

2018

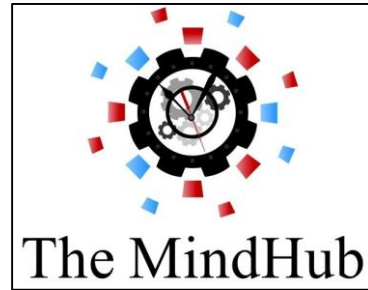
# WJ IV Norm-Based and Supplemental Clinical Test Groupings for “Intelligent” Intelligence Testing with the WJ IV

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### **Author information and conflict of interest disclosure**

Dr. Kevin S. McGrew, Ph.D., is an Educational Psychologist with expertise and interests in applied psychometrics, intelligence theories and testing, human cognition, cognitive and non-cognitive individual difference variables impacting school learning, models of personal competence, conceptualization and measurement of adaptive behavior, measurement issues surrounding the assessment of individuals with disabilities, brain rhythm and mental timing research, and improving the use and understanding of psychological measurement and statistical information by professionals and the public. Prior to establishing IAP, Dr. McGrew was a practicing school psychologist for 12 years. McGrew received his Ph.D. in Educational Psychology (Special Education) from the University of Minnesota (1989).

Dr. McGrew is currently Director of the *Institute for Applied Psychometrics* (IAP), a privately owned applied research organization established by McGrew. Dr. McGrew authored the current manuscript in his role as the Director of IAP. More complete professional information, including his professional resume and conflict of interest statement, can be found at the [MindHub™](#).



**Dr. Kevin McGrew**, coauthor of the WJ III and WJ IV is responsible for the content of this document.

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# The following WJ IV test grouping material is based on:

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- Close examination of the CFA, EFA, cluster analysis and MDS results presented in in the WJ IV technical manual
- Additional unpublished EFA, CFA, cluster analysis and MDS (2D & 3D) completed post-WJ IV publication by Dr. Kevin McGrew (across ages 6-19)
- Review of supplemental/clinical groupings for WJ, WJ-R and WJ III (e.g., McGrew, 1986; 1984)
- Unpublished “Beyond CHC” analysis of the WJ III and WJ IV norm data
- Theoretical and clinical considerations
- Suggested groupings by Dehn (2015), Miller (2014) & Proctor et al. (2015, ASB6)
- Much of this information has been presented in non-peer reviewed sources presented on-line by Dr. Kevin McGrew (see [www.themindhub.com](http://www.themindhub.com) and IQs Corner blog) or at professional conferences and workshops

## Comments on using the WJ V test grouping worksheets

[Note. The following material is drawn from McGrew's (1994) *Clinical Interpretation of the Woodcock-Johnson Tests of Cognitive Ability—Revised*. Some of the text has been revised. I have not taken time to update references as the key concepts and references cited still appear relevant today.]

*The individual tested makes an unspoken plea to the examiner not to summarize his or her intelligence in a single, cold number; the goal of profile interpretation should be to respond to the pleas by identifying hypothesized strengths and weaknesses that extend well beyond the limited information provided by the FS-IQ and that will conceivably lead to practical recommendations that help answer the referral questions* (Kaufman, 1990, p. 422)

- The purpose of the WJ IV test grouping worksheets is to facilitate a *mode of thinking* for clinical interpretation of WJ IV individual test profiles. The emphasis is on interpreting *shared abilities* measured by groups of WJ IV tests (Kamphaus, 1993; Kaufman, 1990)—not on characteristic WJ IV profiles. The search for characteristic intelligence test profiles for clinical groups has been largely unproductive (Kaufman, 1990). To date, no empirical WJ IV profile studies have been reported that could be used to guide interpretation.
- In presenting “worksheets,” there is the risk of the material being used in a mechanistic or cookbook manner. This is wrong. These materials are intended to be used in accordance with the “intelligent” intelligence testing principles, concepts, etc., outlined by Dr. Alan Kaufman, and which I have presented for the WJ and WJ-R in prior books (1986; 1994). Sequential steps and “rules, no matter what their empirical foundation, cannot replace good judgement and must not supersede clinical, neuropsychological, or psychoeducational insights” (Kaufman, 1990, p. 483). The art of clinical interpretation is a skillful process that cannot be learned by simply reading a book.

- The worksheets can be used to informally summarize relative strengths and weaknesses in tests identified by an examiner (using proper methods for identifying statistically and practically significant score differences). By inspecting the shared ability groupings, an examiner might (a) generate a possible clinical hypothesis, or, (b) notice other WJ IV tests that might be administered to further investigate and possibly confirm a particular S/W hypothesis.
  - Precise values for determining whether an individual test in an intelligence battery is significantly discrepant from the average score of all the individual tests are often suggested and provided in various tables for different tests. Although more precise, interpretive procedures that require numerous calculations and statistical manipulations can detract from competent clinical interpretation (Kamphaus, 1993). Precise tables are not provided here. I concur with Kaufman (1990) that “there is no rational defense for encouraging clinicians to use empirical rules that not only encourage additional clerical errors but that suggest a kind of psychometric precision that is just not obtainable in the clinical setting. Empirical rules and guidelines are needed to prevent interpretive chaos, but they should be simple and easily internalized (p. 428).”
- Clinicians will frequently encounter WJ IV test profiles that defy clear analysis. A clinician may need to adopt a flexible and eclectic search for a "one time only" grouping strategy specific to the individual case. The search for an individual-specific interpretation is dependent on the expertise of the clinician, particularly the clinician's ability to draw on their background knowledge, familiarity with research and theory, and clinical experience. The success of this detective process is dependent on the clinician's knowledge in the psychology of learning, cognition, intelligence, neuropsychology, learning disability research, etc. If this knowledge base is limited or has gaps, clinicians should consult other professionals who possess the necessary expertise.
- The extent to which additional supplementary assessment is pursued depends on the confidence a clinician has in the hypotheses he or she has generated. Clinicians should not be pressured into drawing premature conclusions or making important decisions and recommendations based solely on time considerations (Kamphaus, 1993). At times the best practice is to defer the presentation of hypotheses and recommendations until additional assessment is completed.

- If a clinician is unable to generate any grouping-based hypotheses, then other possibilities need to be entertained.
  1. One must consider the possibility that there is nothing unusual with an individual's abilities. Historically much of psychoeducational assessment has been a hunt for a deficit within a subject (viz., deficit or medical model) (Coles, 1978). Aside from the philosophical difficulties inherent in a deficit model, this model often flies in the face of common sense. Environmental factors, including instructional deficits in the case of learning-related referrals, may be the cause of an individual's learning problems. In such cases it would not be unusual for the WJ IV profile to reflect no major weaknesses. *Clinicians should not be driven to locate a cognitive deficit within an individual and should be willing to entertain the possibility that the individual's difficulties may lie in the environment or in non-cognitive domains (e.g., motivation, interest, social-emotional functioning).* The WJ IV test profile may reflect nothing more than normal variability.
  2. There is a possibility that an individual may have a unique pattern of cognitive strengths and weaknesses not reflected by the WJ IV tests. It is naive to assume that everything important regarding an individual's cognitive abilities are measured by the WJ IV tests. The WJ IV tests are only samples from the larger domain of human abilities. The possibility exists that an individual may possess a unique pattern of cognitive strengths and weaknesses that are not measured by the WJ IV. If a clinician considers this possibility, it either dictates the need for further assessment in other domains with other instruments or, the acknowledgment that for certain individuals one may be unable to measure this specific cognitive pattern. It may be more appropriate to forgo further assessment and initiate experimentation with different intervention methods while concurrently monitoring the subject's intervention response.
  3. If after considering the above possibilities a clinician concludes that the WJ IV tests hold the key to interpretation, then individual test interpretation might be considered. This is mentioned only as a possibility. No space is devoted to discussing individual test interpretation. This lack of discussion should not be interpreted to suggest that this level of interpretation should be ignored. Rather, it should be deemphasized (Kamphaus, 1993). Occasionally an experienced clinician, through individual test task analysis, may formulate some perceptive hypotheses. However, individual test interpretation has frequently been found to be useless and is only recommended as a last resort (Kamphaus, 1993; Kaufman, 1979; 1990).

- Hypothesis formation is the primary goal. Clinicians are discouraged from making definitive factual statements such as "this individual 'has' a weakness in...", or "this individual 'will' respond best to an approach that..." Clinicians must acknowledge that the assessment data is gathered in an artificial and isolated testing environment. Assessment data should not be accorded greater power than it deserves. Phrasing all WJ IV interpretations and subsequent recommendations in the language of hypotheses and probabilities is recommended.
- Hypothesis generation implies further verification. Hypotheses are meant to be tested to determine their validity and usefulness. Clinicians must encourage those who receive the results of their WJ IV interpretations to consider the reported strengths, weaknesses, and recommendations as possibilities needing verification in the individual's natural environment. In the context of psychoeducational assessment, this verification could take the form of supplementary assessment or the implementation of the hypotheses-based recommendations during "real world" learning concurrent with continuous monitoring and evaluation of the individuals response (e.g., diagnostic teaching; curriculum-based assessment methods).
- Individual tests in intelligence batteries represent samples from the large domain of intelligent behavior. The individual tests from the WJ IV should not be viewed as *the* list of abilities necessary for success. If an individual is weak on a specific test, this does not mean that training should be directed at remediation of the abilities tapped by the test. The goal of assessment is not to generate remedial plans for individual tests. A non-test remediation philosophy is based on a substantial body of literature that has suggested that this practice is not effective or useful (Hammill & Larsen, 1978; Ross, 1976).
- Clinicians need to recognize that the usefulness of the shared ability approach to interpreting intelligence test profiles has been seriously questioned. Research studies with most intelligence batteries have not supported the diagnostic or treatment relevance of specific test profiles (McDermott, Fantuzzo, & Glutting, 1990). However, Reynolds (1988) argues that the negative research findings are based on studies that only focused on gross group characteristics, rather than the multivariate characteristics of individuals. I agree with Kamphaus (1993, p. 165) who stated that "*clinicians need to be aware of the fact that profile analysis depends exclusively on the clinical acumen of the examiner, not on sound research.*"



- A final brief comment regarding the WJ IV test grouping worksheets. To clinicians familiar with the WJ IV and CHC theory, the test grouping worksheets should be self-explanatory. Each worksheet is followed by the same 2D MDS map that serves as a spatial representation of the degree of correlation/association between the different tests. The tests within the same broad CHC domain worksheet are designated with black dots. Clinicians are encouraged to review these visual-graphic aids to help determine the degree to which any test, or combinations of tests, are expected to “hang together” on test profiles (i.e., tests that are in proximity to one another). In a sense, clinicians can view these aids as a “quick look” at the correlation matrices between the tests as reported in the WJ IV technical manual (“be the correlation matrix ☺”). If a test is listed in a grouping, but it is very spatially discrepant from the other tests (e.g., see Rapid Picture Naming in the *Gc* Lexical knowledge (VL) / Vocabulary-Ext clinical grouping), clinicians should not be surprised if the test does not “hang together” in a profile with the other tests in the hypothesized grouping. In this example, although the Rapid Picture Naming test does require vocabulary knowledge, it is very distant from the other tests most likely because it is a speeded test (requires more *Gs*).

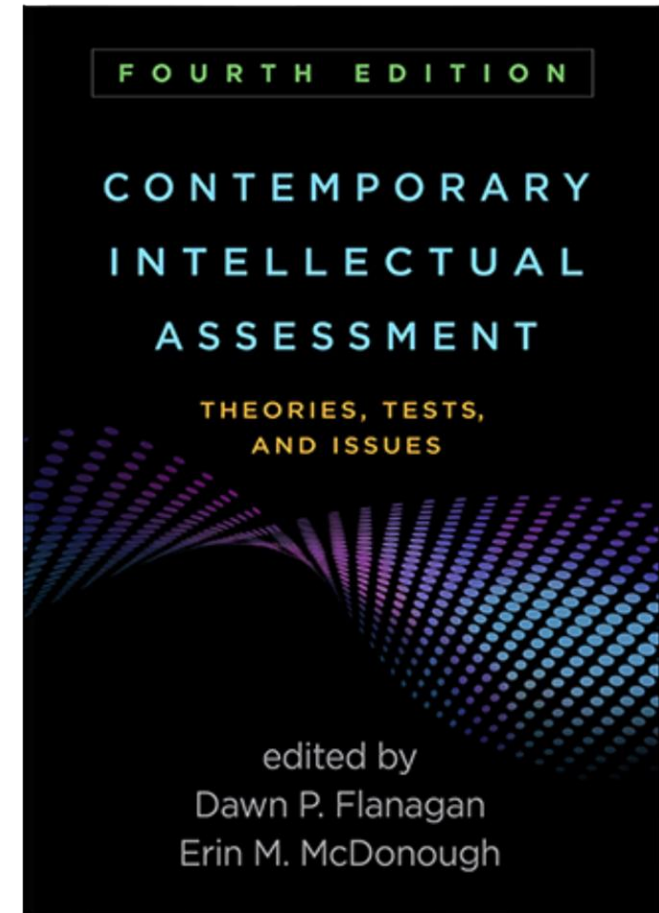
# CHC Theory Revised

For the latest revisions &  
refinements to CHC Theory see  
our chapter in:



Available Sept 2018:

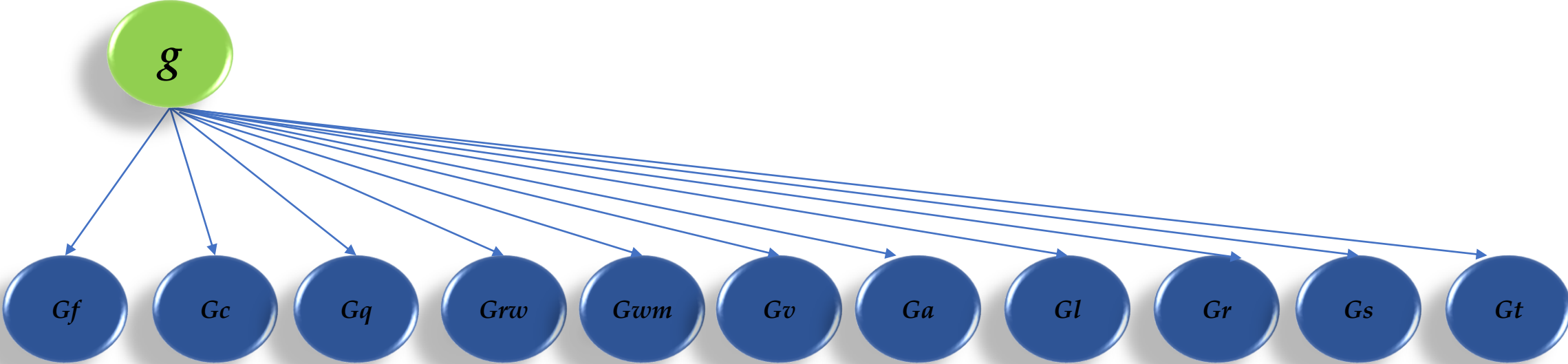
<https://www.guilford.com/books/Contemporary-Intellectual-Assessment/Flanagan-McDonough/9781462535781/summary>



The CHC figures and definitions used in this document have been extracted from this source.

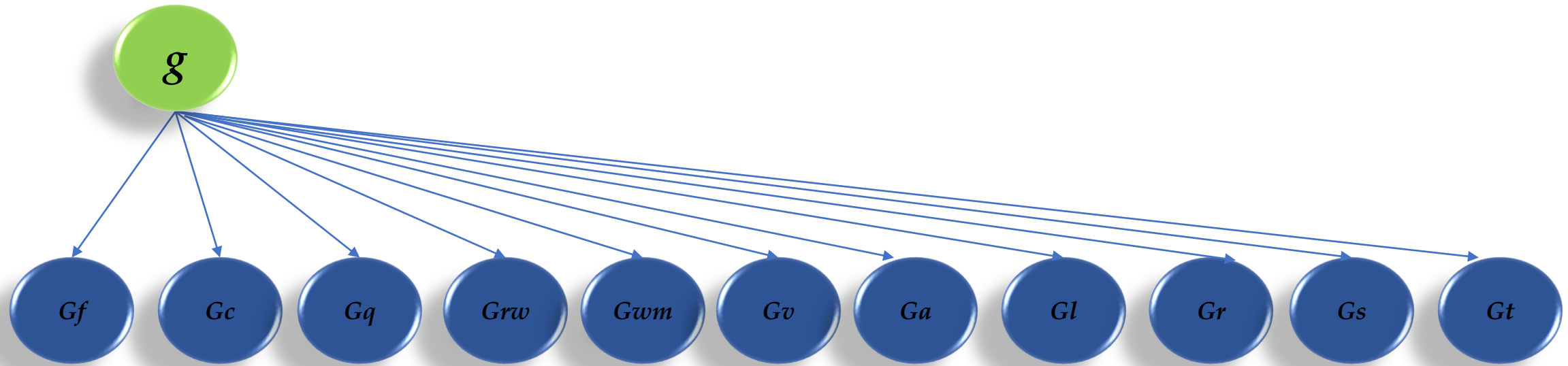
Thanks to Joel Schneider.

Cattell-Horn-Carroll Theory (CHC) of Cognitive Abilities  
(Typical **hierarchical framework** presentation; based on Schneider & McGrew, 2018)



Tentative abilities often excluded from figures





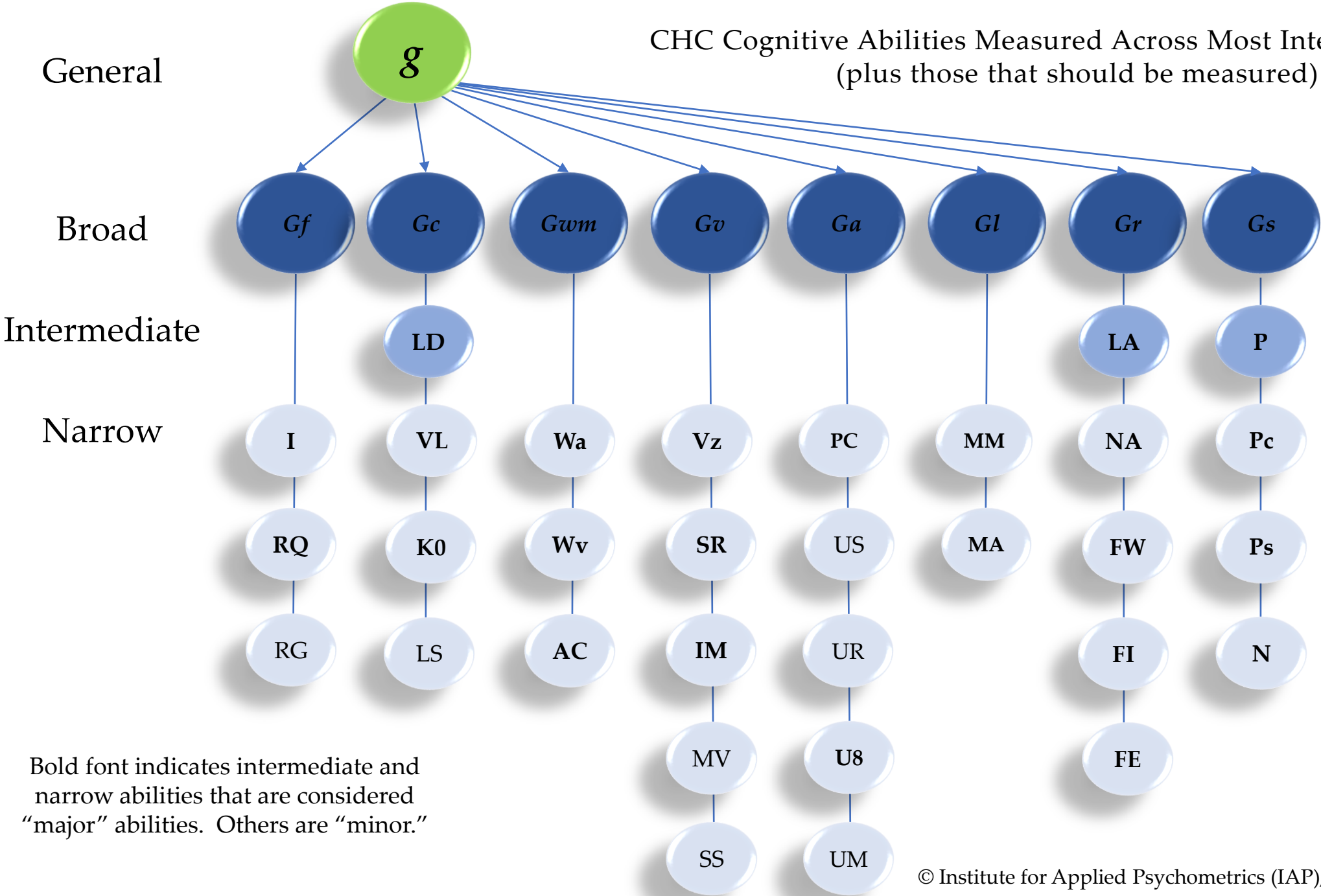
- $Gf$  = Fluid reasoning
- $Gc$  = Comprehension-knowledge
- $Gq$  = Quantitative knowledge
- $Grw$  = Reading and writing
- $Gwm$  = Working memory capacity
- $Gv$  = Visual-processing
- $Ga$  = Auditory processing
- $Gl$  = Learning Efficiency
- $Gr$  = Retrieval fluency
- $Gs$  = Processing speed
- $Gt$  = Reaction and decision speed

# Tentative broad abilities often excluded from figures



- *Gei* = Emotional intelligence
- *Gk* = Kinesthetic abilities
- *Go* = Olfactory abilities
- *Gh* = Tactile abilities
- *Gp* = Psychomotor abilities
- *Gps* = Psychomotor speed

CHC Cognitive Abilities Measured Across Most Intelligence Tests  
(plus those that should be measured)



Bold font indicates intermediate and narrow abilities that are considered "major" abilities. Others are "minor."



# Comprehension-knowledge

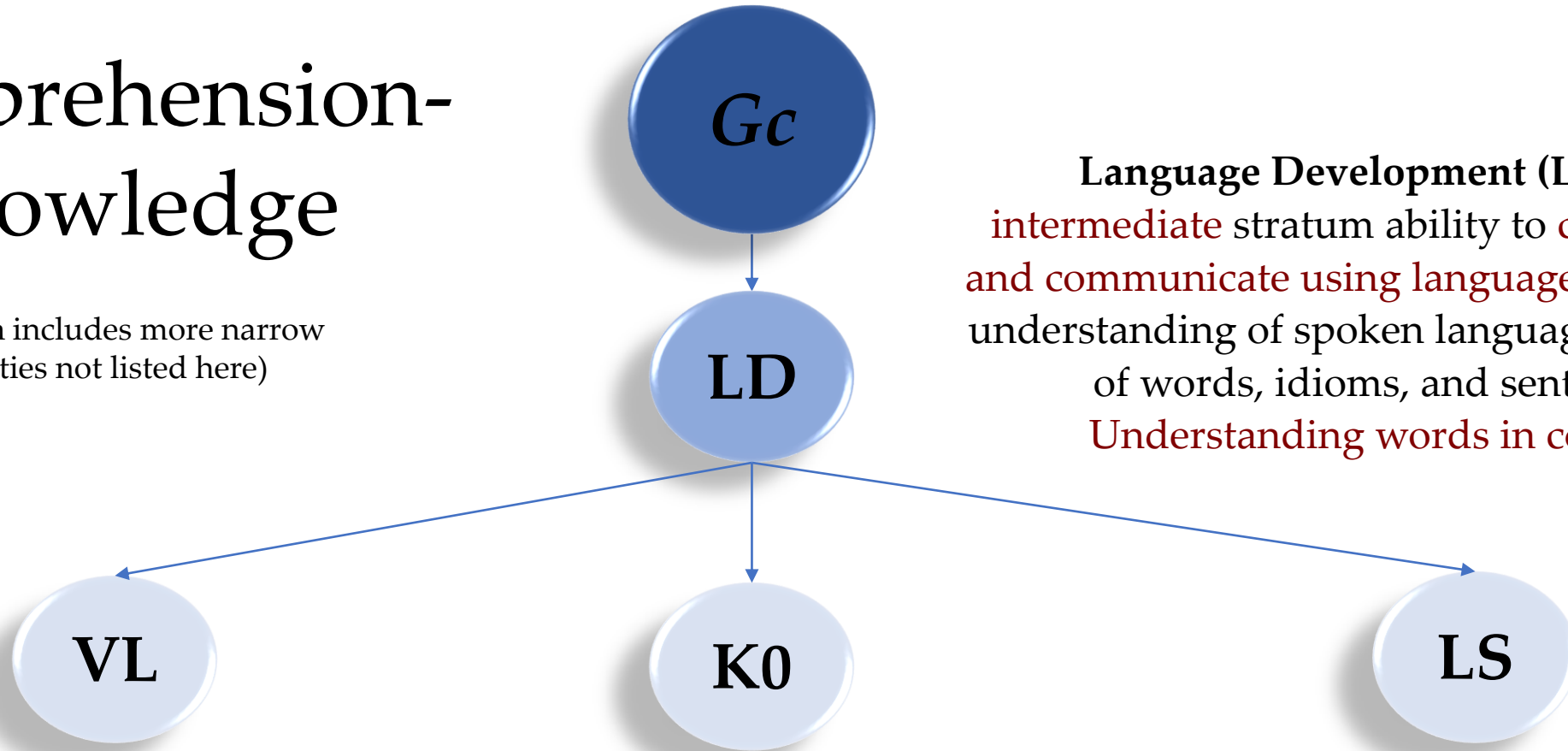
The ability to **comprehend and communicate** culturally-valued knowledge. *Gc* includes the **depth and breadth of knowledge** and skills such as language, words, and general knowledge developed through experience, learning and acculturation.

- **Acquired skills and knowledge** valued in a culture
- The degree to which a person has learned **practically useful knowledge of language, information, and concepts** specific to a culture
- Store of verbal or **language-based knowledge**



# Comprehension- knowledge

(Domain includes more narrow  
abilities not listed here)



**Language Development (LD):** An **intermediate** stratum ability to **comprehend and communicate using language**. The general understanding of spoken language at the level of words, idioms, and sentences. **Understanding words in context.**

**Lexical Knowledge (VL):** The knowledge of the **definitions of words** and the concepts that underlie. **Vocabulary knowledge.**

**General (Verbal) Information (K0):** The breadth and depth of **knowledge that one's culture deems essential**, practical, and worthwhile for everyone to know.

**Listening Ability (LS):** The ability to **understand speech**. This ability starts with comprehending single words and increases to long complex verbal statements.



	COG			OL					ACH				
	ORALVOC	GENINFO	STRYREC	PICVOC	ORALCMP	UNDDIR	RPDPCNM	SENREP	SCIENCE	SOCSTUD	HUM	RDGVOC	PSGCMP
<b>WJ IV norm-based Gc clusters</b>													
<b>Gc: Comprehension-Knowledge</b>													
<b>Gc-Ext: Comprehension-Knowledge-Ext</b>													
Lexical knowledge (VL) - Vocabulary													
Listening ability (LS) - Listening Comp													
<b>Academic Knowledge</b>													
<b>WJ IV clinical Gc groupings</b>													
Lexical knowledge (VL) / Vocabulary-Ext													
Listening ability (LS) - Extended													
General (verbal) information (K0)													
General (verbal) information (K0) - Ext													
Knowledge of culture (Gkn-K2)													
Language development (LD)													

(Note. Bold font designates official WJ IV norm-based cluster scores)

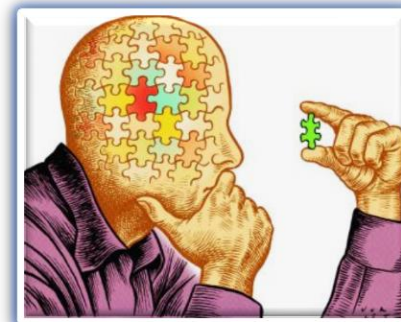




# Fluid reasoning

The use of deliberate and controlled procedures (often requiring focused attention) to **solve novel “on the spot” problems** that cannot be solved by using previously learned habits, schemas, and scripts.

- Solving unfamiliar problems (novel problem solving)
- Evident in abstract reasoning that depends less on prior learning
- **Deductive and inductive reasoning** are primary characteristics
- “Figuring things out”



**Gf**

**I**

**RG**

**RQ**

# Fluid reasoning

**Induction (I):** The ability to observe a phenomenon and **discover the underlying principles or rules** that determine its behavior. This ability is also known as rule inference.

General Sequential Reasoning (RG): The ability to reason logically using known premises and principles This ability also is known as deductive reasoning or rule application.

**Quantitative reasoning (RQ):** The ability to reason with **quantities, mathematical relations, and operators.**

(Domain includes more narrow abilities not listed here)



COG						ACH		
NUMSER	CONFRM	ANLSYN	ORALVOC	VISUAL	VISADLRG	PSGCMP	APPROB	NUMMAT

**WJ IV norm-based Gf clusters**

**Gf-Fluid Reasoning**

**Gf-Ext: Fluid Reasoning - Extended**

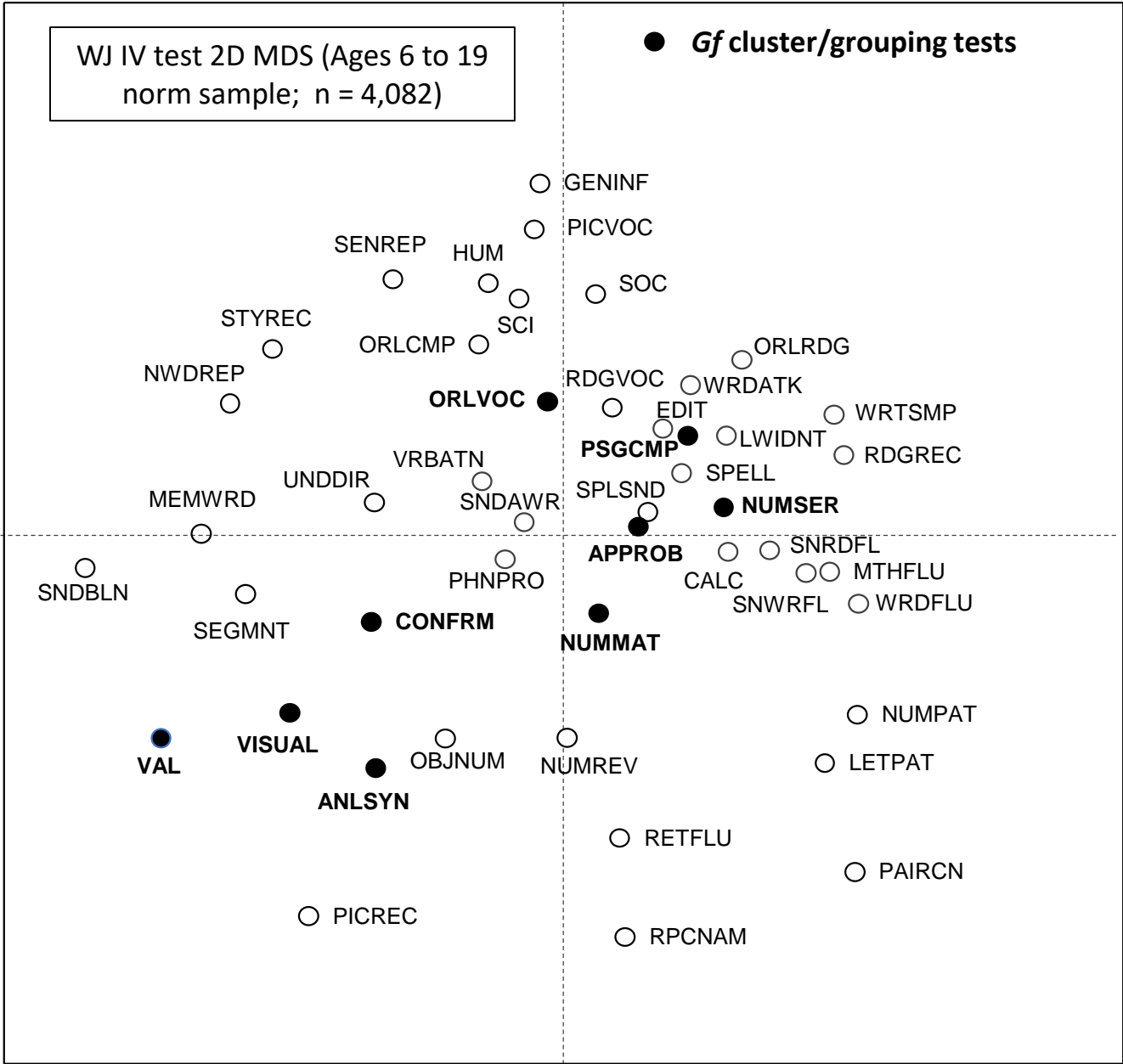
**Quantitative reasoning (RQ) - Qnt Reas**


**WJ IV clinical Gf groupings**

**Quantitative reasoning (RQ) - Ext**

**Verbal reasoning**

**Gf-Extended 4: Gf+Gv hybrid**

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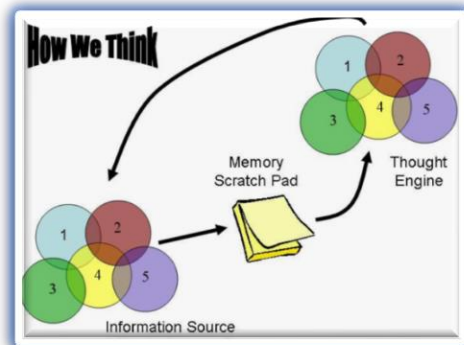


# Working memory capacity

**The ability to maintain and manipulate information in active attention. The mind's mental "scratchpad" or "workbench."**

- A limited capacity system
- Mental scratch pad or workspace
- Loses information quickly through decay of memory traces, unless individual activates other cognitive resources to maintain the information in immediate awareness

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*G<sub>wm</sub>*

W<sub>a</sub>

W<sub>v</sub>

AC

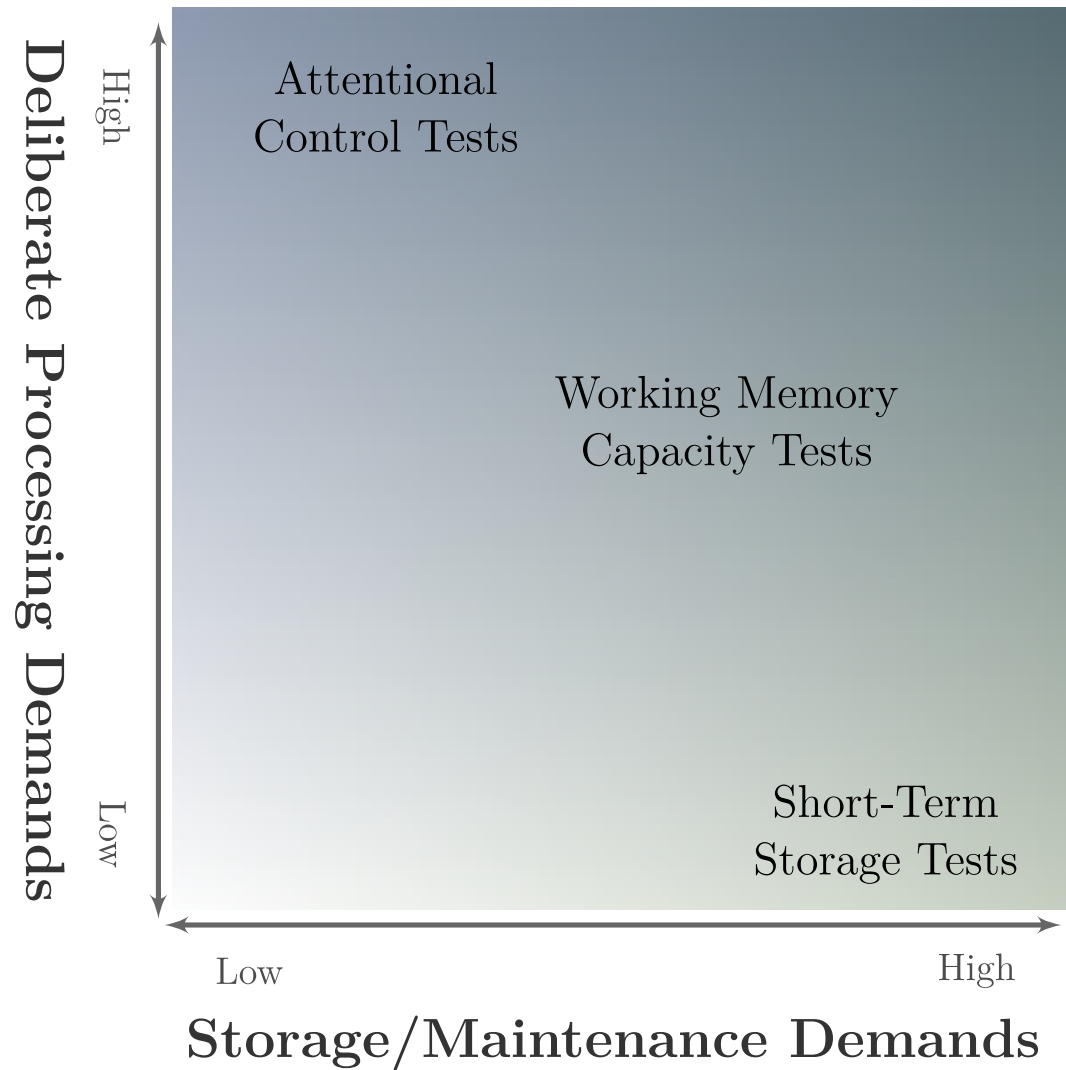
# Working memory capacity

**Auditory short-term storage (W<sub>a</sub>):** The ability to encode and **maintain verbal information in primary memory.**

**Visual-spatial short-term storage (W<sub>v</sub>):** The ability to encode and **maintain visual information in primary memory.**

**Attentional Control (AC):** The ability to manipulate the spotlight of attention flexibly to focus on task-relevant stimuli and ignore task irrelevant stimuli. Sometimes referred to as spotlight or **focal attention, focus, control of attention, executive controlled attention, or executive attention.**





# Working Memory Is a Strange Construct

In the same way that *hurdling* is the controlled alternation of running and jumping, *working memory capacity* is the controlled alternation of storage and deliberate processing.



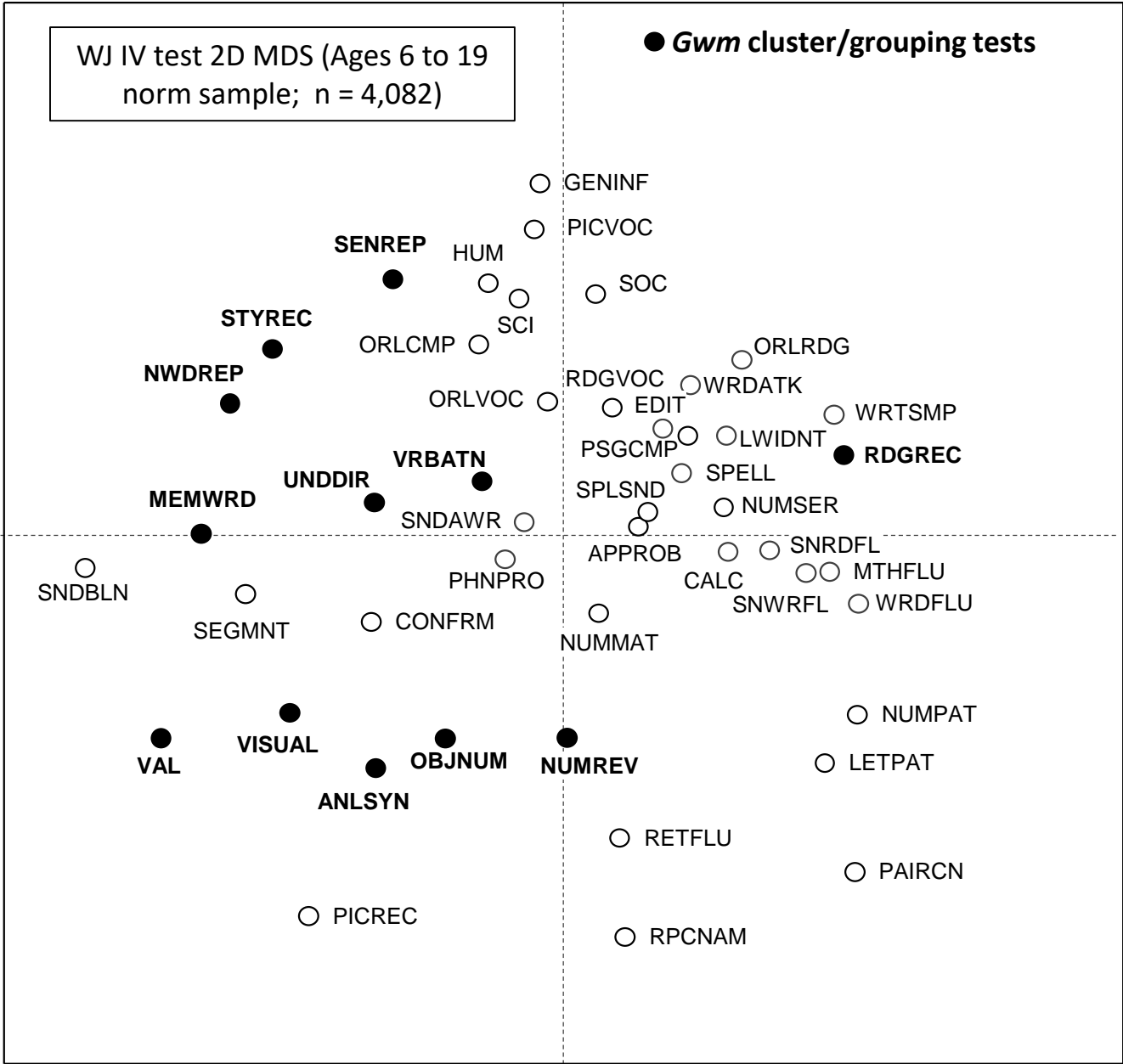
COG									OL		ACH
VERBATN	NUMREV	OBNMSQ	STRYREC	MEMWRD	NONWRRP	VISUAL	VISADLRG	ANLSYN	UNDDIR	SENREP	RDGREC

**WJ IV norm-based Gwm clusters**

<b>Gwm - Short-term Working Memory</b>											
<b>Gwm-Ext: Short-term Work Mem - Ext</b>											
<b>Aud short-term storage (Wa)-Aud Mem Span</b>											

**WJ IV clinical Gwm groupings**

<b>Attentional control (AC)</b>													
<b>Working memory capacity (Wc)</b>													
<b>Verbal/linguistic working memory</b>													
<b>Working memory-Visual-spatial strategy</b>													
<b>Visual working memory</b>													



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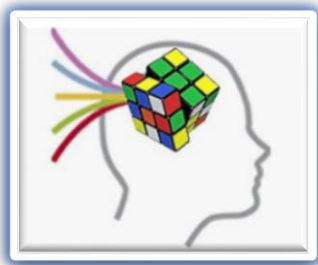


# Visual processing

The ability to make use of simulated mental imagery to solve problems. Perceiving, discriminating and manipulating images in the “mind’s eye.”

- The ability to **perceive & transform visual shapes, forms, or images**
- The ability to maintain **spatial orientation** with regard to objects that may change or move through space
- Processing visual shapes or images “**in the minds eye**”
- **Visual imagination** and ability to **visualize problems**

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**Gv**

**Vz**

**IM**

**Mv**

**SS**

# Visual processing

**Visualization (Vz):** The ability to perceive complex visual patterns and **mentally simulate** how they might look when transformed (e.g., rotated, changed in size, partially obscured, and so forth).

**Imagery (IM):** The ability to voluntarily **mentally produce very vivid images** of objects, people or events that are not actually present.

Visual memory (MV): The ability to **remember complex visual images** over short periods of time (less than 30 seconds).

Spatial scanning (SS): The ability to **quickly and accurately survey (visually explore) a wide or complicated spatial field or pattern** with multiple obstacles and identify a target configuration or identify a path through the field to a target end point.

(Domain includes more narrow abilities not listed here)

*Ga*

# Auditory processing

The ability to discriminate, remember, reason, and work creatively (on) auditory stimuli, which may consist of tones, environmental sounds, and speech units.

- Discriminating patterns in **sounds an music**
- Processing **sounds with distracting background noise**
- Analyze, manipulate, comprehend, and synthesize **sound elements**, groups of sounds, or sound patterns
- Hearing and localizing **sounds in the environment**



*Ga*

PC

US

UR

U8

UM

# Auditory processing

**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**.

**Maintaining and judging rhythm (U8):** The ability to **recognize and maintain a musical beat**.

Memory for sound patterns (UM): The ability to retain (on a short-term basis) auditory codes such as **tones, tonal patterns, or speech sounds**.



COG		
VISUAL	PICREC	VISADLRG

WJ IV norm-based Gv clusters  
**Gv-Visual Processing**

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WJ IV clinical Gv groupings  
 Visual Memory (MV)

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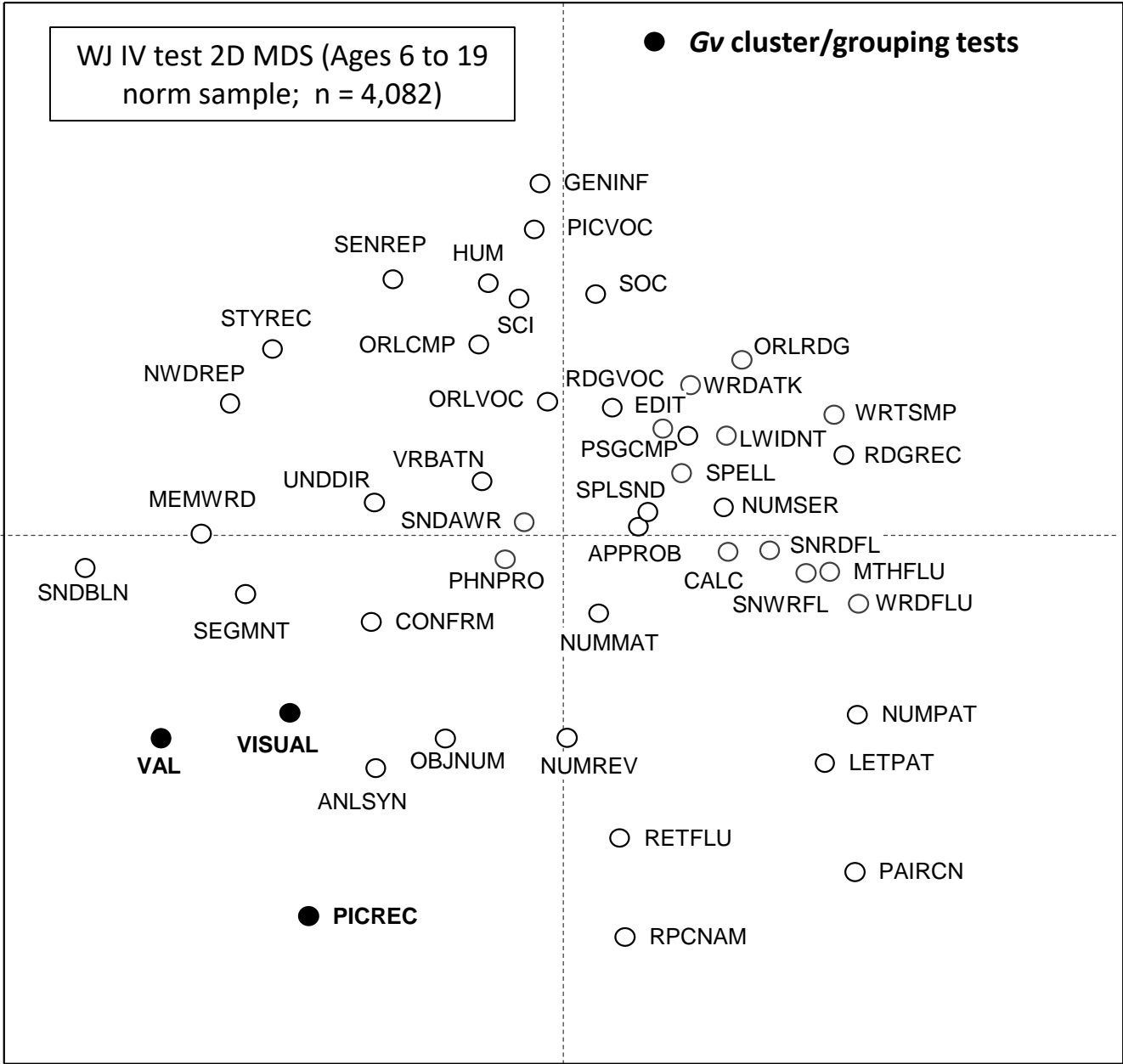


COG		OL				ACH	
PHNPROC	NONWRRP	SEGMENT	SNDBLND	SNDAWR	SENREP	WRDATK	SPLSNDS

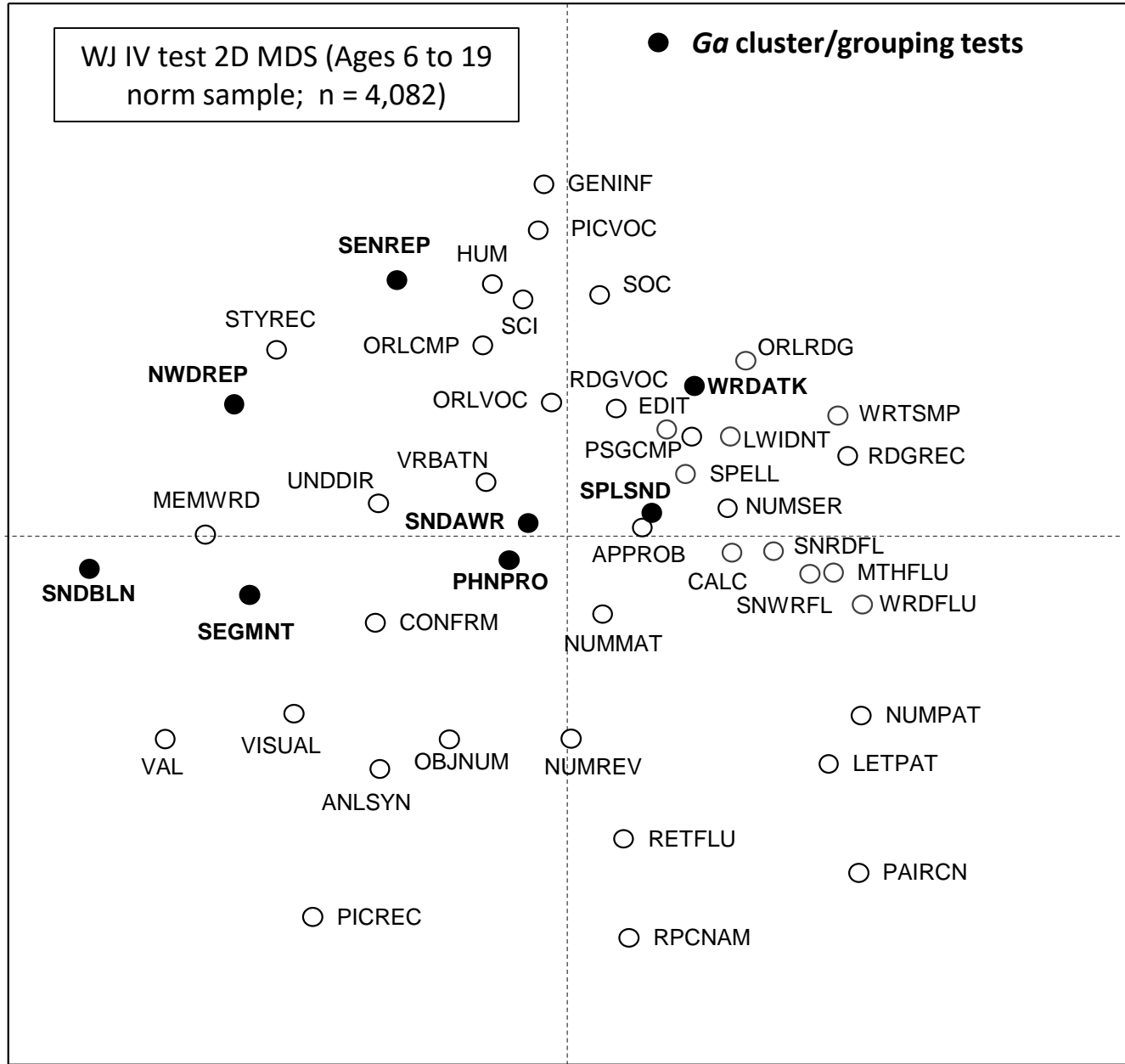
WJ IV norm-based Ga clusters  
**Ga - Auditory Processing**  
 Phonetic coding (PC) - **Phonetic Coding**


WJ IV clinical Ga groupings  
**Ga-Extended**  
**Ga/Gr- Phono-lexical knowledge & fluency**  
**Memory for sound patterns (UM)**



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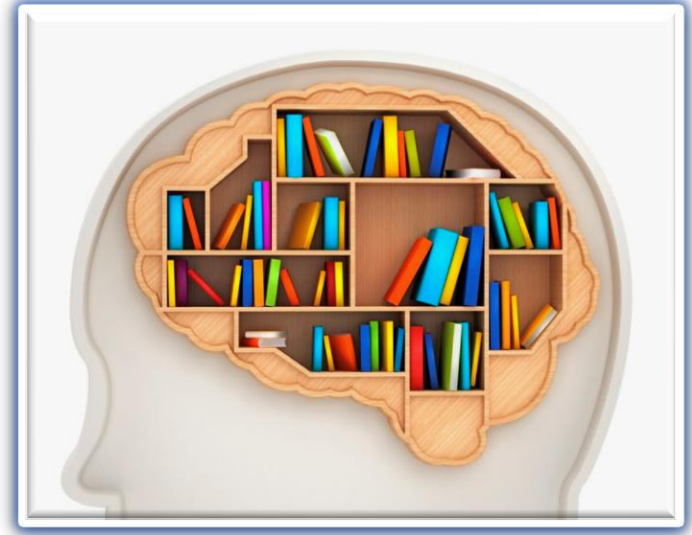
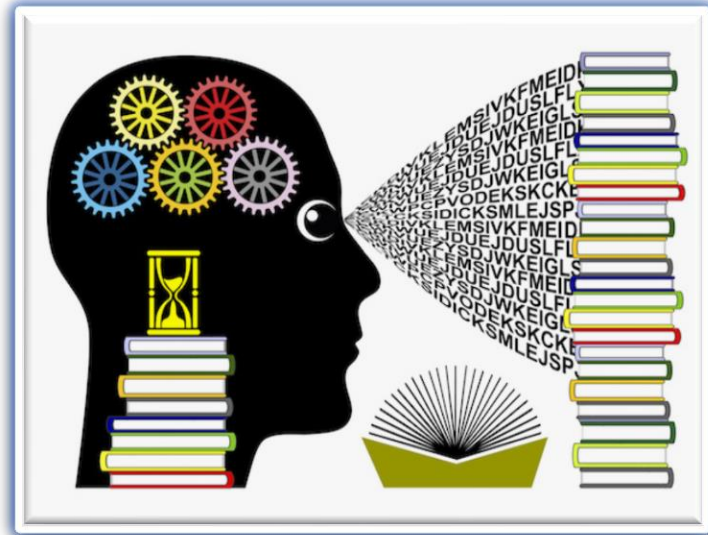
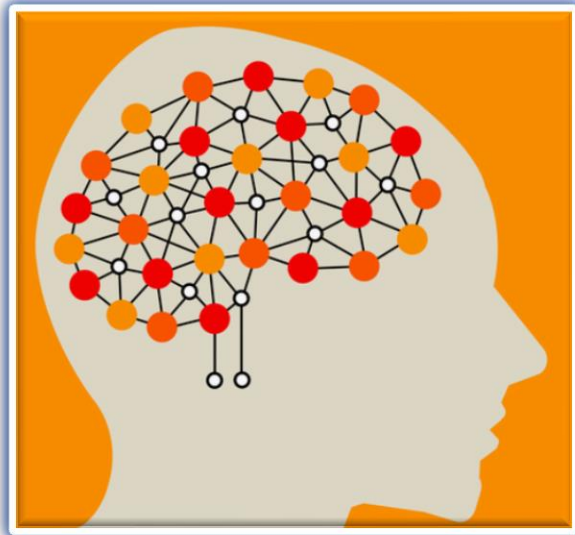


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# Learning efficiency

The ability the ability to learn, store, and consolidate new information over periods of time measured in minutes, hours, days, and years.



*Gl*

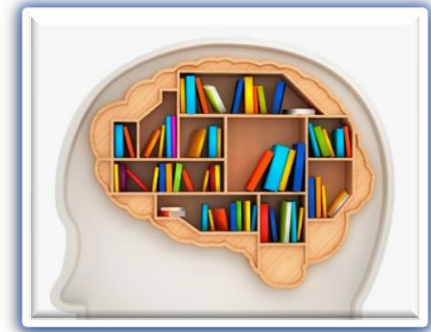
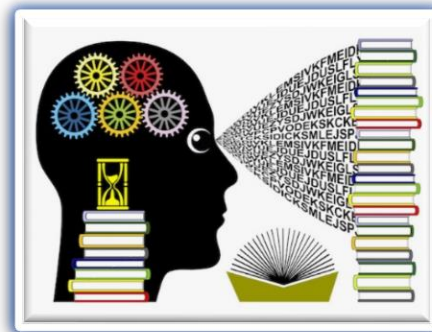
MM

MA

# Learning efficiency

**Associative memory (MA):** The ability to form a link between two previously unrelated stimuli such that the subsequent presentation of one of the stimuli serves to activate the recall of the other stimuli.

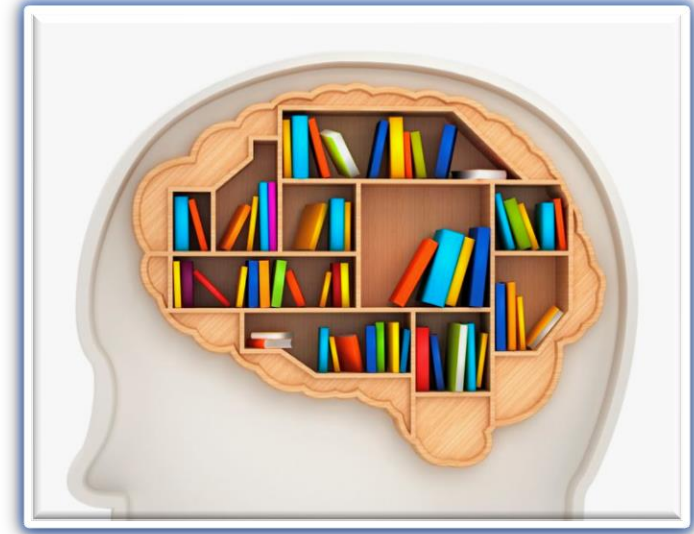
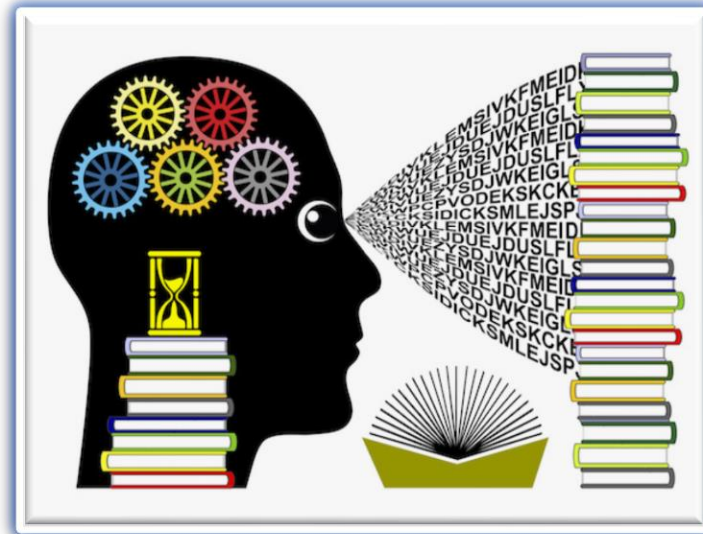
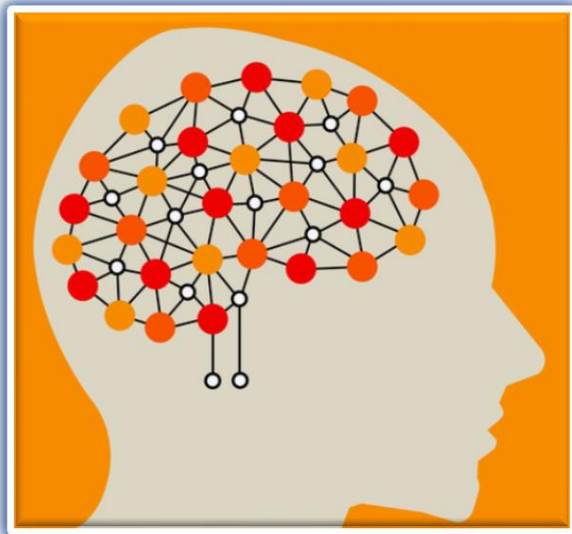
**Meaningful memory (MM):** The ability to remember narratives and other forms of semantically related information.



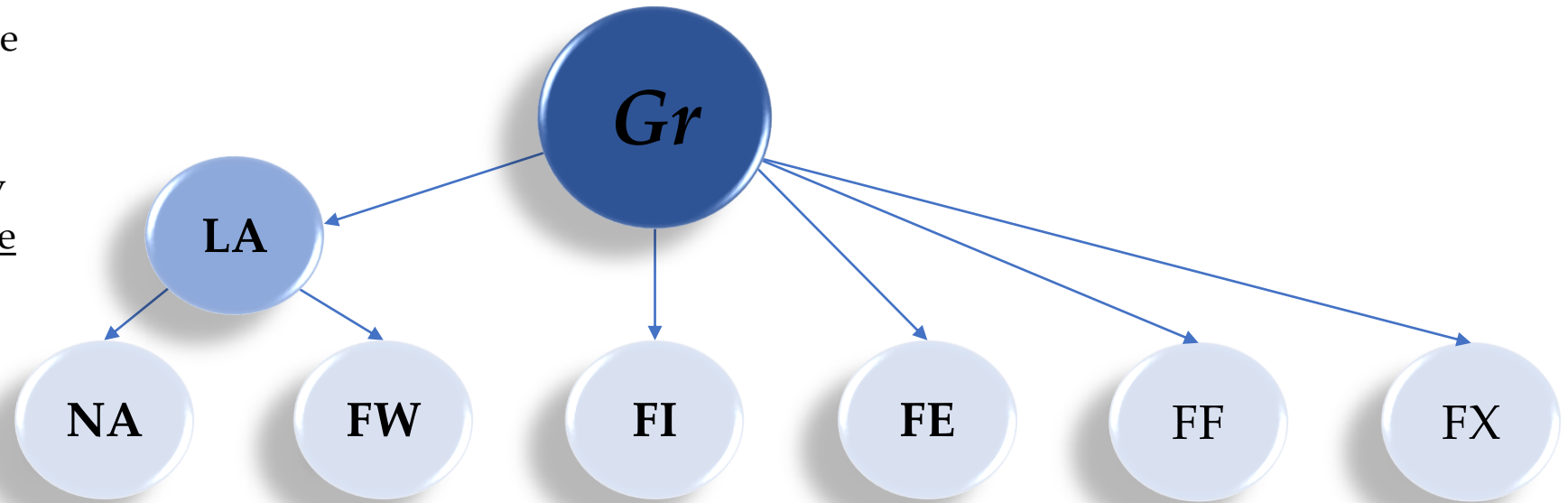
*Gr*

# Retrieval fluency

The rate and fluency at which individuals can access information stored in long-term memory.



**Speed of lexical access (LA):** The ability to rapidly retrieve words from an individual's lexicon. Verbal efficiency or automaticity of lexical access. An intermediate stratum level ability.



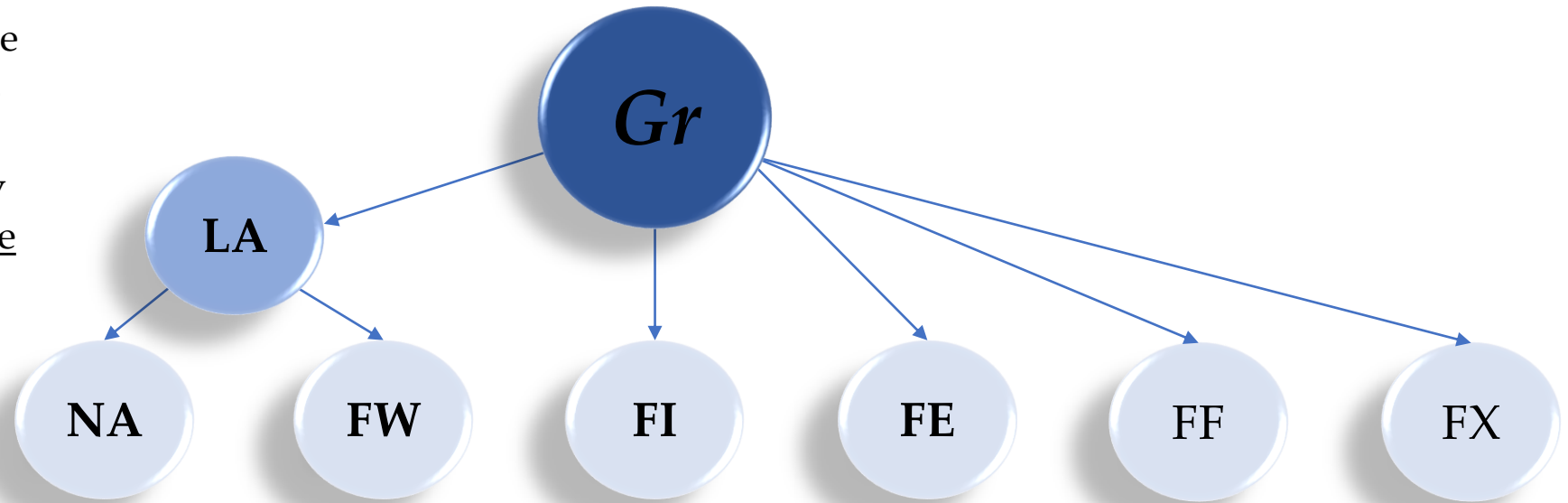
**Naming facility (NA):** The ability to **rapidly call objects by their names**.

**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 feature (e.g., fluency of retrieval of words via a meaning-based representation).

**Ideational fluency (FI):** The ability to **rapidly produce a series of ideas**, words, or phrases related to a specific condition or object.



**Speed of lexical access (LA):** The ability to rapidly retrieve words from an individual's lexicon. Verbal efficiency or automaticity of lexical access. An intermediate stratum level ability.



**Expressional fluency (FE):** The ability to **rapidly think of different ways of expressing an idea.**

Figural fluency (FF): The ability to **rapidly draw or sketch as many things** (or elaborations) as possible when presented with a nonmeaningful visual stimulus (e.g., a set of unique visual elements).

Figural flexibility (FX): The ability to **rapidly draw different solutions** to figural problems.



COG				ACH
STRYREC	VISADLRG	CONFRM	ANLSYN	RDGREC

**WJ IV norm-based G1 clusters**

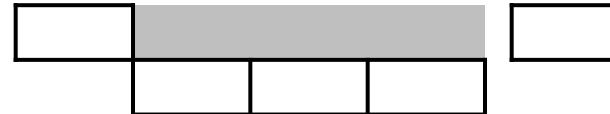
GI-Learning efficiency -Long-term Ret.



**WJ IV clinical G1 groupings**

Meaningful memory (MM)

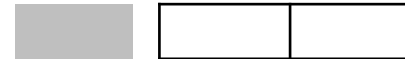
New learning efficiency



COG	OL	
PHNPROC	RPDPCNM	RETFLU

**WJ IV norm-based Gr clusters**

Spd Lex Acc (Gr-LA) - Spd Lex Acc \*

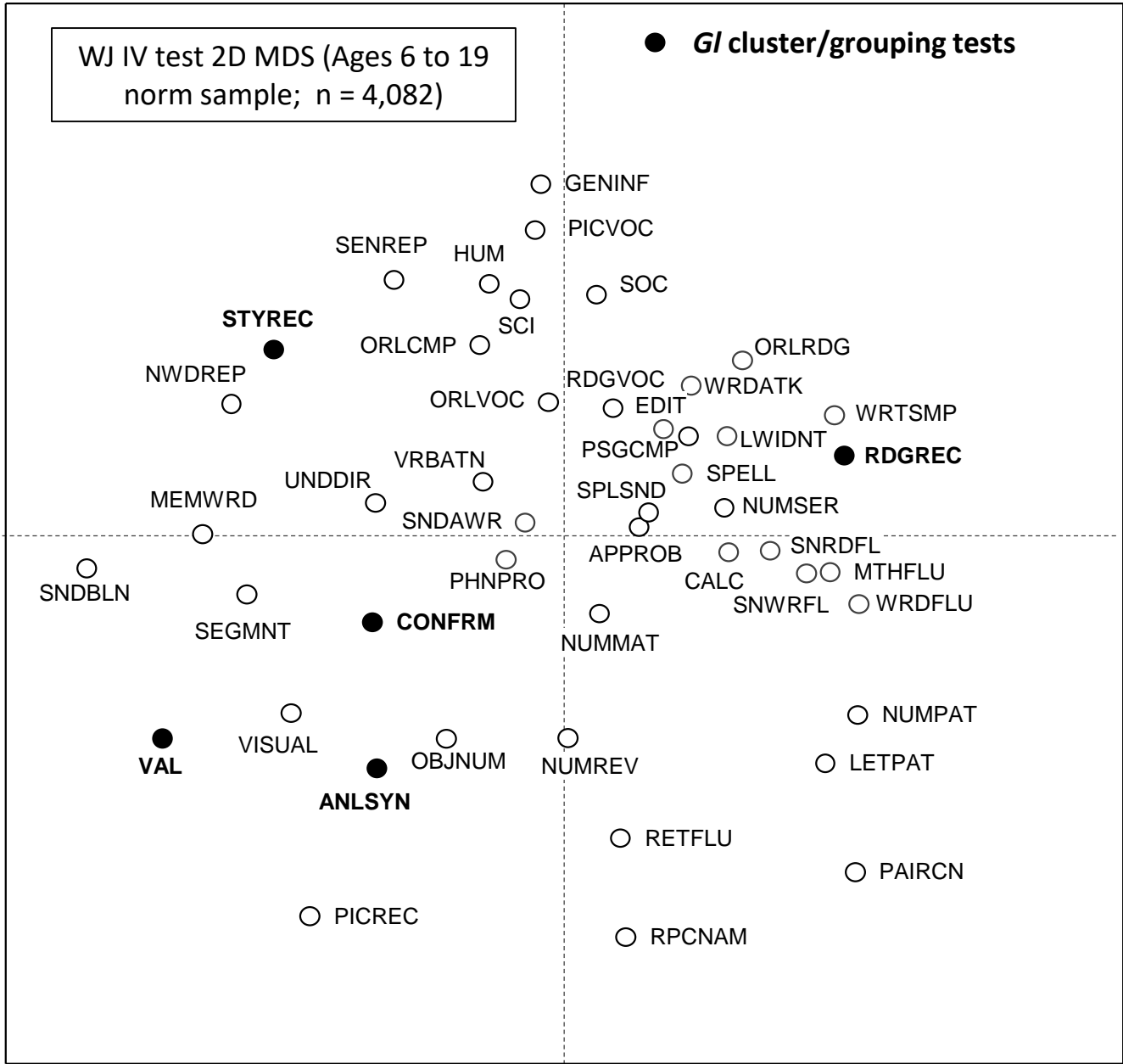


**WJ IV clinical Gr groupings**

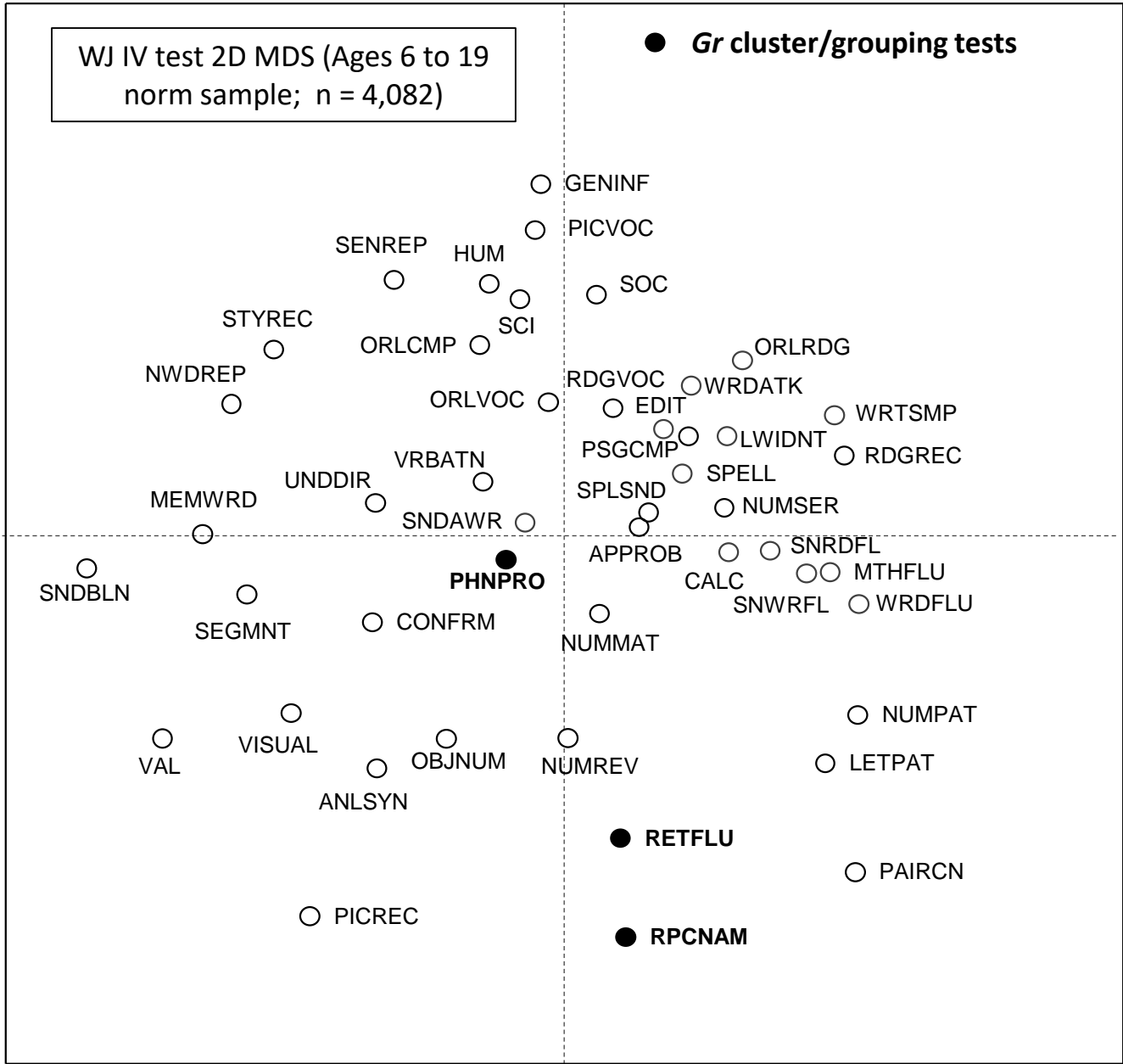
Spd Lex Acc (Gr-LA) - Ext \*







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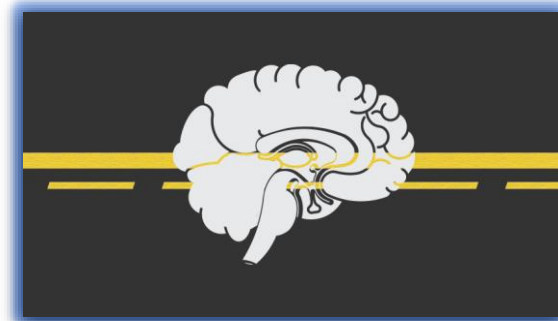
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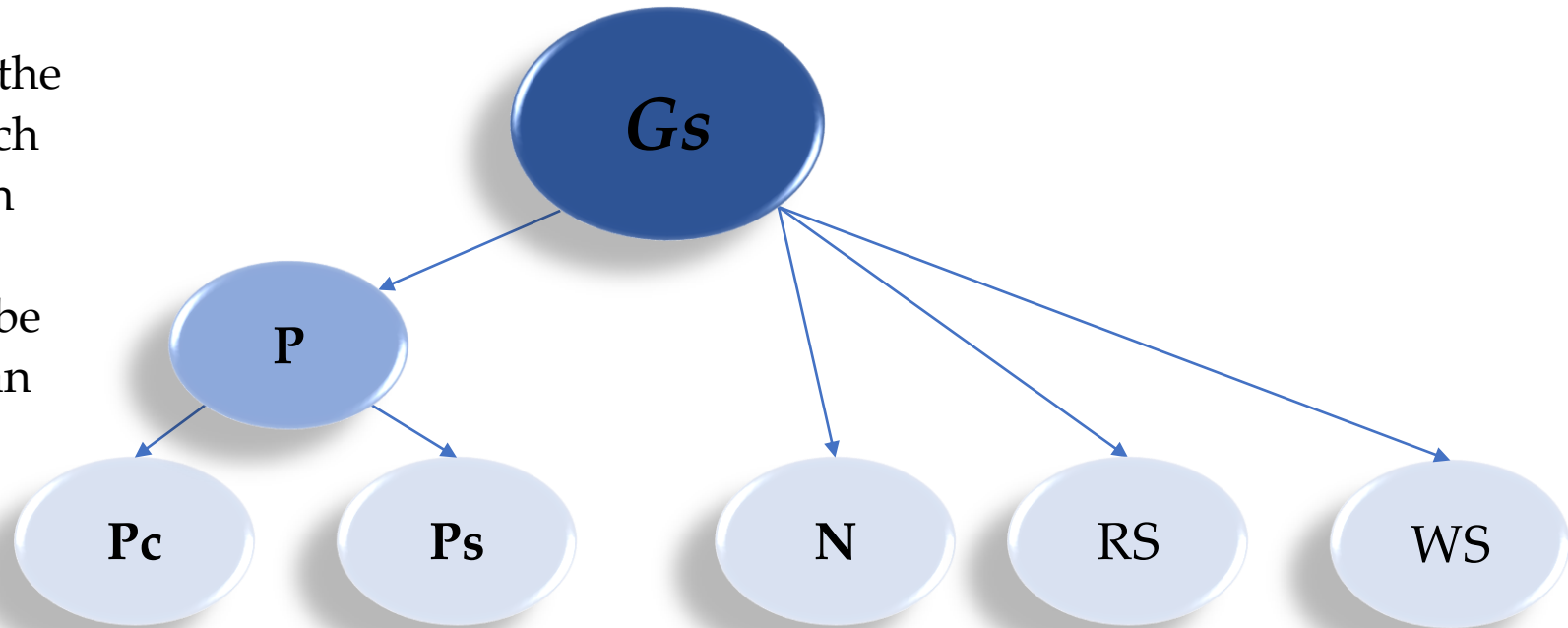
# Processing speed

**The ability to control attention to automatically, quickly and fluently perform relatively simple repetitive cognitive tasks.  
Attentional fluency or attentional speediness.**

- Mental speed
- Fluency of performing tasks
- Speed of executing relatively over-learned cognitive processes



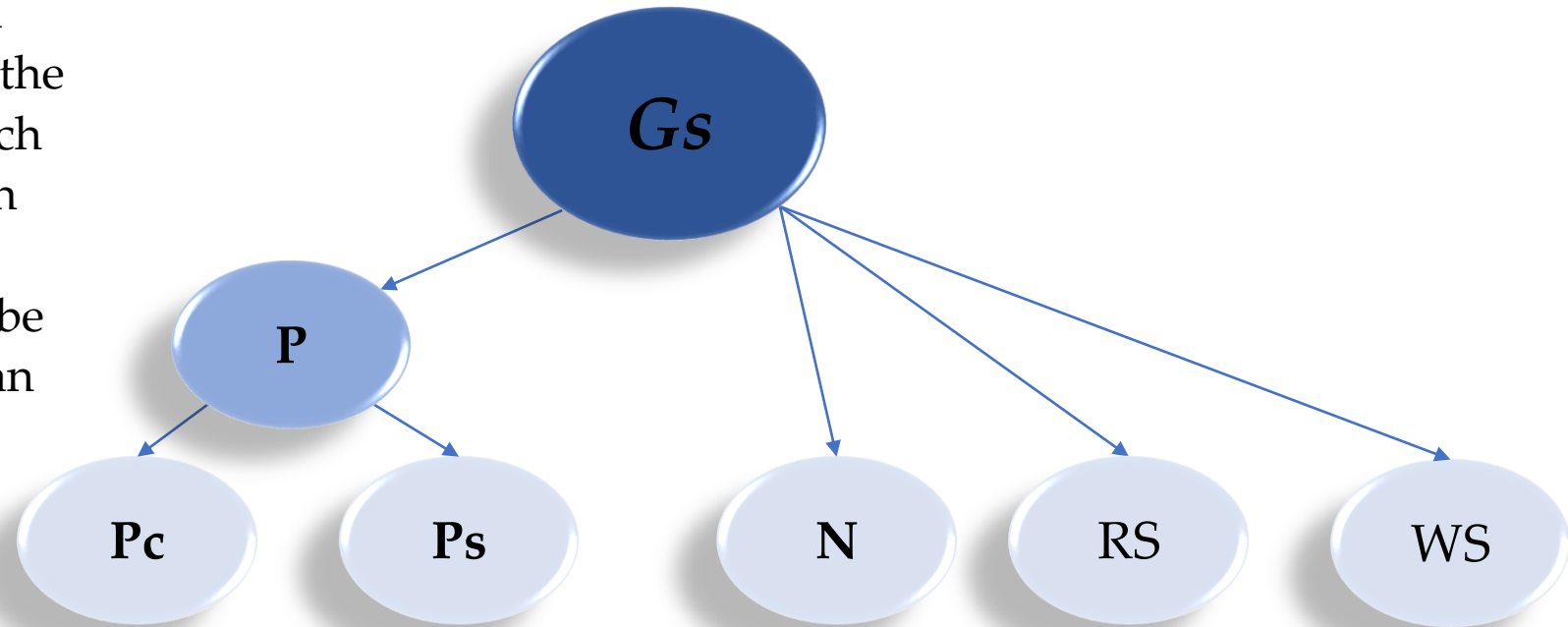
**Perceptual speed (P):** An intermediate stratum level ability that can be defined as the speed and fluency with which similarities or differences in visual stimuli (e.g., letters, numbers, patterns, etc.) can be searched and compared in an extended visual field.



**Perceptual speed-search (Ps):** The speed and fluency of **searching or scanning** an extended visual field to locate one or more simple visual patterns.

**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.

**Perceptual speed (P):** An intermediate stratum level ability that can be defined as the speed and fluency with which similarities or differences in visual stimuli (e.g., letters, numbers, patterns, etc.) can be searched and compared in an extended visual field.



**Number facility (N):** The speed, fluency and accuracy in manipulating **numbers**, comparing **number patterns**, or completing **basic arithmetic**.

Reading speed (fluency) (RS): The **speed and fluency of reading** text with full comprehension. Also listed under *Grw*.

Writing speed (fluency) (WS): The **speed and fluency of generating or copying words** or sentences. Also listed under *Grw* and *Gps*.



COG				OL		ACH							
LETPTMAT	NMPTMAT	PAIRCAN	NUMREV	RPDPCNM	RETFLU	SNRDFL	SNWRFL	WRDFLU	MTHFFLU	WRDATK	SPLSNDS	LETWDID	SPELL

**WJ IV norm-based Gs clusters**

**Gs - Cognitive Processing Speed**

Perceptual speed-search (Ps) - **Perc Spd**

Number facility (N) - **Number Facility**

**Academic Fluency**


**WJ IV clinical Gs groupings**

Gs - Cognitive Processing Speed - Ext

Number facility (N) - Num Fac - Ext

General speediness/fluency \*

Orthographic awareness (Proctor et al.)

Academic Fluency - Extended