

How to Be a Good Informed Consumer of Neuropsychological Testing: Common Tests & Best Practices

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■ Professional Background:

- Northwestern University 1993; Psychology & Philosophy
- 5 Years In-Patient Treatment Staff – Private & State Psychiatric Hospitals
- University of Oregon 2004 – Ph.D. Counseling Psychology
- Specialty Training at Portland VA :
 - Primary Care Psychology & Neuropsychology
- Postdoc: Forensic Counseling with Seattle Juvenile Detention
- Licensed Psychologist in Washington State in 2006

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Current Practice: Seattle, WA

- Specialize in Assessment Psychology, PTSD & Emotional Disorders, & Rehabilitation from TBI
- Current Counseling: Veterans, industrial workers, MVA and victims of violent crime
- Lifespan Neuropsychological Assessment:
 - Adolescent,
 - Adult, &
 - Geriatric Populations

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Goals:

- Provide Overview of basic model of human cognition
- Common neuropsychological assessment tools
 - Wechsler Adult Intelligence Scale-IV, (WAIS-IV)
 - Wechsler Memory Scale-IV, (WMS-IV) &
 - Wechsler Advanced Clinical Solutions (ACS)
- Measurement of Performance (cognitive) and Symptom (Psychiatric & Health) validity.

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Human Thought...

- Thought is NOT a “lightbulb”
- No Switch – On or Off, levels of metabolic demand
- A PROCESS
 - Chemical Electrical
 - 2% of our Mass vs. 25% of our Metabolism
 - Fully active and perceptive 1 moment in 10
 - Behavior mostly subconscious, driven by Habit and Conditioning
 - Conscious thought is
RARE & Metabolically EXPENSIVE...

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Links in the Cognitive Chain...

- Attention – Management of 5 senses
- Concentration – size of “Work Table”
- Memory - Storage
- Verbal and Motor Output –
 - Mechanical function & communication
- Speed of Information Processing –
 - How fast? Intra-cerebral communication

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Intelligence

"The global capacity of a person to act purposefully, to think rationally, and to deal effectively with his/her environment."

Wechsler, David (1939). *The measurement of adult intelligence*. Baltimore: Williams & Wilkins, p. 229.

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WAIS: A Historical Perspective

- Wechsler-Bellevue 1939
- Wechsler-Bellevue II 1946 – govt. funded
- WAIS 1955
- WAIS-R 1981
- WAIS-III 1997
- WAIS-IV 2008

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Current Wechsler Intelligence, Memory IV & Advanced Clinical Solutions Tools:

- WAIS-IV, WMS-IV, and ACS were developed to be used together.
- Decisions made in the development of one instrument affected the development of other components.
- Allows comparisons of Intelligence, Memory, *Motivation* and *Social Function*

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WAIS-IV and WMS-IV used for

- School based evaluations
- Disability evaluations
- Psychiatric evaluations
- Neuropsychological evaluations
- Forensic evaluations
- Medical/legal evaluations
- Competency evaluations
- Vocational Rehabilitation evaluations

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Wechsler Version IV 2008 Updates:

- Normative Data
- Expand FSIQ Range
- Improve Floors and Ceilings
- Maintain or improve subtest and composite reliability
- Improved evidence of validity

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WAIS-IV Normative Sample

- Ages 16-90
- Normative sample: N = 2200
 - 200 examinees per age band for ages 16-69
 - 100 examinees per age band for ages 70-90
- National sample stratified by:
 - Sex
 - Education Level
 - Ethnicity
 - Region

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WAIS-IV Clinical Studies

- Intellectual Disability: Mild Severity
- Intellectual Disability: Moderate Severity
- Borderline Intellectual Functioning
- Gifted Intellectual Functioning
 - Autistic Disorder
 - Asperger's Disorder
- Learning Disability: Reading
- Learning Disability: Math
 - ADHD
 - TBI
- Mild Cognitive Impairment
- Dementia of the Alzheimer's Type
 - Depression

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Test Structure for WAIS-IV FSIQ: Big 4

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graph TD; A[FULL Scale IQ] --> B[Verbal Comprehension]; A --> C[Perceptual Reasoning]; A --> D[Working Memory]; A --> E[Processing Speed];
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Test Structure for FSIQ: Big 4

<ul style="list-style-type: none">■ Verbal Comprehension<ul style="list-style-type: none">■ Similarities■ Vocabulary■ Information■ Working Memory<ul style="list-style-type: none">■ Digit Span■ Arithmetic	<ul style="list-style-type: none">■ Perceptual Reasoning<ul style="list-style-type: none">■ Block Design■ Matrix Reasoning■ Visual Puzzles■ Processing Speed<ul style="list-style-type: none">■ Symbol Search■ Coding
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Verbal Comprehension

- Measures
 - application of verbal skills and information to the solution of new problems
 - ability to process verbal information
 - ability to think with words
 - crystallized knowledge
 - cognitive flexibility (including the ability to shift mental operations)
 - ability to self-monitor.
- Oral input (questions) Receptive Language
- Oral output (answers) Expressive Language

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Perceptual Reasoning

- Measures
 - Ability to think in terms of visual images and manipulate them with fluency
 - Cognitive flexibility (including the ability to shift mental operations)
 - Relative cognitive speed, ability to interpret or organize visually perceived material within a time limit
 - Ability to form abstract concepts and relationships without the use of words
 - Fluid reasoning,
 - Self-Monitoring

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Working Memory

- Measures
 - working memory / concentration / short-term memory
 - Ability to select, sustain & switch attention,
 - Numerical ability
 - Encoding ability,
 - Auditory processing skills
 - Cognitive flexibility (including the ability to shift mental operations),
 - Ability to self-monitor.
- Both verbal and nonverbal factors play a role in solving Working Memory tasks.

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Processing Speed

- Measures
 - Rate of test taking and motor production
 - Perceptual discrimination
 - Speed of mental operation, ie,
 - INTERGRATION:
 - attention
 - Concentration
 - short-term visual memory
 - visual-motor coordination,
 - numerical ability,
 - cognitive flexibility (including the ability to shift mental operations)

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Tasks of the Verbal Comprehension Index

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Similarities

- Verbal concept formation and reasoning
 - Crystallized intelligence
 - Abstract reasoning
 - Auditory comprehension
 - Memory
 - Associative and categorical thinking
 - Distinction between nonessential and essential features
 - Verbal
- Degree of abstraction is an critical in score determinant

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Vocabulary

- Word knowledge and retrieval
 - It also measures an examinee's
 - crystallized intelligence,
 - fund of knowledge,
 - Learning ability, long-term memory, and the degree of language development.
 - Other abilities that may be used
 - auditory comprehension and verbal expression

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Information

- Measures ability to acquire, retain, and retrieve general factual knowledge.
 - Also involves
 - crystallized intelligence and
 - long-term memory.
 - Other skills that may be used include
 - verbal receptive ability,
 - verbal comprehension and retrieval
 - verbal expression

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TASKS OF THE PERCEPTUAL REASONING INDEX

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Block Design

- Measures the ability to analyze and synthesize abstract visual stimuli.
 - It also involves
 - nonverbal concept formation and reasoning,
 - broad visual intelligence,
 - fluid intelligence,
 - visual perception and organization,
 - simultaneous processing,
 - visual-motor coordination,
 - learning, and
 - the ability to separate figure-ground in visual stimuli

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Matrix Reasoning

- Involves
 - fluid intelligence,
 - broad visual intelligence,
 - classification and spatial ability,
 - knowledge of part-whole relationships,
 - simultaneous processing, and
 - perceptual organization

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Visual Puzzles -- New

- Visual Puzzles—examinee views a completed puzzle, and selects the 3 pieces from an array to make that puzzle
- Designed to measure
 - nonverbal reasoning
 - ability to analyze and synthesize abstract visual stimuli.
- Similar measures involve
 - visual perception,
 - broad visual intelligence,
 - fluid intelligence,
 - simultaneous processing,
 - Spatial visualization and manipulation, and the ability to anticipate relationships among parts

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TASKS OF THE WORKING MEMORY INDEX

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Digit Span – New and Improved

- Key changes
 - Added sequencing task
 - Eliminated phonetically similar intra-trial numbers
 - All three tasks contribute to Digit Span subtest score
- Why Add DS Sequencing?
 - •Sequencing increases load of working memory for the DS subtest
 - •All three still administered:
 - –Forward provides floor for low ability examinees
 - –Forward also seems to be a warm-up precursor task for Backward DS
 - –Sequencing increases load of working memory and added to ceiling

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Digit Span Forward

- Involves rote learning and memory, attention, encoding, and auditory processing.

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Digit Span Backward

- Involves working memory, transformation of information, mental manipulation, and viso-spatial-imaging

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Digit Span Sequencing

- Is similar to other tasks that are designed to measure working memory and mental manipulation

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Arithmetic

- Measures
 - mental manipulation
 - concentration,
 - attention,
 - short-and long-term memory,
 - numerical reasoning ability, and
 - mental alertness
- May also involve
 - sequential processing
 - fluid, quantitative, and logical reasoning
 - quantitative knowledge
- Omitted references to English measurement system and currency
- Decreased emphasis on mathematical skills to increase emphasis on working memory

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TASKS OF THE PROCESSING SPEED INDEX

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Symbol Search

- Test of Visual Search and Identification
- One of most important uses for this subtest is score comparison with *Coding*
- Allows pulling out fine motor (grapho-motor) speed from mental processing speed.

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Coding

- Measure the capacity and speed of:
 - Short-term visual memory
 - grapho-motor-processing
 - Sustained attention to task
 - Time on task
 - Self-monitoring

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Interpreting the WAIS-IV

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A Game of Comparison...
HUMAN COGNITION:
Verbal Ability vs.
Visual Comprehension vs.
Concentration vs.
Speed....

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An Effort to Measure Intelligence

"The global capacity of a person to act purposefully, to think rationally, and to deal effectively with his/her environment."

Wechsler, David (1939). *The measurement of adult intelligence*. Baltimore: Williams & Wilkins, p. 229.

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First, look at the Full Scale IQ & the 4 Index Scales:

- Gives the Biggest Picture: Full Scale IQ
 - Human cognitive function reduced to a single number??
 - Simple can be Misleading...
- Index Scores give more detail:
 - Verbal– 3 subtests
 - Visual – 3 subtests
 - Working Memory – 2 subtests
 - And Processing Speed - 2 subtests

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Profile Analysis: Comparing Index Scales

- The Full Scale IQ can be a valuable measure of general intellectual ability. It allows **RANKING**.
 - BUT...Tells us little about the specific underlying abilities on which it is based.
- Knowledge of ability patterns inform teaching strategies and other types of interventions.
- Examining the Index scores and the Subtests within best demonstrate strengths or weaknesses.

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Statistically Significant Differences

Do the 4 Main Indexes differ significantly from each other (e.g., Verbal Comprehension vs. Perceptual Reasoning)?

Do the subtest scaled scores of interest differ significantly from each other (e.g., Vocabulary vs. Block Design)?

Do the subtest scaled scores of interest differ significantly from the mean of their respective Composites (e.g., Similarities vs. the Verbal Comprehension mean)?

Do the subtest scaled scores of interest differ significantly from the mean of the other subtests administered (e.g., Similarities vs. the mean of the other nine subtests administered)?

Whatever comparisons you choose to make you must determine whether the differences are statistically significant (i.e., too large to be likely to have occurred by chance).

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Base Rates

- This approach to profile analysis is to determine the frequency with which the differences between scores in a adult's profile occurred in the standardization sample;
- This is called the *Base Rate Approach* or the *Probability of Occurrence Approach*.

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Interpretation of WAIS-IV Results Data

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Verbal > Visual Hypotheses

- Verbal comprehension skills are better developed than perceptual reasoning skills.
- Verbal processing is better developed than visual-spatial processing.
- Auditory-vocal processing is better developed than visual discrimination processing.
- Retrieval of verbal information from long-term memory is better developed than nonverbal problem solving.
- Knowledge acquired through accumulated experience is better developed than knowledge needed to solve nonverbal problems.
- Crystallized knowledge is better developed than fluid reasoning.

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Visual > Verbal Hypotheses

- Perceptual reasoning skills are better developed than verbal comprehension skills.
- Visual-spatial processing is better developed than verbal processing.
- Visual-discrimination processing is better developed than auditory-vocal processing.
- Knowledge needed to solve nonverbal problems is better developed than knowledge acquired through accumulated experience.
- Nonverbal problem solving is better developed than retrieval of verbal information from long-term memory.
- Fluid reasoning is better developed than crystallized knowledge.

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Verbal > Working Memory Hypotheses

- Verbal comprehension is better developed than working memory.
- Verbal processing is better developed than short-term auditory memory.
- Auditory-vocal processing is better developed than use of encoding strategies.
- Long-term verbal memory is better developed than short-term auditory memory.
- Retrieval of verbal information from long-term memory is better developed than retrieval of information from short-term memory.
- Crystallized knowledge is better developed than short-term auditory memory.

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Working Memory > Verbal Hypotheses

- Working memory is better developed than verbal comprehension.
- Short-term auditory memory is better developed than verbal processing.
- Use of encoding strategies is better developed than auditory-vocal processing.
- Short-term auditory memory is better developed than long-term verbal memory.
- Retrieval of information from short-term memory is better developed than retrieval of verbal information from long-term memory.
- Short-term auditory memory is better developed than crystallized knowledge.

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Visual > Working Memory Hypotheses

- Perceptual reasoning is better developed than working memory.
- Visual-spatial processing is better developed than short-term auditory memory.
- Immediate problem-solving ability is better developed than use of encoding strategies.
- Interpretation or organization of visually perceived material is better developed than short-term auditory memory.

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Verbal > Process Speed Hypotheses

- Verbal comprehension is better developed than processing speed.
- Verbal processing is better developed than speed of mental operation.
- Auditory-vocal processing is better developed than visual motor coordination.
- Processing of verbal stimuli is better developed than processing of nonverbal stimuli.
- Long-term verbal memory is better developed than short-term visual memory.
- Crystallized knowledge is better developed than processing speed.

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Process Speed > Verbal Hypotheses

- Processing speed is better developed than verbal comprehension.
- Speed of mental operation is better developed than verbal processing.
- Visual-motor coordination is better developed than auditory-vocal processing.
- Processing of nonverbal stimuli is better developed than processing of verbal stimuli.
- Short-term visual memory is better developed than long-term verbal memory.
- Processing speed is better developed than crystallized knowledge.

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And Now...

Memory Assessment with the
Wechsler Memory Scale-IV



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Memory and Learning

- Learning - process of acquiring new information.
- Memory – “Persistence of learning in a state that can be revealed at a later time” (Squire, 1987).
- WMS-IV measures ability to learn and remember information presented verbally and visually

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3 BASIC Process of Learning and Remembering

■ Encoding	■ External information is transformed into mental representations or memories and stored in STM.
■ Consolidation	■ Information from immediate memory is solidified into long-term memory stores.
■ Retrieval	■ Information is brought into conscious awareness

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WMS-IV Normative Sample

- 16–90 years, n = 1400 total
- 100 per age band (14 age bands)
- Based on 2005 US Census
 - Age
 - Gender
 - Race/Ethnicity (White, African American, Hispanic, Asian, and Other)
 - Education level
 - Geographic region

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Test Reliability

- Delayed Memory .94 .92
- Visual Working .93
- Visual Memory .96 .97
- Auditory Memory .95 .95

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Many Studies of Concurrent Validity

- WMS-III
- WMS-III Abbreviated
- CVLT-II
- Children's Memory Scale
- WAIS-IV
- WAIS-III
- WISC-IV
- RBANS
- DKEFS
- WIAT-II
- ILS
- ABAS-II
- Brown ADD Scales
- BDI-II
- BDI-Fast Screen

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WMS-IV Structure

- Brief Cognitive Exam (NEW)
- Auditory Memory Index: Immediate and Delayed
- Visual Memory Index: Immediate and Delayed
- Visual Working Memory Index (NEW)

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Brief Cognitive Status Exam

- This *optional* subtest is a brief screen of a variety of cognitive functions.
 - orientation to time,
 - mental control,
 - clock drawing,
 - incidental recall,
 - automaticity and inhibitory control, and
 - verbal production.
- Replaces MSE, MOCA, etc...

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Auditory Memory Index

- **Logical Memory I**
 - This subtest assesses narrative memory under a free recall condition.
 - Two short stories are presented orally.
 - For older adults, one story is presented twice.
 - The examinee is asked to retell each story from memory immediately after hearing it.

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Auditory Memory Index

- **Logical Memory II – 20-30 min. later**
 - The delayed condition assesses long-term narrative memory with free recall and recognition tasks.
 - The examinee is asked to retell both stories from the immediate condition.
 - Then the examinee is asked yes/no questions about both stories - Recognition.

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Auditory Memory Index

- **Verbal Paired Associates I**
 - This subtest assesses verbal memory for associated word pairs.
 - The examiner reads 10 or 14 word pairs to the examinee. Then, the examiner reads the first word of each pair, and asks the examinee to provide the corresponding word.
 - There are four trials of the same list in different orders.

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Auditory Memory Index

- **Verbal Paired Associates II – Free Recall - 20-30 min. later**
 - The delayed condition assesses long-term recall for verbally paired information with cued recall and recognition tasks, and includes a free recall task.
 - The examinee is orally presented with the first word of each pair learned in the immediate condition and asked to provide the corresponding word.

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Auditory Memory Index

- **Verbal Paired Associates II - Recognition**
 - The examinee is then read a list of word pairs and asked to identify each as either one of the word pairs he or she was asked to remember or a new word pair.
 - Finally, during the optional word recall task, the examinee is asked to say as many of the words from the pairs as he or she can recall.

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Interpretive Considerations: Logical Memory and Verbal Paired Associates

- Both measure aspects of semantic and auditory memory.
- Presentation of information is organized/meaningful for LM and unorganized for VPA.
- VPA requires single word responses; LM requires longer, more cohesive responses.
- VPA is multi-trial learning measure. For Adult Battery, LM represents single-trial learning ability.

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And Memory for Pictures....

- **WMS-IV:
Visual Memory Index**

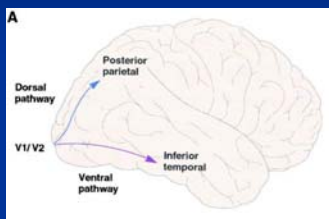
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Visual processing: Two pathways

Dorsal (Occipito-parietal):

Object & object feature recognition Disorders:

visual object agnosia,
Prosopagnosia (an inability to recognize the faces of familiar people), achromatopsia (light sensitivity, and the absence of color vision).



Ventral (Occipito-temporal): Visual recognition of spatial location Disorders: optic ataxia, ocular apraxia, simultanagnosia (inability of an individual to perceive more than a single object at a time); constructional apraxia, akinopsia (motion blindness).

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Visual Reproduction: Test One

- This subtest assesses memory for nonverbal visual stimuli.
- A series of five designs is shown, one at a time, for 10 seconds each.
- After each design is presented, the examinee is asked to draw the design from memory.

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Visual Reproduction: Scoring

- See Appendix B (in Manual) for scoring criteria for each item.
- Do not penalize or mistake poor motor control for memory or orientation issues.
- Use scoring template.

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**Visual Reproduction:
Scoring Instructions Link
Immediate and Delayed Tasks**

- VR is first subtest administered.
- Say, "Later I will ask you to draw all of the designs again, so try to remember them."
- Prompt allows assessment of visual Learning Strategy

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**Visual Reproduction II:
Delayed Free Recall - 20-30 min. later**

- The delayed condition assesses long-term visual-spatial memory with free recall, recognition task, and includes a direct copy task.
- First, the examinee is asked to redraw the designs shown during the immediate condition.
- Designs are drawn from memory in any order.

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**Visual Reproduction II:
Delayed Recognition**

- Second, the examinee is asked to choose which of six designs on a page matches the original design shown during the immediate condition.
- Third, for an optional copy task, the examinee is asked to draw the designs while looking at them.

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2ND Visual Memory Task: Designs I

- This subtest assesses spatial memory for unfamiliar visual material.
- The examiner shows examinee a grid with 4–8 designs on a page for 10 seconds, and then removes the page from examinee’s view.
- The examinee then selects the designs from a set of cards and places the cards in a grid in the same place as previously shown.

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Designs II: Delayed FREE Recall - 20-30 min. later

- The delayed condition assesses long term spatial and visual memory with free recall and recognition tasks.
- First, the examinee is asked to recreate the pages shown in the immediate condition with the cards and grid.

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Designs II: Delayed Recognition

- Then he or she is shown a series of grids and asked to select the two designs that are correct and in the same place as on the pages shown in the immediate condition.

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Interpretive Considerations: Visual Memory Tasks

- Visual Reproduction and Designs:
- Both measure aspects of visual processing, spatial memory and memory retrieval.
- Response process for Visual Reproduction includes more visual-construction and fine motor abilities than Designs.

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WMS-IV 3rd Index: Visual Working Memory Index

- Defined as....
- Assessment of mental manipulation, construction and problem solving...
- Sig. advancement vs previous versions of Wechsler Memory Tests...

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Visual Working Memory Index

- **Test 1: Spatial Addition (Ages 16-69)**
 - Spatial Addition replaces Spatial Span.
 - Assesses visual-spatial working memory using a visual addition task.
 - Examiner shows the examinee, sequentially, two grids with blue and red circles. [5 sec.]
 - Then, examiner asks examinee to add or subtract the location of the circles based on a set of rules.

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Visual Working Memory Index

■ Test 2: Symbol Span

- This subtest assesses visual working memory using novel visual stimuli.
- The examinee is briefly shown a series of abstract symbols on a page and then asked to select the symbols from an array of symbols, in the same order they were presented on the previous page.

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Visual Working Memory Index

■ Interpretive Considerations: Spatial Addition and Symbol Span

- SA taps spatial location memory and the ability to compare spatial images.
- SSP is highly focused on recall of visual details and the sequence of the images must also be maintained in memory.
- SA uses a free recall format.
- SSP uses a recognition memory format.

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The WMS-IV: New Norms and Improved Interpretative Power...

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Contrast Scores – New Data...

- The basis of the comparison for contrast scores is other people of similar performance levels on the initial/control skill, not age-based peers.
- Assessment of How Rare Differences WITHIN a person's cognitive profile are...
- New interpretive data...

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Contrast Score Overview

- Scored on 1-19 Scaled Score Metric.
- Does not replace normative scores.
- Answers specific hypothesis about an examinee's performance relative to his/her performance on other measures.
- ? of Unusual separation of cognitive performances....

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Why Important?

- Normative score asks: Is this person's delayed memory impaired?
- Contrast score asks: Is this person's delayed memory impaired given his/her initial encoding ability?
- Further identifying possible injury/impairment.
- Improved specificity in causal determinations.

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Advanced Clinical Solutions (ACS)

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Introduction to ACS

- Advanced Clinical Solutions for WAIS-IV and WMS-IV is an individually administered array of tests addressing new and specific clinical questions and needs
- Expands and enhances the clinical utility of WAIS-IV and WMS-IV assessments

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Content of ACS

- Demographically-adjusted norms
- Pre-Morbid Ability estimation*
- Reliable Change scores
- Effort measures*
- Additional subtest and Index scores for WAIS-IV and WMS-IV
- Social Cognition measures*

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Demographically Adjusted Norms

- Enable clinician to refine hypothesis about the degree to which a specific score is unexpected when compared to individuals of similar background characteristics (e.g., education level)
- Norms approximate the unique demographic subgroup of an individual
- Demographic Adjusted norms for WAIS-IV and WMS-IV Subtest and Index Scores
 - Education-only adjusted t-scores
 - Full Demographic adjusted t-scores
- Do not replace WAIS-IV or WMS-IV conventional age-adjusted norms

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Use of Demographically Adjusted Norms

“The demographically adjusted scores are most appropriately applied in the context of a neurodiagnostic assessment to minimize the impact of psychosocial variables on the diagnosis of cognitive impairment, such as estimating the degree of cognitive impairment after a brain injury or insult. The demographically adjusted scores are not intended for use in psychoeducational evaluations, determination of intellectual deficiency, vocational assessment, or in any context in which the purpose of the evaluation is to determine the absolute functional level (IQ or Memory) of the examinee relative to a representative sample of the U.S. population.”

-(The Psychological Corporation, 2002)

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Pre-Morbid Ability Estimation

- IMPORTANT!
- Determine if cognitive decline has occurred from an unknown start point, based on scores obtained from a single test-session
- Estimate the degree of loss of cognitive functioning from a point prior to the first assessment
- ACS Test of Pre-morbid Functioning is a revision of the Wechsler Test of Adult Reading (WTAR)
- Predictions can be based on demographics alone, on the Test of Pre-morbid Functioning alone, or on a combination of both demographics and the Test of Pre-morbid Functioning

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Test of Premorbid Functioning

- Uses Atypical Grapheme-Phoneme translation to measure word knowledge through reading.
- *Relatively* resistant to brain injury and dementia.

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Pre-morbid Ability Estimation

- Software applies a regression equation to predict pre-morbid abilities using demographic characteristics and/or performance on the ACS Test of Pre-morbid Functioning
- Software Provides Estimate of Pre-morbid Intellectual Abilities
 - FSIQ, GAI, VCI, PRI, WMI, and PSI
- Software Provides Estimate of Pre-morbid Memory Ability
 - AMI, VMI, VWMI, IMI and DMI

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Reliable Change Scores

- Assesses whether an individual's change across assessment times is large enough to be due to change in the individual instead of unreliability of the measure
- Uses scores from the WAIS-IV and/or WMS-IV to compute a reliable change score between an assessment at Time 1 and Time 2
- Software uses regression based models to control for the impact of practice effects, ability level, and age where appropriate
- Available for all WAIS-IV and WMS-IV subtest and index scores

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Effort Measures

- Standalone measure of suboptimal effort during the assessment
- Also examines embedded measures help to identify examinees with atypical performance
- Information on true clinical cases is compared to those simulating cognitive deficit, providing greater information on issues related to suspected poor effort

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Effort Measures (continued)

- Available for Ages 16-69
- External Measures
 - New subtest: Word Choice
- Imbedded Measures
 - Reliable Digit Span
 - Logical Memory Recognition
 - Verbal Paired Associates Recognition
 - Visual Reproduction Recognition

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Malingering Patterns in Wechsler IV Imbedded Tests

- Pattern Analysis
 - WMS-IV
 - Malingers: Attention/Concentration < General Memory *
 - Opposite pattern to typical head injury
 - WAIS-IV: Digit Span
 - Malingers: Low digit span performance (ss < 4)
 - Reliable Digit Span (sum of longest correct span for both trials < 7)
 - Vocabulary vs. Digit Span (low digit span while vocabulary is high)

Iverson & Binder, 2000; Larrabee, 2005

Social Cognition

- Increasingly, the need to evaluate affect recognition, social perception, and aspects of memory related to social functioning are needed. Three new subtests in the ACS provide examiners with tools to assess emotion recognition from faces and auditory information, and recall for socially relevant information.
 - Social Perception
 - Faces
 - Names

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Social Perception

- Measures affect recognition and naming, integrating prosody with affect recognition and integrating prosody with interactions between pairs of people
- Social Perception Scores
 - Affect Recognition
 - Prosody of Language (tone & meaning recognition)
 - Pairs (Language and Affect together)
 - Total Performance Measure

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Faces

- Measures immediate and delayed face recognition and spatial memory.
- Faces Scores
 - Immediate Memory
 - Delayed Memory
 - Content Memory
 - Spatial Memory

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Names

- Measures the ability to associate names and faces, activities with names and faces, and incidental recall of emotional expression.
- Names Scores
 - Immediate Memory
 - Delayed Memory
 - Names Content Memory
 - Activity Content Memory
 - Emotion recognition recall

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ACS: Social Cognition

- Useful in evaluation of Autistic Spectrum Disorders
- Useful for evaluation of TBI impacting social function.
- Compares data with other Wechsler Assessments

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Assessment of Motivation & Malingering

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Malingering

- Defined as...
 - Intentional production of false or grossly exaggerated physical or psychological symptoms, motivated by external incentives
- Prevalence of malingering
 - Around 8% of general evaluations
 - Around 20% of forensic evaluations
 - Miller, 2000; Rogers & Cruise, 2000; Rogers, Salekin, Sewell, & Goldstein, 1996

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Malingering: DSM-5

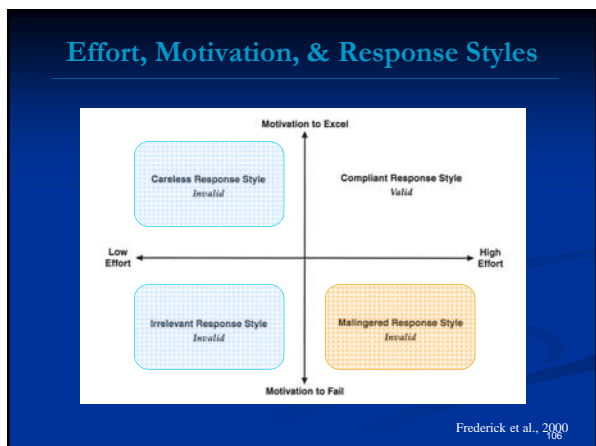
- “any combination” of the following four items is present in a patient, you should consider the condition of malingering: V-Code, not formal diagnosis...
 - (1) Medicolegal context of presentation (a lawyer sends the client for evaluation or the patient presents for care in the midst of criminal charges)
 - (2) There is a “marked discrepancy” between the individual’s “claimed stress or disability” and “objective findings and observations”
 - (3) “Lack of cooperation during the diagnostic evaluation and in complying with the prescribed treatment regimen” (some tired clinicians would summarize this as “a difficult patient”, though I much prefer DSM-5’s bx description)
 - (4) The presence of antisocial personality disorder

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Motivation for Malingered Behavior:

- The intentional production of false or grossly exaggerated physical or psychological symptoms which are motivated by external incentives:
 - a) avoiding military duty
 - b) avoiding work
 - c) obtaining financial compensation
 - d) evading criminal prosecution
 - e) obtaining drugs

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- ## DOMAINS OF MALINGERING
- Malingering typically occurs across three domains:
1. **Cognitive impairment**
 1. (Symptom Validity Tests and embedded formal cognitive tests).
 2. **Psychopathology**
 1. (i.e., MMPI-2: F, Fb, Fp).
 3. **Physical or Medical Illness**
 1. over-reporting of somatic complaints (MMPI-2RF: Fake Bad Scale, Fs Scale.)
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Differential Diagnosis vs. MALINGERING

-Factitious Disorder:
External incentives are absent and there is an assumed intrapsychic need to maintain the sick role.

-Conversion & Somatoform Disorders:
There is no intentional production of symptoms generated by external gain.

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Test Popularity Among Experts

<ul style="list-style-type: none"> ■ Forced-choice testing: <ul style="list-style-type: none"> ■ Digit Recognition <ul style="list-style-type: none"> ■ Digit Memory Test (DMT) ■ Portland Digit Recognition Test (PDR1) ■ Victoria Symptom Validity Test (VSVT) ■ Computerized Assessment of Response Bias (CARB) ■ Word Recognition <ul style="list-style-type: none"> ■ 21-Item Test ■ Word Memory Test (WMT) ■ Verbal & Nonverbal Abilities <ul style="list-style-type: none"> ■ Validity Indicator Profile (VIP) 	<ul style="list-style-type: none"> • Forced-choice testing: <ul style="list-style-type: none"> – Visual Recognition <ul style="list-style-type: none"> • Test of Memory Malingering (TOMM) • Letter Memory Test • 48-Pictures Test • Simplistic tests: <ul style="list-style-type: none"> – Rey 15-Item Test – Dot counting Test – The b Test <p style="margin-top: 10px;"> Always/Often Used: > 40% Always/Often Used: 30-39% Always/Often Used: 20-29% Always/Often Used: 10-19% </p>
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Slick et al., 2004 109

Test Sensitivity*

<ul style="list-style-type: none"> ■ Forced-choice testing: <ul style="list-style-type: none"> ■ Digit Recognition <ul style="list-style-type: none"> ■ Digit Memory Test (DMT) ■ Portland Digit Recognition Test (PDR1) ■ Victoria Symptom Validity Test (VSVT) ■ Computerized Assessment of Response Bias (CARB) ■ Word Recognition <ul style="list-style-type: none"> ■ 21-Item Test ■ Word Memory Test (WMT) ■ Verbal & Nonverbal Abilities <ul style="list-style-type: none"> ■ Validity Indicator Profile (VIP) 	<ul style="list-style-type: none"> ■ Forced-choice testing: <ul style="list-style-type: none"> ■ Visual Recognition <ul style="list-style-type: none"> ■ Test of Memory Malingering (TOMM) ■ Letter Memory Test ■ 48-Pictures Test ■ Simplistic tests: <ul style="list-style-type: none"> ■ Rey 15-Item Test ■ Dot counting Test ■ The b Test <p style="margin-top: 10px;"> Sensitivity: > 85% Sensitivity: 70 – 84 % Sensitivity: 50 – 69 % Sensitivity: < 49 % </p>
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* Sensitivity = % of malingers correctly classified Lezak et al., 2004, Vickery et al., 2001

Test Specificity*

<ul style="list-style-type: none"> ■ Forced-choice testing: <ul style="list-style-type: none"> ■ Digit Recognition <ul style="list-style-type: none"> ■ Digit Memory Test (DMT) ■ Portland Digit Recognition Test (PDR1) ■ Victoria Symptom Validity Test (VSVT) ■ Computerized Assessment of Response Bias (CARB) ■ Word Recognition <ul style="list-style-type: none"> ■ 21-Item Test ■ Word Memory Test (WMT) ■ Verbal & Nonverbal Abilities <ul style="list-style-type: none"> ■ Validity Indicator Profile (VIP) 	<ul style="list-style-type: none"> ■ Forced-choice testing: <ul style="list-style-type: none"> ■ Visual Recognition <ul style="list-style-type: none"> ■ Test of Memory Malingering (TOMM) ■ Letter Memory Test ■ 48-Pictures Test ■ Simplistic tests: <ul style="list-style-type: none"> ■ Rey 15-Item Test ■ Dot counting Test ■ The b Test <p style="margin-top: 10px;"> Specificity: > 85% Specificity: 70 – 84 % Specificity: 50 – 69 % Specificity: < 49 % </p>
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* Specificity = % of non-malingers correctly classified Lezak et al., 2004, Vickery et al., 2001

Motivation Problems:

- 2 Types:
 - Performance –
 - Cognitive and Intellectual
 - Symptom –
 - Psychological and Health

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Performance Validity Tests

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FORCED CHOICE Performance VALIDITY TESTS

Forced Choice Symptom Validity Tests:

- Word Memory Test (Green, P.)
- Computerized Assessment of Response Bias (Allen, L.)
- Portland Digit Recognition Test (Binder, L.)
- Victory Symptom Validity Test (Slick)
- Validity Indicator Profile (Frederick, R.)
- Test of Memory Malingering (Tombaugh, T.)
- Warrington's Recognition Memory Test

- All are recognition format tests.
- All require that the patient choose between a correct and incorrect answer.

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Performance Validity Tests

- Forced choice measure.
- Example: 5 digit number is presented.
- Followed by two choices (correct and distractor).
- By guessing alone, should get about 50% correct.
- Thus, as test scores decrease below chance, it is likely that the individual is deliberately choosing the wrong answer.

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Performance Validity Tests

92149

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Performance Validity Tests

92149

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Most Commonly Used Test of Performance Validity:

Test of Memory Malingering (TOMM)

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TEST OF MEMORY MALINGERING (TOMM) Tombaugh (1996)

Trial 1:

- Presentation of 50 pictures.
- Forced choice paradigm (2 pictures; feedback).

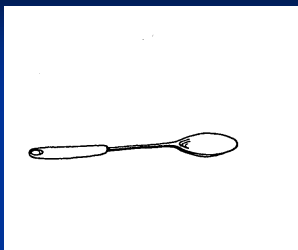
Trial 2:

- Presentation of 50 pictures.
- Forced choice paradigm (2 pictures; feedback).

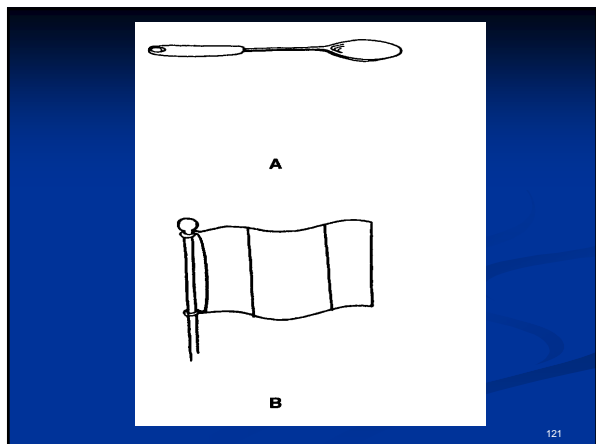
Retention Trial (20 minutes later):

- Forced choice paradigm (2 pictures; feedback)

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Group	Trial 1	Trial 2	Retention
Severe TBI	45.9 (4.7)	49.4 (1.3)	49.6 (1.1)
Dementia	41.0 (6.6)	45.7 (5.3)	47.0 (4.4)
TBI (Seeking Comp) All performances significantly lower than patient groups	25.3 (10.8)	32.8 (13.4)	35.1 (11.8)

BASIC PREMISE OF PERFORMANCE VALIDITY TESTS

- Patients can perform below chance based on the binomial probability.
- Nies & Sweet (1994) found that only a minority of malingers actually score this poorly.
- At or above chance performances, however, can discriminate those demonstrating good effort from those demonstrating insufficient effort.

M-Fast: Symptom Validity



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Development of the M-FAST

- M-FAST items were developed to operationalize the response styles and interview strategies that have been validated for identifying individuals who are malingering
 - Reported vs Observed symptoms (RO)
 - Extreme Symptomatology (ES)
 - Rare Combinations (RC)
 - Unusual Hallucinations (UH)
 - Unusual Symptom Course (USC)
 - Negative Image (NI)
 - Suggestibility (S)

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M-Fast:

- Scored on a Cut Score
- Validated on people 18 yrs and older
- Validated with different ethnic/race groups
- Validated across gender
- Performance normed against populations
 - In prison
 - On probation
 - In forensic hospital
 - In civil hospital
 - Outpatient disability assessment

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MMPI: Still the Most Used Measure of Symptom Validity

- Most used measure of symptom validity
- Multiple Symptom Validity Measures...
- Largest normative sample

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Multiple Scales of Validity:

- Fp (Infrequency--psychopathology)
- Fs (Over--Reporting Somatic and Health)
- VRIN (Variable Response Inconsistency)
- TRIN (True Response Inconsistency)

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MMPI2RF- Symptom Validity Scale (FBS): New Development

- Elevated in individuals undergoing assessment based on disability/personal injury claims.
- 33 item scale based on item endorsement
- The scale assesses somatic concerns, unusual beliefs, and deviant attitudes.
- Possible reasons for the elevations are inconsistent responding and/or overreporting of somatic or cognitive symptoms.
- T \geq 100 associated with low false positive rate and indicative of non-credible presentation especially of cognitive impairment.

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Malingering Patterns in other NΨ Tests

- **Pattern Analysis**
 - **Word Memory Test**
 - Malingers: Inconsistent responding, poor initial recognition
 - Pattern should reflect severity of impairments
 - **Category Test**
 - Malingers: Poor performance on first 2 subtests
 - **Wisconsin Card Sorting Task**
 - Malingers: Poor ratios of categories completed compared to both perseverative errors and failure to maintain set
 - **Motor Functioning**
 - Malingers: Suppress motor functioning to extreme levels
 - Motor decline should only be associated with severe brain injury

Iverson & Binder, 2000; Larrabee 2005

Symptom Exaggeration

- **Self-Report of Symptoms**
 - May be exaggerated due to other variables (depression, pain, stress)
 - e.g., Post-Concussive Syndrome persisting for more than 3 months
- **MMPI-2**
 - Malingers tend to show elevations in clinical scales 1, 2, 3, 7, and 8, the Fake Bad Scale (FBS), VRIN, TRIN, the Infrequency-Psychopathology Scale [F(p)].
 - The F Scale and F – K does not appear to be as sensitive, and therefore “valid” profiles may be obtained.
 - Caution should be given to interpreting the clinical scales and F Scale derivatives, as these can be easily influenced by psychiatric comorbidities.

Iverson & Binder, 2000; Larrabee 2005

Testing Motivation: Summary & Conclusions

- **Defining Malingering**
 - External reward, negative response bias, and discrepancies in NΨ data and/or self-report
 - Combination of effort and motivation
 - Research: Case studies, simulation studies, known-group designs, differential prevalence designs
- **Detection of Malingering**
 - Numerous symptom and performance validity tests
 - Most forced-choice tests demonstrate excellent specificity, but not all show high sensitivity
 - Pattern analysis of NΨ data
 - Symptom exaggeration

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Motivation Assessment: Critical

- Neuropsychological tests are more sensitive to motivation than ANY other factor... (Iverson, 2000)
- Measurement of motivation is the current standard of care. (APA, 2010)

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Thank You!



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