knowledge
Short-term Memory (Gsm)	Short-Term Memory
Visual Processing (Gv)	Visual Processing
Auditory Processing (Ga)	Auditory Processing
Long-Term Memory Retrieval (Glr)	Long-Term Memory Retrieval
Processing Speed (Gs)	Processing Speed

### Fluid Reasoning (Gf):

The use of inductive, deductive, and quantitative reasoning to solve novel, “on-the-spot” problems.

**Gf** refers to inductive, deductive, and quantitative reasoning with materials and processes that are new to the person doing the reasoning. It involves deliberate and controlled mental operations. Most fluid reasoning tests use nonverbal stimuli but require integration of verbal and nonverbal thinking.

### Crystallized Intelligence (Gc):

The person’s breadth and depth and application of acquired knowledge of the language, information, and concepts of a culture.

**Gc** refers to the application of acquired knowledge and learned skills to answering questions and solving problems that present at materials and processes that are at least broadly familiar to the person. Gc tests include general knowledge and vocabulary tests.

### Short-term Memory (Gsm)

The ability to apprehend, maintain awareness of, and mentally manipulate elements of information in the immediate situation.

**Gsm**, also termed recent or working memory, refers to the ability to temporarily store and manage elements of information required to carry out cognitive tasks such as learning, reasoning, and comprehension. *Gsm* typically has a limited capacity, and loses information quickly through decay unless an individual is able to use other cognitive resources to maintain the information in immediate awareness.

*Gsm* includes:

- memory span—the number of items, usually words or numbers, that a person can hold onto and recall.
- working memory—the ability to hold to and also manipulate information in the mind over short periods of time.

### Visual Processing (Gv):

The ability to generate, retain, retrieve, and transform well-structured visual images.

**Gv** involves:

- a range of visual processes, from fairly simple visual perceptual tasks to higher level visual, cognitive processes.
- the ability to generate, retain, retrieve and transform well-structured visual images.
- Does not include the aspect of dealing with novel stimuli or applying novel mental processes that characterizes *Gf* tasks.

### **Auditory Processing (Ga):**

Abilities involved in discriminating patterns in sounds and musical structure, often against background noise or distorting conditions, or both.

**Ga** includes:

- the abilities to analyze, manipulate, comprehend, and synthesize sound elements, groups of sounds, or sound patterns.
- the ability to recognize similarities and differences between sounds.
- the ability to recognize degraded words, such as words with sounds omitted or separated.
- phonemic awareness skills which are important for the acquisition of emerging reading skills.

### **Long-term Memory Retrieval (Glr)**

The ability to store and consolidate new information in long-term memory, and later fluently retrieve the stored information through association.

**Glr** refers to:

- the ability to store and consolidate new information in long-term memory.
- the fluent retrieval of the stored information through association.

The actual information that is stored refers to Crystallized Intelligence (Gc).

### **Processing speed (Gs)**

The ability to automatically and fluently perform relatively easy or over-learned cognitive tasks, especially when high mental efficiency (i.e., attention and focused concentration) is required.

**Gs** is the speed of executing relatively over-learned or automatized elementary cognitive processes.

## Features of *Insight*

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***Insight*** has many features that make it a valuable cognitive assessment tool:

- *Insight* subtests measure cognitive abilities that have been empirically linked to the emergence and development of specific academic functions.
- *Insight* results are easy to interpret, since the subtests are named by the broad abilities that they measure.
- *Insight* subtests require no reading or writing. A student's level of attainment in reading and written language has minimal impact on the scores.
- *Insight* is group-administered using a DVD. The teacher's role is to check the audio/visual equipment, distribute the booklets, play the DVD, and monitor the students.
- *Insight* is designed for students aged 6 years to 12 years in grades 2 through 7.
  - Level 1 for students in grades 2 and 3
  - Level 2 for students in grades 4 and 5
  - Level 3 for students in grades 6 and 7
- *Insight* is scored by computer.

### ***Insight* Materials**

#### **Reusable Materials**

- Examiner's Manual
- DVD

#### **Consumable Materials**

- Student Test Books

#### **Required Equipment**

- computer capable of playing a DVD
  - external speakers
  - data projector
  - projection screen (or wall)
- or comparable smartboard setup  
or (for a small group) a TV and DVD player

## Administration Times

*Insight* subtests are independent of one another, allowing for scheduling flexibility. When all subtests will be administered, it is suggested that testing be spread over at least two days. The following table shows the testing time required for each subtest.

	Testing Times (in minutes, including instructions/samples)		
	Level 1 grades 2–3	Level 2 grades 4–5	Level 3 grades 6–7
Crystallized Knowledge	17	17	16
Visual Processing	16	16	16
Fluid Reasoning	14	14	14
<b>Gifted Screening</b>	<b>47</b>	<b>47</b>	<b>46</b>
Short-Term Memory	9	11	10
Long-Term Memory Retrieval	12	13	17
Auditory Processing	13	12	13
Processing Speed	3	3	3
<b>Total</b>	<b>84</b>	<b>86</b>	<b>89</b>

## *Insight* Composite Scores

*Insight* score reports provide the following composite scores to describe a student's cognitive abilities:

Insight Ability Score (IAS):

- An overall cognitive ability score, based on all seven *Insight* subtests

Insight General Ability Index (gI)

- A measure of intentional processing with a restricted range of abilities
- Based on Crystallized Knowledge, Visual Processing, Fluid Reasoning

Insight Thinking Index (ITI):

- A measure of intentional cognitive processing when information in short-term memory cannot be processed automatically
- Based on Visual Processing, Fluid Reasoning, Long-Term Memory Retrieval, Auditory Processing

Insight Memory & Processing Index (IMPI):

- A measure of cognitive efficiency for automatic cognitive functioning involving speed and short-term memory; it represents the capacity of the cognitive system to process information automatically
- Based on Short-Term Memory, Processing Speed

For more information about *Insight* score reports, see *Understanding Insight Reports* at [www.canadiantestcentre.com/INSIGHT](http://www.canadiantestcentre.com/INSIGHT). Please feel free to contact us at 1 800 668 1006.

## References for Further Reading

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