

# WJ IV Digital Brief Cognitive Ability Assessment Demo

Katy Genseke, Psy.D.  
Head of Clinical Products  
Riverside Insights

## Goals identified in transforming the paper version of WJ IV tests into a digital format:

Accuracy

Accessibility

Portability

Efficiency

Flexibility

Engagement





## Accuracy

- Automated basal and ceiling rules
- Automated starting points
- Automated aspects of scoring
- All information and instructions accessible throughout the testing session in one place
- Remove common sources of examiner error





## Accessibility

Accessible to any examiner with an internet connection

No Specific brand or type of equipment required  
(can use any laptop and any tablet)

WCAG Compliant Design

## Portability

Easily carry equipment

Lightweight

No storage required





## Efficient

Automation and streamlining saves the examiner time

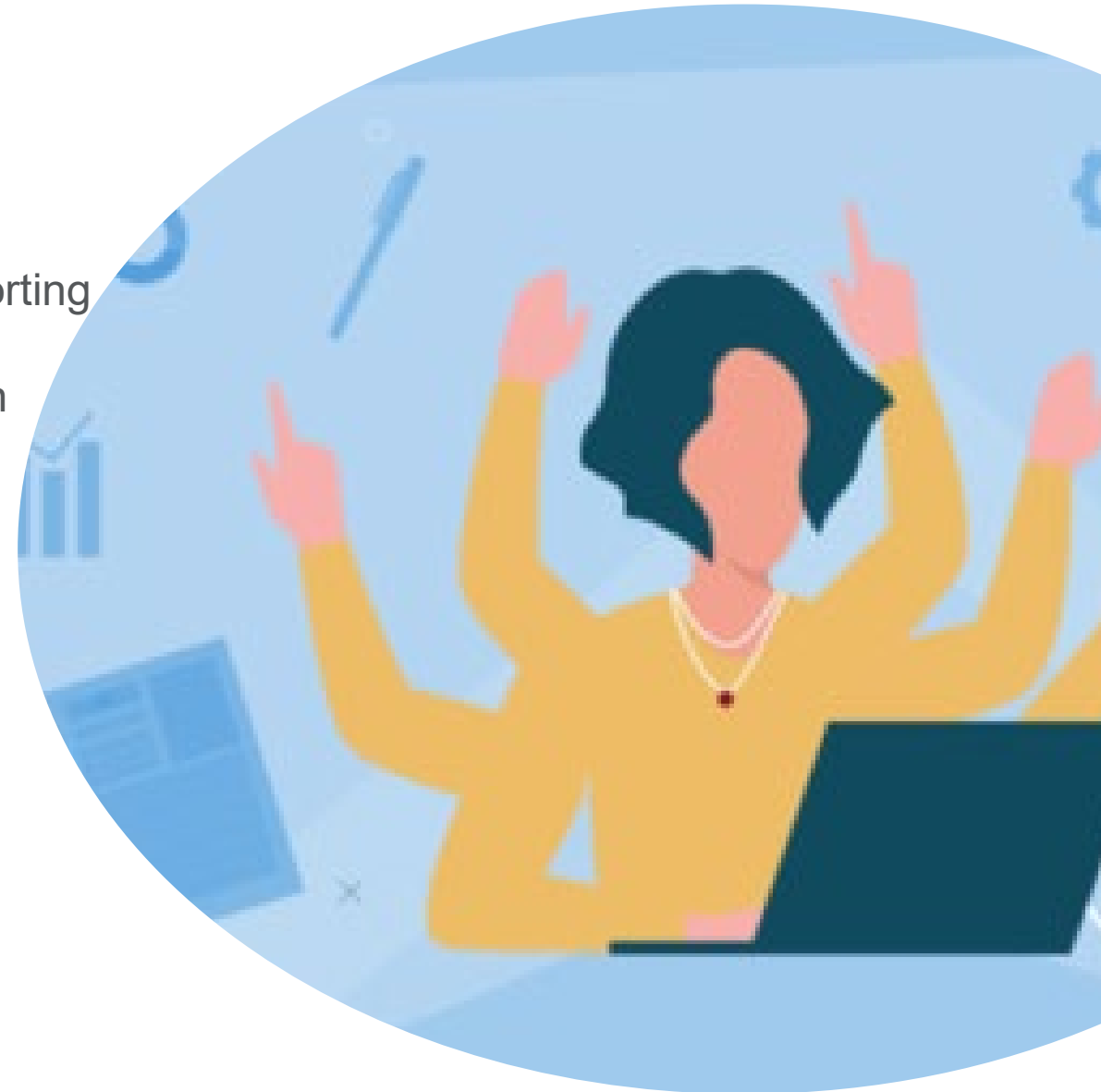
No more multi-step process to obtain scoring and reporting

Real-time data and score estimates during the session

## Flexible

Can create your own test battery (pick and choose your tests)

Allows for more personalized assessment





## Engagement

Majority of examinees prefer to work on tablets and computers than with paper

Children display continued interest when interacting with the tablet

Examiners can focus more on the examinee, as opposed to timing and directions that have become automated, helping them to better attend to the examinee's performance





# Early UI/UX Design

## Exploration of Scoring

Harry Potter | | | |

**Introduction** ✕

- Point to **near** on subject's page and say: *Another word that means near is close.*

**Sample Item A . Trial 1.**  
Point to **big** on subject's page and say: *Tell me another word for big.*

**Correct:** large, gigantic, huge

**Incorrect:** bigger, small

Other: please specify

## Exploration of Video

Harry Potter | | | |

Examines View | | |

Say: For each problem tell me the number that goes in the empty box. Some of the

1. 

1		3	4
---	--	---	---

Correct: 2  
 Incorrect  
Doesn't Know  
No Response

Score Item (x) **Total Raw Score**

1		3	4
---	--	---	---





# Evolution of the Design

## Re-organizing the instructions and scoring based on advisory panel feedback

The image displays three panels illustrating the evolution of a design for an exam interface.

**Left Panel (Harry Potter Exam Item):** Shows a sidebar with 'Video', 'Record', and 'Info' buttons. The main content area displays 'Item 6' with instructions: 'Correct: mad enraged furious infuriated irate', 'Incorrect: frustrated happy ire sad', 'Query: upset mean', and 'Other: Please specify'. A 'Next Recommended Item: 7' is shown at the bottom right.

**Middle Panel (Examinee View):** Shows the 'Examinee View' with the word 'angry' and a list of adjectives: 'Correct: mad enraged furious infuriated irate', 'Incorrect: frustrated happy ire sad', 'Query: upset mean', and 'Other: Please specify'. A 'Next Recommended Item: 7' is shown at the bottom right.

**Right Panel (Sample Item A, Trial 1):** Shows a 'Sample Item A, Trial 1' with a drawing of a square and a list of shapes for selection: A (square), B (circle), C (square), D (circle), and E (rectangle). A 'Next Recommended Item: 7' is shown at the bottom right.



# WJ IV Digital Brief Cognitive Ability Assessment

# Why the Gf-Gc Composite as Opposed to the BIA?

Specifically designed to be an estimate of intellectual ability based on the two highest-order (g-loaded or g-saturated) factors: comprehension-knowledge (Gc) and fluid reasoning (Gf).

Provides important diagnostic information in several types of cases

- Useful for identifying individuals for gifted and talented programs
- Estimate of potential in an ability-achievement discrepancy procedure to determine the presence of a learning disability
- Provides a better estimate of academic potential
- Substantiate intellectual disability

The BIA is ideal for screening or re-evaluations

- Based on equal weighting of the tests in the cluster, as opposed to differential weighting of tests.

		Cognitive Composites					
		General Intellectual Ability (GIA)	Brief Intellectual Ability	Gf-Gc Composite	Comprehension-Knowledge (Gc)	Fluid Reasoning (Gf)	Short-Term Memory
Standard Battery	COG 1	Oral Vocabulary	■	■	■	■	
	COG 2	Number Series	■	■	■		■
	COG 3	Verbal Attention	■	■			■
	COG 4	Letter-Pattern Matching	■				■
	COG 5	Phonological Processing	■				
	COG 6	Story Recall	■				
	COG 7	Visualization	■				
	COG 8	General Information			■	■	
	COG 9	Concept Formation			■		■
	COG 10	Numbers Reversed					■



# What is Comprehension-Knowledge?

Comprehension-Knowledge was originally referred to by Cattell as crystallized knowledge.

Crystallized knowledge includes the breadth and depth of a person's acquired knowledge, the ability to communicate one's knowledge (especially verbally), and the ability to reason using previously learned experiences or procedures.

Examples of the use of Crystallized Intelligence, on the other hand, include recalling historical events and dates, remembering geographical locations, building one's vocabulary, and reciting poetic texts (Horn, 1968).

This type of intelligence is linked to education, experience and cultural background and is measured by tests of general information.



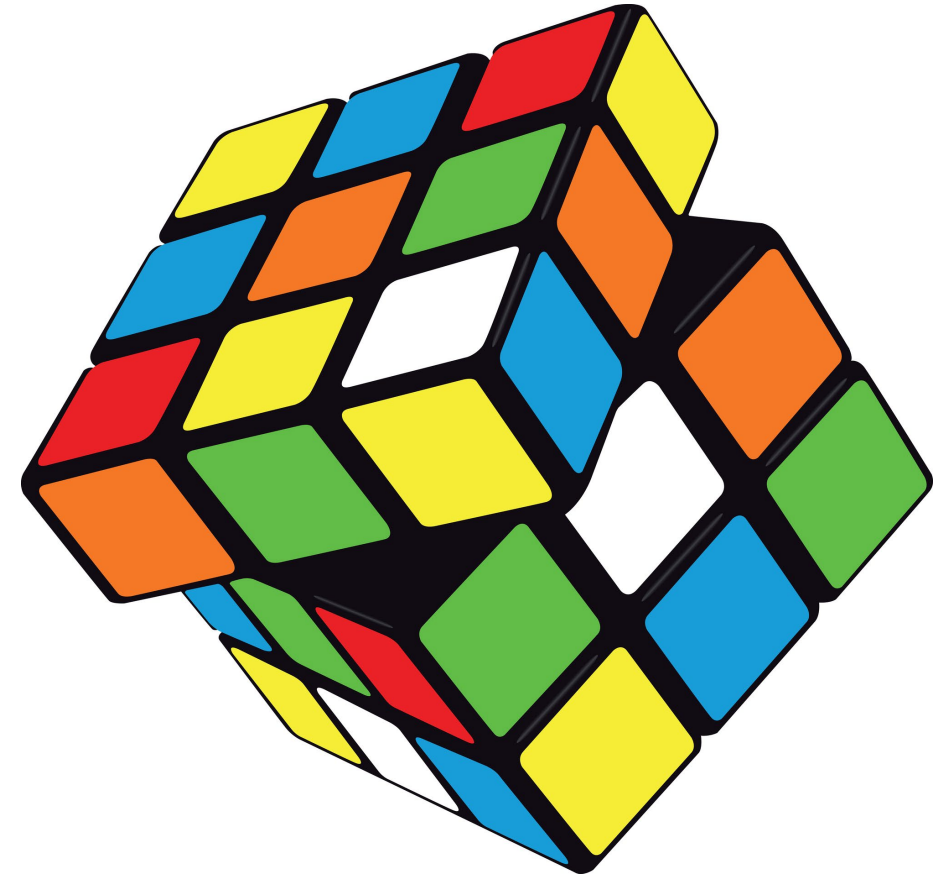


## What is Fluid Reasoning?

Fluid reasoning includes the broad ability to reason, form concepts, and solve problems using unfamiliar information or novel procedures.

Fluid reasoning allows us to perceive and draw inferences about relationships among variables, and to conceptualize abstract information, which aids problem-solving.

Examples of the use of fluid reasoning include solving puzzles, constructing strategies to deal with new problems, seeing patterns in statistical data, and engaging in speculative philosophical reasoning (Unsworth, Fukuda, Awh & Vogel, 2014).



# Tests in the WJ IV Digital Brief Cognitive Ability Assessment

## Oral Vocabulary

- Synonyms
- Antonyms

## Number Series

## General Information

- Where
- What

## Concept Formation

			Cognitive Composites					
			General Intellectual Ability (GIA)	Brief Intellectual Ability	Gf-Gc Composite	Comprehension-Knowledge (Gc)	Fluid Reasoning (Gf)	Short-Term Memory
Standard Battery	COG 1	Oral Vocabulary	■	■	■	■		
	COG 2	Number Series	■	■	■		■	
	COG 3	Verbal Attention	■	■				■
	COG 4	Letter-Pattern Matching	■					■
	COG 5	Phonological Processing	■					
	COG 6	Story Recall	■					
	COG 7	Visualization	■					
	COG 8	General Information			■	■		
	COG 9	Concept Formation			■		■	
	COG 10	Numbers Reversed						■



# Oral Vocabulary

## Oral Vocabulary-Synonyms

Synonyms measures an aspect of vocabulary knowledge. It requires the examinee to listen to a word and then provide an appropriate word with the same or similar meaning. It is a measure of acquired knowledge.

## Oral Vocabulary-Antonyms

Antonyms is a measure of vocabulary knowledge as well. It requires the examinee to listen to a word and then provide an appropriate word with the opposite meaning. It also contributes to a measure of acquired knowledge.





# Number Series

## Number Series

Number Series is a test of quantitative reasoning and inductive reasoning, which are narrow abilities of fluid reasoning. The examinee is presented with a series of numbers with one number missing in the series. The examinee must determine the missing number.







## General Information



Measures the depth of an examinee's general information and knowledge.

Consists of two tests: Where and What

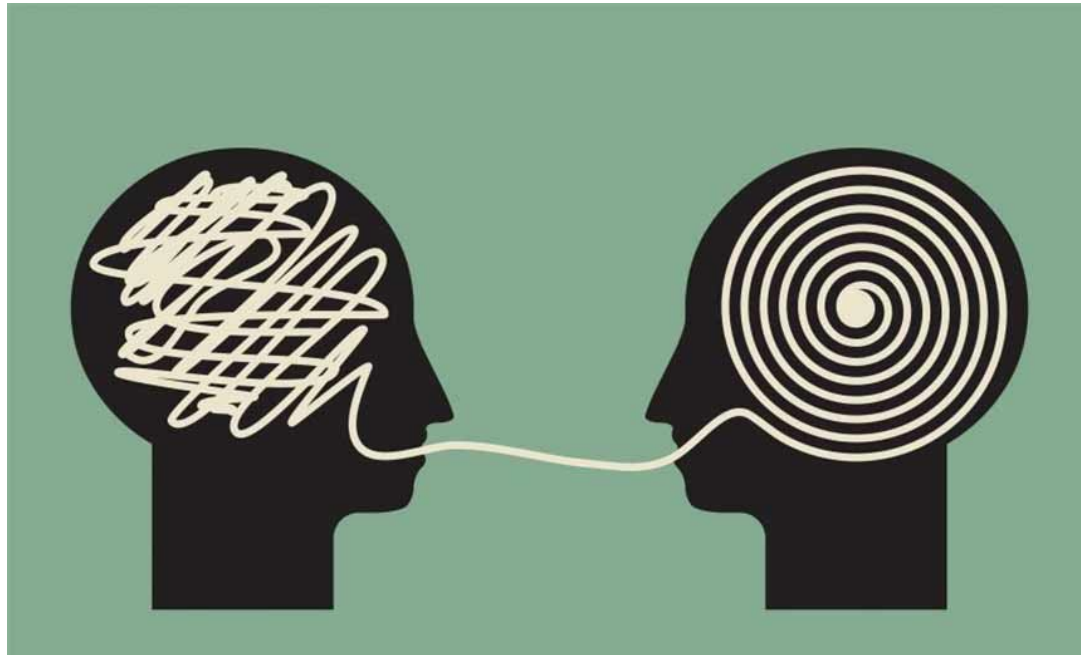
Where: Questions about “where would you find...(an object)?”

What: Questions about “what would you do with....(an object)”

Initial items involve objects that appear commonly in the environment and become increasingly difficult and more unusual



## Concept Formation



Controlled learning task that involves categorical reasoning based on principles of inductive logic

Also measures an aspect of executive processing

Mental flexibility required when a person shifts mental set.

Does not include a memory component.

Required to derive the rule for each item presented and given immediate feedback on their performance, leading to a controlled learning task.

# WJ IV Digital Brief Cognitive Ability Assessment Demo