Woodcock-Johnson V Tests of Cognitive Abilities

Test Descriptions

Below are descriptions of the different tests included in the Woodcock-Johnson V Tests of Cognitive Abilities and their corresponding CHC Abilities. For more detailed descriptions of the different CHC abilities, please reference pages 9-13 of this document.

Test	CHC Abilities	Description	Considerations for Inclusion in Evaluation Plan
Oral Vocabulary	Broad: Comprehension-Knowledge (Gc) Narrow: Lexical knowledge (VL)	Consists of two subtests: Synonyms and Antonyms, which each measure an aspect of vocabulary knowledge of spoken English. Synonyms requires the examinee to listen and view a word then provide an appropriate word with the same or similar meaning. Antonyms requires the examinee to hear and view a word and then provide an appropriate word with an opposite meaning.	Contributes to the: • General Intellectual Ability (GIA) score • Brief Intellectual Ability (BIA) score • Gf-Gc Composite score • Comprehension-Knowledge (Gc) cluster May have clinical utility for examinees who present with difficulties with: • Acquiring vocabulary • Comprehending oral and written language • Using prior knowledge to support learning • Finding the right words to use/say
Matrices	Broad: Fluid Reasoning (Gf) Narrow: Induction (I)	The examinee selects, from among four choices, the one that completes the pattern in a figural matrix. Early items contain 2 x 2 matrices while later items contain 3 x 3 matrices.	Contributes to the: • General Intellectual Ability (GIA) score • Brief Intellectual Ability (BIA) score • Gf-Gc Composite score • Fluid Reasoning (Gf) cluster May have clinical utility for examinees who present with difficulties with: • Identifying patterns and logical relationships • Solving novel visual problems without verbal support • Understanding how parts fit together to form a whole

Test	CHC Abilities	Description	Considerations for Inclusion in Evaluation Plan
Spatial Relations	Broad: Visual Processing (Gv) Narrow: Visualization (Vz)	Using visual-mental rotation processes, the examinee must determine which two or three 2-dimensional puzzle pieces (from among six options) go together to form the shape in the key.	Contributes to the: • General Intellectual Ability (GIA) score • Visual Processing (Gv) cluster May have clinical utility for examinees who present with difficulties with: • Interpreting diagrams, maps, or geometric figures • Completing tasks requiring mental manipulation of shapes • Organizing materials or navigating physical space
Story Recall	Broad: Long-Term Storage (Gl) Narrow: Meaningful Memory (MM)	The examinee listens to short stories from an audio recording and then retells the stories with as much detail as possible.	Contributes to the: • General Intellectual Ability (GIA) score • Long-Term Storage (Gl) cluster May have clinical utility for examinees who present with difficulties with: • Recalling/retrieving information using association • Retrieving specific information • Learning information quickly
Semantic Word Retrieval	Broad: Retrieval Fluency (Gr) Narrow: Ideational Fluency (FI)	The examinee has 1 minute to say as many words as possible that fit into a semantic category. There are three trials, each with a different semantic category.	Contributes to the: • General Intellectual Ability (GIA) score • Retrieval Fluency (Gr) cluster May have clinical utility for examinees who present with difficulties with: • Quickly accessing vocabulary during conversation or writing • Producing category-specific words or associative language • Efficient verbal expression during timed or demanding tasks

Test	CHC Abilities	Description	Considerations for Inclusion in Evaluation Plan
Verbal Attention	Broad: Auditory Working Memory Capacity (Gwm) Narrow: Working Memory Capacity (Wc) and Auditory Short-Term Storage (Wa)	The examinee hears a series of intermingled animals and digits presented from an audio recording. Then the examinee must answer a specific question about the sequence; for example, "Tell me the animal that came before five."	Contributes to the: • General Intellectual Ability (GIA) score • Brief Intellectual Ability (BIA) score • Auditory Working Memory Capacity (Gwm) cluster • Cognitive Efficiency (CE) cluster May have clinical utility for examinees who present with difficulties with: • Following multi-step oral or written directions • Remembering information long enough to apply it • Remembering sequences of information • Maintaining one's place during math problem solving or while writing • Listening to and comprehending lengthy discourse
Number-Pattern Matching	Broad: Cognitive Processing Speed (Gs) Narrow: Perceptual Speed: Search (Ps) and Quantitative Knowledge (Gq)	The examinee has 3 minutes to tap pairs of identical 1- to 3-digit numbers among rows of six numbers.	Contributes to the: • General Intellectual Ability (GIA) score • Cognitive Processing Speed (Gs) cluster • Cognitive Efficiency (CE) cluster May have clinical utility for examinees who present with difficulties with: • Processing information quickly and efficiently • Completing timed tasks within time limits • Making rapid comparisons/perceiving relationships • Completing simple, rote tasks quickly

Test	CHC Abilities	Description	Considerations for Inclusion in Evaluation Plan
Verbal Analogies	Broad: Comprehension-Knowledge (Gc) and Fluid Reasoning (Gf) Narrow: Lexical Knowledge (VL) and Induction (I)	The Examinee sees three words of a verbal analogy (e.g., A is to B as C is to ...) and hears the examiner read the analogy orally. The examinee then says a word to complete the analogy.	Contributes to the: • General Intellectual Ability (GIA) score • Gf-Gc Composite score • Comprehension-Knowledge (Gc) cluster May have clinical utility for examinees who present with difficulties with: • Recognizing relationships between words or ideas • Using reasoning to understand higher-level language • Drawing inferences and applying verbal logic • Understanding classroom explanations or academic text structure
Analysis-Synthesis	Broad: Fluid Reasoning (Gf) Narrow: General Sequential Reasoning (RG)	During the training phases of this controlled learning test, the examinee learns to use a key containing colored squares to solve puzzles. The examinee then uses deductive reasoning to solve each puzzle and name the missing color(s). With the exception of the last several items, the examiner provides immediate feedback for correct and incorrect answers.	Contributes to the: • Gf-Gc Composite score • Fluid Reasoning (Gf) cluster May have clinical utility for examinees who present with difficulties with: • Creating solutions to novel problems • Transferring and generalizing learning • Problem solving through rule application • Transforming and extending knowledge • Solving abstract problems

Test	CHC Abilities	Description	Considerations for Inclusion in Evaluation Plan
Block Rotation	Broad: Visual Processing (Gv) Narrow: Visualization (Vz)	Using visual-mental rotation processes, the examinee must determine which two (from among five options) 3-dimensional block figures match the figure in the key.	Contributes to the Visual Processing (Gv) cluster. May have clinical utility for examinees who present with difficulties with: • Noting visual detail • Reading maps, graphs, and charts • Sensing spatial orientation/characteristics • Recalling visual information
Story Comprehension	Broad: Long-Term Storage (Gl) Narrow: Meaningful Memory (MM)	The examinee listens to short stories from an audio recording and then answers story-specific comprehension questions read orally by the examiner.	Contributes to the Long-Term Storage (Gl) cluster. May have clinical utility for examinees who present with difficulties with: • Understanding orally presented stories or explanations • Making inferences or connecting ideas across a narrative • Identifying key details or main ideas in spoken language • Using context to interpret meaning
Phonemic Word Retrieval	Broad: Retrieval Fluency (Gr) Narrow: Word Fluency (FW)	The examinee has 1 minute to say as many words as possible that begin with a specific sound. There are three trials, each with a different beginning sound.	Contributes to the: • Retrieval Fluency (Gr) cluster • Phonemic Retrieval Fluency (Gr) cluster May have clinical utility for examinees who present with difficulties with: • Quickly accessing words during speech • Producing words beginning with a given sound or syllable • Fluency tasks requiring rapid, accurate verbal output

Test	CHC Abilities	Description	Considerations for Inclusion in Evaluation Plan
Numbers Reversed	Broad: Auditory Working Memory Capacity (Gwm) Narrow: Working Memory Capacity (Wc) and Auditory Short-Term Storage (Wa)	The examinee hears a sequence of numbers from an audio recording and then says the numbers in reverse order.	Contributes to the Auditory Working Memory Capacity (Gwm) cluster. May have clinical utility for examinees who present with difficulties with: • Remembering information long enough to apply it • Remembering sequences of information
Letter-Pattern Matching	Broad: Cognitive Processing Speed (Gs) Narrow: Perceptual Speed: Search (Ps) and Reading and Writing (Grw)	The examinee has 3 minutes to tap pairs of identical nonword combinations of one to four letters among rows of letters or letter combinations.	Contributes to the Cognitive Processing Speed (Gs) cluster. May have clinical utility for examinees who present with difficulties with: • Processing information quickly and efficiently • Completing timed tasks within time limits • Making rapid comparisons/perceiving relationships • Completing simple, rote tasks quickly
General Information	Broad: Comprehension-Knowledge (Gc) Narrow: General Knowledge (K0)	This test is comprised of two subtests: Where and What. The examinee answers “Where would you find...?” and “What would you do with...?” questions read orally by the examiner.	May have clinical utility for examinees who present with difficulties with: • Acquiring general knowledge and knowledge in content areas • Answering fact-based/informational questions • Comprehending oral and written language • Using prior knowledge to support learning • Finding the right words to use/say

Test	CHC Abilities	Description	Considerations for Inclusion in Evaluation Plan
Concept Formation	Broad: Fluid Reasoning (Gf) Narrow: Induction (I)	During the training phases of this controlled-learning task, the examinee learns rules for solving puzzles that require grouping of pictures on shape, size, color, and quantity. The examinee then uses inductive reasoning to state the rule that explains how one or more pictures is/are different from the other pictures in each puzzle. With the exception of the last several items, the examiner provides immediate feedback for correct and incorrect answers.	May have clinical utility for examinees who present with difficulties with: • Creating solutions to novel problems • Transferring and generalized learning • Problem solving through rule application • Transforming and extending knowledge • Thinking conceptually
Number Series	Broad: Quantitative Knowledge (Gq) and Fluid Reasoning (Gf) Narrow: Mathematical Achievement (A3) and Quantitative Reasoning (RQ)	The examinee sees a series of numbers with one number missing and must determine the underlying rule to provide the missing number.	May have clinical utility for examinees who present with difficulties with: • Creating solutions to novel problems • Transferring and generalizing learning • Problem solving through rule application • Higher level reasoning with numbers • Transforming and extending knowledge

Test	CHC Abilities	Description	Considerations for Inclusion in Evaluation Plan
Visual-Auditory Learning	Broad: Visual Processing (Gv) and Fluid Reasoning (Gf) Narrow: Visual Memory (MV) and General Sequential Reasoning (RG)	During the training phases, the examinee learns relationships between words and pictures (rebuses). The examinee must then read "sentences" formed by the rebuses. Sentences increase in difficulty as new rebuses are presented in each training phase; the examiner provides oral feedback and error correction. This controlled learning task mirrors the early reading process.	May have clinical utility for examinees who present with difficulties with: • Recalling/retrieving information using association • Using associations to facilitate storage and retrieval • Learning information quickly • Pairing and retaining visual and auditory information
Visual Working Memory	Broad: Visual-Spatial Working Memory (Gwm, Gv) Narrow: Working Memory Capacity (Wc), Visual-Spatial Short-Term Storage (Wv), and Visual Memory (MV)	After briefly viewing a pattern of dots on the screen (from 1 to 9 dots presented inside randomly displayed patterns of squares), the examinee completes a simple visual distractor task, which currently retaining the dot patterns in active memory. Then the examinee must recall the location of the dots from the first screen (in randomly displayed patterns of 2 to 23 empty boxes) immediately after the visual distractor task.	May have clinical utility for examinees who present with difficulties with: • Holding and manipulating visual information in mind • Remembering visual details long enough to use them • Copying from the board or tracking multi-step visual tasks • Managing tasks that require remembering sequences of symbols or images

Test	CHC Abilities	Description	Considerations for Inclusion in Evaluation Plan
Symbol Inhibition	Broad: Cognitive Processing Speed (Gs) Narrow: Perceptual Speed: Compare (Pc) and Visual Processing (Gv)	The examinee has 1 minute to quickly tap successive colored shapes in a row of shapes but not tap (i.e., inhibit) the shape(s) that are identical to the shape(s) in the key at the top of the screen. The task becomes more complex as additional shapes are added to the key.	May have clinical utility for examinees who present with difficulties with: • Stopping automatic or habitual responses • Maintaining accuracy while suppressing impulsive actions • Shifting between rules or response patterns • Completing tasks requiring cognitive control under time pressure

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Definitions of CHC Abilities

Comprehension-Knowledge (Gc)

Originally described as crystallized intelligence, including the depth and breadth of a person's acquired knowledge, the ability to communicate one's knowledge, and the ability to reason using previously learned experiences or procedures. This story of knowledge is primarily language-based and represents those abilities that have been developed largely through the investment of time, talent, and resources during education and general life experiences.

Fluid Reasoning (Gf)

Includes the broad ability to reason, form concepts, and solve problems using unfamiliar information or novel procedures. It is a complex mixture of many mental operations, such as identifying relations, drawing inferences, recognizing, and forming concepts, identifying conjunctions, and recognizing disjunctions. It also requires deliberate and flexible control of attention to solve on-the-spot problems.

Visual Processing (Gv)

The ability to perceive, analyze, synthesize, and think with visual patterns. Includes the ability to store and recall visual representations (visual working memory and long-term retrieval of visual elements).

Long-Term Storage (Gl)

The ability to acquire, store, and consolidate information. Unlike short-term working memory that requires maintaining information in immediate awareness, long-term storage involves information that has been removed from immediate awareness and stored, to be retrieved at a later time.

Retrieval Fluency (Gr)

The individual's ability to access information stored in long-term memory both accurately and quickly. Retrieval Fluency abilities include recall of ideas, words, and figures.

Auditory Working Memory Capacity (Gwm)

The ability to maintain and manipulate information in one's immediate awareness. It is a temporary, limited capacity storage system. Auditory Working Memory Capacity is an important ability because performance in many areas, including higher level cognitive functions such as complex reasoning, relies on its efficiency. It is significantly related to all academic areas and limits in this ability can limit new learning and may negatively impact performance on all nonautomatic tasks.

Cognitive Processing Speed (Gs)

The ability to quickly perform both simple and complex cognitive tasks, particularly when measured under pressure to sustain controlled attention and concentration. Cognitive processing speed is an aspect of cognitive efficiency.

Lexical knowledge (VL)

The knowledge of the definitions of words and the concepts that underlie them. Vocabulary knowledge.

Induction (I)

The ability to observe a phenomenon and discover the underlying principles or rules that determine it's behavior. This ability is also known as rule inference.

Visualization (Vz)

The ability to perceive complex patterns and mentally simulate how they might look when transformed (e.g., rotated, changed in size, partially obscured. Visualization is the core Visual Processing (Gv) ability.

Meaningful Memory (MM)

The ability to remember narratives and other forms of semantically related information.

Ideational Fluency (FI)

The ability to rapidly produce a series of ideas, words, or phrases related to a specific condition or object.

Working Memory Capacity (Wc)

The ability to actively manipulate information in primary memory. Working Memory Capacity (Wc) is technically not a narrow ability; instead, it is the combination of short-term storage (either Auditory Short-Term Storage [Wa] or Visual-Spatial Short-Term Storage [Wv]) plus Attentional Control (AC). Working memory tasks vary in the degree of demand placed on short-term storage and the degree of attentional control (AC) active manipulation of information while in short-term memory.

Auditory Short-Term Storage (Wa)

The ability to encode and maintain verbal information in primary memory. In earlier CHC and psychometric literature this was often referred to as a form of Memory Span (MS).

Perceptual Speed: Search (Ps)

The speed and fluency of searching or scanning an extended visual field to locate one or more sim-ple visual patterns.

Quantitative Knowledge (Gq)

The depth and breadth of declarative and procedural knowledge related to mathematics. It consists of acquired knowledge about mathematics, such as knowledge of mathematical symbols, operations, computational procedures, and other math-related skills.

General Sequential Reasoning (RG)

The ability to reason logically using known premises and principles. This ability is also known as deductive reasoning or rule application.

Word Fluency (FW)

The ability to rapidly produce words that share a phonological (e.g., fluency of retrieval of words via a phonological cue) or semantic (e.g., fluency of retrieval of words via a meaning-based representation) feature.

Reading and Writing (Grw)

The depth and breadth of knowledge and skills related to written language. Grw has traditionally been referred to as literacy. People with high Grw read with little effort and write with little difficulty. When Grw is sufficiently high, reading and writing become windows (i.e., facets) for viewing a person's language development. Although reading and writing are clearly distinct activities, the underlying sources of individual differences in reading and writing skills do not differentiate clearly between the two activities. It appears that the Grw ability is common across all reading and writing skills.

General Knowledge (K0)

The breadth and depth of shared common knowledge considered essential, practical, or worthwhile for everyone in a culture to know.

Mathematical Achievement (A3)

Measured (tested) mathematics achievement, including the ability to perform basic calculations and solve contextualized math problems. Both draw on Gf-RQ (quantitative reasoning), particularly as the achievement problems require more problem solving.

Quantitative Reasoning (RQ)

The ability to reason, either with induction, or deduction, with quantities, mathematical relations, and operations.

Visual Memory (MV)

The ability to remember complex images over short periods of time (less than 30 seconds). It is important to note that MV differs from the construct of visual or visual-spatial working memory, an ability that requires much more complex visual-spatial manipulation and memory encoding and retrieval processes.

Visual-Spatial Short-Term Storage (Wv)

The ability to encode and maintain visual information in primary memory. In earlier CHC and psychometric literature this was often referred to as a form of memory span (MS).

Perceptual Speed: Compare (Pc)

The speed and fluency of looking up and comparing visual stimuli that are side by side or more widely separated in an extended visual field.