

Fluid reasoning (Gf): The use of deliberate and controlled focused attention to solve novel “on the spot” problems that cannot be solved solely by using prior knowledge (previously learned habits, schemas, or scripts). Reasoning that depends minimally on learning and acculturation.

- *Induction (I):* The ability to infer general implicit principles or rules that govern the observed behavior of a phenomenon or the solution to a problem. Rule discovery.
- *General sequential reasoning (RG):* The ability to reach logical conclusions from given premises and principles, often in a series of two or more sequential steps. Deductive reasoning.
- *Quantitative reasoning (RQ):* The ability to reason, either with induction or deduction, with numbers or mathematical relations, operations and algorithms.

Short-term working memory (Gwm): The ability to encode, maintain, and/or manipulate auditory or visual information in primary memory (while avoiding distractions) to solve multiple-step problems. The mind’s mental “scratchpad” or “workbench.”

- *Memory span (MS):* The ability to encode and maintain verbal information in primary memory and accurately reproduce the information in the originally presented sequence.
- *Working memory capacity (WM):* The capacity limitation for the amount of information that can be actively maintained, recoded or assembled into structures in primary memory.
- *Attentional control (AC):* The ability to focus on task-relevant stimuli (target enhancement) and ignore task irrelevant stimuli (distractor suppression). Sometimes referred to as spotlight or focal attention, focus, control of attention, executive controlled attention, or executive attention.

Long-term storage and retrieval (Glr): The ability to learn, store, consolidate, and retrieve information over periods of time measured in minutes, hours, days, and years.

Gl-Learning efficiency: The ability and efficiency to learn, store, and consolidate new information.

- *Associative memory (MA):* The ability to encode and remember previously unrelated information after it has been paired. Paired-associate learning.
- *Meaningful memory (MM):* The ability to remember and construct coherent mental representations from meaningful narratives or other semantically related information.
- *Free recall memory (M6):* The ability to recall lists or sets of unrelated materials in any order. The information to be recalled exceeds an individual’s memory span.

Gr-Retrieval fluency: The rate and fluency at which individuals can produce and retrieve information or ideas stored in long-term memory.

- *Ideational fluency (FI):* The ability to rapidly produce instances of given concepts or categories of experiences.
- *Associational fluency (FA):* The ability to rapidly produce a series of original associations drawn from restricted classes that are associated in meaning (e.g., synonyms).
- *Expressional fluency (FE):* The ability to rapidly produce different ways of expressing meaningful and syntactically coherent discourse, often requiring rapid manipulation of linguistic elements.
- *Sensitivity to problems/alternative solution fluency (SP):* The ability to rapidly think of a number of alternative solutions to a practical problem.
- *Originality/creativity (FO):* The ability to rapidly produce original, clever, and insightful responses to a given topic, situation, or task.
- *Naming facility (NA):* The ability to rapidly produce names for common objects.
- *Word fluency (FW):* The ability to rapidly produce words that share a phonological, semantic or nonsemantic feature.
- *Speed of lexical access (LA):* The ability to rapidly retrieve words from an individual’s lexicon based on orthographic, phonological or semantic characteristics of the words. A relatively new CHC ability (McGrew et al., 2014) that may be an *intermediate* factor over ideational fluency (FI), word fluency (FW) and naming facility (NA).
- *Figural fluency (FF):* The ability to rapidly draw or sketch as many things (or elaborations) as possible when presented with a nonmeaningful visual stimulus.
- *Figural flexibility (FX):* The ability to rapidly draw different solutions to figural problems.

Processing speed (Gps): The ability to control attention to automatically and fluently perform relatively simple repetitive cognitive tasks. Attentional fluency.

- *Perceptual speed (P):* The speed and fluency with which similarities or differences in visual stimuli (e.g., letters, numbers, patterns, etc.) can be compared and distinguished. Carroll (1993) also listed this ability under *Gv*.
- *Rate-of-test-taking (R9):* The speed and fluency of completing simple cognitive tests not associated with any particular stimulus characteristic. A “miscellaneous” category for speeded tasks that are not easily classified via cognitive operations or content characteristics.
- *Number facility (N):* The speed and fluency in manipulating numbers, comparing number patterns, or completing basic arithmetic operations.
- *Reading speed (RS):* The speed and fluency of reading text with full comprehension. Also listed under *Grw*.
- *Writing speed (WS):* The speed and fluency of generating or copying words or sentences. Also listed under *Grw* and *Gps*.

Psychomotor speed (Gps): Psychomotor speed is the speed and fluidity with which physical body movements can be made.

- *Speed of limb movement (R3):* The speed of arm and leg movement. This speed is measured after the movement is initiated. Accuracy is not important.
- *Writing speed (fluency) (WS):* The speed at which written words can be copied. Also listed under *Grw* and *Gps*.
- *Speed of articulation (PT):* The ability to rapidly perform successive articulations with the speech musculature.
- *Movement time (MT):* The time taken to physically move a body part (e.g., a finger) to make the required response. Also is listed under *Gt*.

Reaction and decision speed (Gt): The speed at which very simple perceptual discriminations or decisions can be made.

- *Simple reaction time (R1):* The reaction time to the onset of a single visual or auditory stimulus.
- *Choice reaction time (R2):* The reaction time required when a very simple choice must be made.
- *Semantic processing speed (R4):* The reaction time required when a decision requires simple encoding and mental manipulation of the stimulus content.
- *Mental comparison speed (R7):* The reaction time required when stimuli must be compared for a particular characteristic or attribute.
- *Inspection time (IT):* The speed at which differences in stimuli can be perceived.

Comprehension-knowledge (Gc): The depth and breadth of declarative and procedural knowledge and skills valued by one’s culture. Comprehension of language, words, and general knowledge developed through experience, learning and acculturation.

- *General (verbal) information (K0):* The breadth and depth of knowledge that one’s culture deems essential, practical, or worthwhile for most everyone to know.
- *Language development (LD):* The general understanding of spoken language at the level of words, idioms, and sentences. An *intermediate* factor between broad *Gc* and other narrow *Gc* abilities. It usually represents a number of narrow language abilities working together in concert—therefore it is not likely a unique ability.
- *Lexical knowledge (VL):* The knowledge of the word definitions and the concepts that underlie them. Vocabulary knowledge.
- *Listening ability (LS):* The ability to understand speech, starting with comprehending single words and increasing to long complex verbal statements.
- *Communication ability (CM):* The ability to use speech to communicate one’s thoughts clearly.
- *Grammatical sensitivity (MY):* The awareness of the formal rules of grammar and morphology of words in speech.

Domain-specific knowledge (Gkn): The depth, breadth, and mastery of specialized declarative and procedural knowledge typically acquired through one’s career, hobby, or other passionate interest. The *Gkn* domain is likely to contain more narrow abilities than are currently listed in the CHC model.

- *Foreign language proficiency (KL):* This ability is similar to language development (*Gc-LD*) but it is the proficiency in another language. There are likely different *KL* factors for different languages.
- *Knowledge of signing (KF):* The knowledge of finger spelling and signing (e.g., American Sign Language).
- *Skill in lip reading (LP):* Competence in the ability to understand communication from others by watching the movement of their mouths and expressions.
- *Geography achievement (A5):* Range of geography knowledge (e.g., capitals of countries).
- *General science information (K1):* Range of scientific knowledge (e.g., biology, physics, engineering, mechanics, electronics).
- *Knowledge of culture (K2):* The range of knowledge about the humanities (e.g., philosophy, religion, history, literature, music, and art).

- *Mechanical knowledge (MK)*: Range of knowledge about the function, terminology, and operation of ordinary tools, machines, and equipment.
- *Knowledge of behavioral content (BC)*: Knowledge or sensitivity to nonverbal human communication/interaction systems (e.g., facial expressions and gestures).

Reading and writing (Grw): The depth and breadth of declarative and procedural knowledge and skills related to written language or literacy.

- *Verbal (print) language comprehension (V)*: The general development or understanding of printed words, sentences, and paragraphs in a native language. Most likely an *intermediate* factor between broad *Grw* and other narrow *Grw* abilities. Schneider & McGrew (2012) recommend dropping it from the CHC taxonomy.
- *Reading decoding (RD)*: The ability to identify words from text through word recognition and decoding.
- *Reading comprehension (RC)*: The ability to understand written discourse.
- *Reading speed (RS)*: The speed and fluency of reading text with full comprehension. Also listed under *Gs*.
- *Spelling ability (SG)*: The ability to spell words.
- *English usage (EU)*: Knowledge of written language conventions (e.g., capitalization, punctuation, word usage). Most likely is present in all languages.
- *Writing ability (WA)*: The ability to use written text to communicate ideas clearly.
- *Writing speed (WS)*: The speed and fluency of generating or copying words or sentences. Also listed under *Gs* and *Gps*.

Quantitative knowledge (Gq): The depth and breadth of declarative and procedural knowledge related to mathematics. The *Gq* domain is likely to contain more narrow abilities than are currently listed in the CHC model.

- *Mathematical knowledge (KM)*: The range of general knowledge about mathematics (not the performance of mathematic operations).
- *Mathematical achievement (A3)*: Measured (tested) mathematics achievement.

Visual-spatial processing (Gv): The ability to use mental imagery, store images in primary memory, or perform visual-spatial analysis or mental transformation of images in the “mind’s eye.”

- *Visualization (Vz)*: The ability to perceive complex 2-D or 3-D visual patterns and mentally simulate their transformation (e.g., rotate, change size, etc.).
- *Speeded rotation (SR)*: The ability to solve problems quickly using mental rotation of simple images. This ability is similar to visualization (*Vz*) but is distinct because it involves the *speed* at which mental rotation tasks can be completed.
- *Closure speed (CS)*: The ability to quickly identify a familiar, meaningful visual object from incomplete (e.g., vague, partially obscured, disguised, disconnected) visual stimuli without knowing in advance what the object is.
- *Flexibility of closure (CF)*: The ability to identify a visual figure or pattern embedded in a complex distracting or disguised visual pattern or array when the pattern is known in advance.
- *Visual memory (MV)*: The ability to form and remember complex visual images over short periods of time.
- *Spatial scanning (SS)*: The ability to quickly and accurately survey (visually explore) a wide or complicated spatial field or pattern and identify a particular target configuration or identify a path through the field to a target end point.
- *Serial perceptual integration (PI)*: The ability to recognize an object after only parts of it are shown in rapid succession.
- *Length estimation (LE)*: The ability to visually estimate the length of objects (without using measuring instruments).
- *Perceptual illusions (IL)*: The ability to not be fooled by visual illusions.
- *Perceptual alternations (PN)*: Consistency in the rate of alternating between different visual perceptions.
- *Imagery (IM)*: The ability to mentally form vivid images or patterns.
- *Perceptual speed (P)*: See *Gs*.

Auditory processing (Ga): The ability to perceive, discriminate, and manipulate sounds and information received through the ears. Includes the processing of auditory information in primary memory and/or the activation, restructuring, or retrieval of information from semantic-lexical memory based on phonemes.

- *Phonetic coding (PC)*: The ability to distinctly hear phonemes, blend sounds into words, and segment words into parts, sounds, or phonemes.
- *Speech sound discrimination (US)*: The ability to detect and discriminate differences in speech sounds (other than phonemes) under conditions of little or no distraction or distortion.
- *Resistance to auditory stimulus distortion (UR)*: The ability to hear words or extended speech passages correctly under conditions of distortion or background noise.
- *Memory for sound patterns (UM)*: The ability to retain (on a short-term basis) auditory codes such as tones, tonal patterns, or speech sounds.
- *Maintaining and judging rhythm (U8)*: The ability to recognize and maintain a musical beat.
- *Musical discrimination and judgment (U1 U9)*: The ability to discriminate and judge tonal patterns in music with respect to melodic, harmonic, and expressive characteristics (phrasing, tempo, harmonic complexity, intensity variations).
- *Absolute pitch (UP)*: The ability to perfectly identify the pitch of tones.
- *Sound localization (UL)*: The ability to localize heard sounds in space.

Olfactory abilities (Go): The ability to detect and process meaningful information in odors. Perceiving, discriminating and manipulating odors. The *Go* domain is likely to contain more narrow abilities than are currently listed in the CHC model.

- *Olfactory memory (OM)*: The ability to recognize previously encountered distinctive odors.

Tactile (haptic) abilities (Gh): The ability to detect and process meaningful information in haptic (touch) sensations. Perceiving, discriminating and manipulating touch stimuli. Currently there are no well-supported narrow *Gh* cognitive ability factors.

Kinesthetic abilities (Gk): The ability to detect and process meaningful information in proprioceptive sensations. Perceiving, discriminating and manipulating sensations of body movement. Currently there are no well-supported narrow *Gk* cognitive ability factors.

Psychomotor abilities (Gp): The ability to perform skilled physical body motor movements (e.g., movement of fingers, hands, legs) with precision, coordination, or strength. The *Gp* domain is likely to contain more narrow abilities than are currently listed in the CHC model.

- *Aiming (AI)*: The ability to precisely and fluently execute a sequence of eye-hand coordination movements for positioning purposes.
- *Manual dexterity (P1)*: The ability to make precisely coordinated movements of a hand or a hand and attached arm.
- *Finger dexterity (P2)*: The ability to make precisely coordinated movements of the fingers (with or without the manipulation of objects).
- *Static strength (P3)*: The ability to exert muscular force to move (push, lift, pull) a relatively heavy or immobile object.
- *Gross body equilibrium (P4)*: The ability to maintain the body in an upright position in space or to regain balance after balance has been disturbed.
- *Multilimb coordination (P6)*: The ability to make quick, specific, or discrete motor movements of the arms or legs.
- *Arm-hand steadiness (P7)*: The ability to precisely and skillfully coordinate arm-hand positioning in space.
- *Control precision (P8)*: The ability to exert precise control over muscle movements, typically in response to environmental feedback.

Note: These are abridged and adapted definitions first published in McGrew (1997).¹ They were subsequently refined by McGrew (2005, 2009), Schneider & McGrew (2012) and McGrew, LaForte & Schrank (2014). More complete definitions can be found in McGrew et al. (2014) and at: www.iqscorner.com/2014/06/the-chc-taxonomy-of-human-cognitive.html

¹ McGrew worked collaboratively with Jack B. Carroll to develop the first 1997 working CHC definitions, based on Carroll’s (1993) seminal treatise.