

Interpretive Report of WMS-IV Testing

Examinee and Testing Information

| | | | |
|----------------|-----------------|--------------------|-----------------|
| Examinee Name | Sample Examinee | Date of Report | 7/1/2009 |
| Examinee ID | 12345 | Years of Education | 11 |
| Date of Birth | 3/24/1988 | Home Language | English |
| Gender | Male | Handedness | Right |
| Race/Ethnicity | White | Examiner Name | Sample Examiner |

| | | | | | |
|-------------------|--------------------|----------------|-------------------|---------|----|
| Test Administered | WMS-IV (6/23/2009) | Age at Testing | 21 years 2 months | Retest? | No |
|-------------------|--------------------|----------------|-------------------|---------|----|

| | | | | | |
|-----------------|--|--|--|--|--|
| WMS-IV Comments | Sample attended the session alone and was cooperative and gave his best effort during testing. | | | | |
|-----------------|--|--|--|--|--|

Index Score Summary

| Index | | Index Score |
|-----------------------|------|-------------|
| Auditory Memory | AMI | 115 |
| Visual Memory | VMI | 95 |
| Visual Working Memory | VWMI | 94 |
| Immediate Memory | IMI | 102 |
| Delayed Memory | DMI | 110 |

Purpose for Evaluation

Sample was referred for an evaluation by Sample Referral, his counselor, secondary to School-Related difficulties specifically related to learning and attention.

Background

Sample is a 21-year-old single male who lives alone.

Sample completed the 11th grade.

Sample has a current diagnosis of ADHD and is currently being treated with medication. In addition to his current treatment, he has previously been treated with medication.

Sample has no major medical problems.



Sample is currently employed full-time as a construction worker. It is reported that his work performance is unsatisfactory.

Test Session Behavior

Sample arrived on time for the test session unaccompanied. His appearance was neat.

Interpretation of WMS–IV Results

Sample was administered 10 subtests of the Adult battery of the Wechsler Memory Scale–Fourth Edition (WMS–IV), from which his index scores were derived. He was also administered the Brief Cognitive Status Exam (BCSE), an optional procedure measuring global cognitive functioning. Sample's scores on the WMS–IV indexes are discussed in the following sections of this report, as are discrepancies in performance across different modalities and categories of memory processes. In addition, specific strengths and deficits within modalities are discussed.

When interpreting performance on the WMS–IV, it is important to take into consideration factors that may have contributed to Sample's test performance, such as difficulties with vision, hearing, motor functioning, English language proficiency, and speech/language functioning. In addition, personal factors, such as physical illness, fatigue, headache, or factors specific to the testing session such as distractions or a lack of motivation, can affect performance on any given day. According to the information provided, Sample's performance may have been affected by the following issue. He experienced difficulties paying attention during testing, which may have diminished his concentration and ability to attend to instructions and stimuli and appeared to have a minimal effect on his overall performance.

Brief Cognitive Status Exam

The Brief Cognitive Status Exam (BCSE) evaluates basic cognitive functions through tasks that assess orientation to time, incidental recall, mental control, planning/visual perceptual processing, inhibitory control, and verbal productivity. Sample's global cognitive functioning, as measured by the BCSE, was in the Average range, compared to others, ages 16 to 29, with a similar educational background. This classification level represents 25–100% of cases within his age and education group. Functioning in this range is not typically associated with global impairments in cognitive functioning.

Auditory Memory

The Auditory Memory Index (AMI) is a measure of Sample's ability to listen to oral information, repeat it immediately, and then recall the information after a 20 to 30 minute delay. Compared to other individuals his age, Sample's auditory memory capacity is in the High Average range (AMI = 115, 95% Confidence Interval = 108-120) and exceeds that of approximately 84 percent of individuals in his age group.

However, it is important to note that the severe attention difficulties that Sample appeared to experience during the assessment are suspected of having had a minimal effect on his ability to fully express his auditory memory capacity. In spite of these observed difficulties, Sample performed in the High Average range, and his scores in this area may have been even higher in the absence of these difficulties.

The interpretation of Sample's AMI score should account for the significant inconsistency in performance on specific measures within this domain. A closer look at these subtests is warranted.

Within auditory memory, Sample exhibited a strength on the Logical Memory II subtest. At the same time, he displayed a relative weakness on the Verbal Paired Associates I subtest and a relative weakness on the Verbal Paired Associates II subtest. On Logical Memory II, Sample was asked to recall specific details of information presented orally in a story format in a single exposure after a 20 to 30 minute delay. This subtest measures the ability to recall verbal information that is conceptually organized and semantically related after a delay (Logical Memory II scaled score = 16). Verbal Paired Associates I required Sample to recall novel and semantically related word pairs. This subtest measures immediate learning of verbal associations over multiple exposures (Verbal Paired Associates I scaled score = 10). On Verbal Paired Associates II, Sample was required to recall novel and semantically related word pairs after a 20 to 30 minute delay. This subtest provides a measure of delayed cued recall for word associations (Verbal Paired Associates II scaled score = 9).

Visual Memory

On the Visual Memory Index (VMI), a measure of memory for visual details and spatial location, Sample performed in the Average range (VMI = 95, 95% Confidence Interval = 90-101). Sample's visual memory capacity exceeds that of approximately 37 percent of individuals in his age group. However, it is important to note that the attention difficulties that Sample appeared to experience during the assessment are suspected of having had a minimal effect on his ability to fully express his visual memory capacity. In spite of these observed difficulties, Sample performed in the Average range, and his scores in this area may have been even higher in the absence of these difficulties.

The interpretation of Sample's VMI score should account for the significant inconsistency in performance on specific measures within this domain. A closer look at these subtests is warranted. Within visual memory, Sample exhibited a strength on the Visual Reproduction II subtest. However, he displayed a weakness on the Designs I subtest.

On Designs I Sample was required to recall designs and their locations in a grid immediately after seeing them. This subtest measures spatial recall and memory for visual details (Designs I scaled score = 5). Visual Reproduction II required Sample to recall designs viewed and drawn 20 to 30 minutes earlier, without any visual cues. This subtest measures the ability to freely recall and reproduce visual information, without prompting, after a delay (Visual Reproduction II scaled score = 14).

Modality-Specific Memory Strengths and Weaknesses

Some individuals are better at recalling visual information than recalling auditory information, while for others the reverse is true. Compared to individuals with similar auditory memory capacity, Sample's visual memory performance is in the Average range (25th percentile), indicating no significant difference between his levels of visual and auditory memory functioning. The interpretation of Sample's modality-specific memory strengths and weaknesses should take into account the previously mentioned difficulties which may have affected his performance.

Visual Working Memory

On the Visual Working Memory Index (VWMI), a measure of his ability to temporarily hold and manipulate spatial locations and visual details, Sample performed in the Average range (VWMI = 94, 95% Confidence Interval = 87-102). Sample's visual working memory ability exceeds that of approximately 34 percent of individuals in his age group. However, it is important to note that the attention difficulties that Sample appeared to experience during the assessment are suspected of

having had a minimal effect on his ability to fully express his visual working memory capacity. In spite of these observed difficulties, Sample performed in the High Average range, and his scores in this area may have been even higher in the absence of these difficulties.

Sample's performance on the Symbol Span subtest was significantly better than his performance on the Spatial Addition subtest, suggesting that his profile of memory functioning within visual working memory exhibits significant variability. Therefore, a closer look at these two subtests is warranted. On Spatial Addition, Sample was shown patterns of blue and red circles on two grids presented consecutively. He was then required to place cards with different colored circles in a grid according to a set of rules, based on the grids that he had been shown. This subtest measures spatial working memory and requires storage, manipulation, and the ability to ignore competing stimuli (Spatial Addition scaled score = 6). Symbol Span required Sample to identify a series of novel symbols, in order from left to right, immediately after seeing the symbols in their correct order. This subtest measures the capacity to keep a mental image of a symbol and its relative spatial position on the page in mind (Symbol Span scaled score = 12).

Specificity of Episodic Visual Memory Abilities Compared to Visual Working Memory Abilities

Comparing episodic visual memory to visual working memory performance can help determine the relative influence of visual memory on visual working memory (e.g., to determine if a low VMI score is due to deficits in visual working memory or to episodic visual memory deficits). Compared to individuals with similar visual working memory capacity, Sample's visual memory performance is in the Average range (50th percentile), indicating no significant difference between his levels of visual memory and visual working memory functioning.

Immediate and Delayed Memory

The Immediate Memory Index (IMI) is a measure of Sample's ability to recall verbal and visual information immediately after the stimuli is presented. Compared to other individuals his age, Sample's immediate memory capacity is in the Average range (IMI = 102, 95% Confidence Interval = 96-108) and exceeds that of approximately 55 percent of individuals in his age group. On the Delayed Memory Index (DMI), a measure of the ability to recall verbal and visual information after a 20 to 30 minute delay, Sample performed in the High Average range (DMI = 110, 95% Confidence Interval = 103-116). Sample's delayed memory capacity exceeds that of approximately 75 percent of individuals in his age group. However, it is important to note that the severe attention difficulties that Sample appeared to experience during the assessment are suspected of having had a minimal effect on his immediate and delayed memory functioning. In spite of these observed difficulties, Sample performed in the Average range of immediate memory functioning and in the High Average range of delayed memory functioning, and his scores in these areas may have been even higher in the absence of these difficulties.

The interpretation of Sample's IMI score should account for the significant inconsistency in performance on specific measures within this domain. A closer look at these subtests is warranted. Within immediate memory, Sample exhibited a strength on the Logical Memory I subtest. He displayed a weakness on the Designs I subtest. Logical Memory I required Sample to recall specific details of information presented orally in a story format after only a single exposure. This subtest measures the ability to recall verbal information that is conceptually organized and semantically related immediately after hearing it (Logical Memory I scaled score = 15).

The interpretation of Sample's DMI score should account for the significant inconsistency in performance on specific measures within this domain. A closer look at these subtests is warranted. Within delayed memory, Sample exhibited a strength on the Logical Memory II subtest and a strength on the Visual Reproduction II subtest. He displayed a relative weakness on the Verbal Paired Associates II subtest and a weakness on the Designs II subtest. Designs II required Sample to recall designs and their locations in a grid after a 20 to 30 minute delay. This subtest measures the ability to recall designs and their locations after a delay (Designs II scaled score = 7).

Retention of Information

Some individuals lose information between immediate and delayed recall, while others actually improve their memory performance over time. The overall amount of forgetting and consolidation that occurred between the immediate and delayed tasks is indicated by the level of Sample's delayed memory performance given his immediate memory performance. Compared to individuals with a similar level of immediate memory capacity, Sample's delayed memory performance is in the High Average range (84th percentile), indicating that his delayed memory is somewhat better than expected, given his level of initial encoding.

Specific Auditory Memory Abilities

Auditory Process Scores

On a measure of his ability to answer specific questions about details from a previously heard story, Sample performed in the high average range (LM II Recognition cumulative percentage = >75%). Sample performed in the extremely low range on a measure of his ability to identify previously presented word associations (VPA II Recognition cumulative percentage = ≤2%). When asked to recall as many words as he could remember from a previously presented list of word pairs, without being required to correctly associate the words, Sample performed in the average range (VPA II Word Recall scaled score = 8).

Auditory Forgetting and Retrieval Scores

The degree to which Sample may benefit from story details being presented in a recognition format instead of a free recall format can be determined by comparing his delayed cued recall performance to that of individuals with a similar level of recognition memory (LM II Recognition vs. Delayed Recall contrast scaled score = 16). This comparison suggests that Sample may have better free recall than recognition for story details. This is unusual, because most individuals perform better when asked specific questions about a story than when asked to recall story details with no cues. The degree to which Sample forgot the story details he learned during the immediate condition of Logical Memory I can be determined by comparing his delayed recall performance to that of others with a similar level of immediate recall (LM II Immediate Recall vs. Delayed Recall contrast scaled score = 13). This comparison indicates that Sample has relatively good delayed recall, given his initial level of recall.

The degree to which Sample may benefit from word associations being presented in recognition format versus cued recall can be determined by comparing his delayed cued recall performance to that of individuals with a similar level of recognition memory (VPA II Recognition vs. Delayed Recall contrast scaled score = 16). Based on this comparison, Sample's cued recall for word associations may be better than his recognition memory. This is unusual, and suggests that for Sample, the recognition format may interfere with memory retrieval. The degree to which Sample forgot the word

associations he learned during immediate recall of Verbal Paired Associates I can be determined by comparing his delayed recall performance to that of others with a similar level of immediate recall (VPA II Immediate Recall vs. Delayed Recall contrast scaled score = 8). This comparison indicates that Sample is able to recall cued word associations after a delay as well as expected, given his level of immediate recall.

Specific Visual Memory Abilities

Visual Process Scores

Sample's immediate and delayed memory for visual details are both below average, suggesting that he may have general difficulties recalling specific visual information when compared to individuals his age (DE I Content scaled score = 4, DE II Content scaled score = 7). When required to recall designs and their locations in a grid, Sample's immediate and delayed memory for the locations of cards placed in the grid, regardless of his ability to recall the visual details of the cards, are both below average, suggesting that he may have general difficulty recalling spatial locations when compared to individuals his age (DE I Spatial scaled score = 3, DE II Spatial scaled score = 7). On a measure of his ability to recognize designs previously presented and the correct locations for the designs, Sample performed in the high average range when compared to others his age (DE II Recognition cumulative percentage = >75%).

When required to simply copy designs as he looked at them, Sample was able to perform the task as well as or better than 3-9% percent of individuals his age. It should be noted that Sample's performance on the memory portions of the Visual Reproduction subtest may be confounded by his poor copying ability.

Visual Forgetting and Retrieval Scores

Sample's immediate recall of visual details is below average when compared to others with similar levels of immediate spatial memory ability. His delayed recall of visual details is average when compared to others with similar levels of delayed spatial memory ability. Sample's level of free recall for visual details and spatial locations relative to his recognition memory for this visual information can be determined by comparing his delayed recall performance to that of individuals with a similar level of recognition memory (DE II Recognition vs. Delayed Recall contrast scaled score = 5). This comparison indicates that his free recall for visual information is lower than expected, given his recognition memory. The degree to which Sample forgot the visual details and spatial locations he learned during the immediate condition of the Designs subtest can be determined by comparing his delayed recall performance to that of individuals with a similar level of immediate memory (DE Immediate Recall vs. Delayed Recall contrast scaled score = 11). Based on this comparison, Sample is able to recall visual details and spatial locations after a delay as well as expected, given his level of immediate recall.

When compared to others with a similar level of simple copying ability, Sample's ability to immediately recall and draw the details and relative spatial relationships among elements of a design is very good considering his level of copying ability (VR II Copy vs. Immediate Recall contrast scaled score = 15). The degree to which Sample forgot the details and relative spatial relationship among elements of the designs presented during the immediate recall of the Visual Reproduction subtest can be determined by comparing his ability to recall and draw the designs after a delay to that of individuals with a similar level of immediate ability (VR Immediate Recall vs. Delayed Recall



contrast scaled score = 14). Based on this comparison, his delayed recall for this type of visual information is above average. This suggests that the interval between immediate and delayed recall may benefit Sample by providing time for him to consolidate his ability to recall and draw the designs.

Test Results Summary

Sample is a 21-year-old male who completed the WMS-IV. Sample was referred for an evaluation by Sample Referral, his counselor, secondary to School-Related difficulties specifically related to learning and attention. When reviewing Sample's results, it is important to keep in mind the previously noted factors that may have affected his test performance.

Sample was administered 10 subtests of the Adult battery of the WMS-IV. Sample's global cognitive functioning as measured by the BCSE was in the Average range, compared to others ages 16 to 29 and of a similar educational background. Sample's ability to listen to oral information and repeat it immediately, and then recall the information after a 20 to 30 minute delay is in the High Average range. His memory for visual details and spatial location is in the Average range. His ability to temporarily hold and manipulate spatial locations and visual details is in the Average range. Sample's ability to recall verbal and visual information immediately after the stimuli is presented is in the Average range. His ability to recall verbal and visual information after a 20 to 30 minute delay is in the High Average range. Sample displayed a notable amount of consolidation between the immediate and delayed tasks of the WMS-IV. Compared to individuals with a similar level of immediate memory capacity, Sample's delayed memory performance is in the High Average range, indicating that his delayed memory is somewhat better than expected given his level of initial encoding.

Recommendations

Sample is encouraged to study or work in an area with few visual and auditory distractions.

Provide Sample with a mixture of tasks that are of both high- and low-interest to him.

This report is valid only if signed by a qualified professional:

Score Report

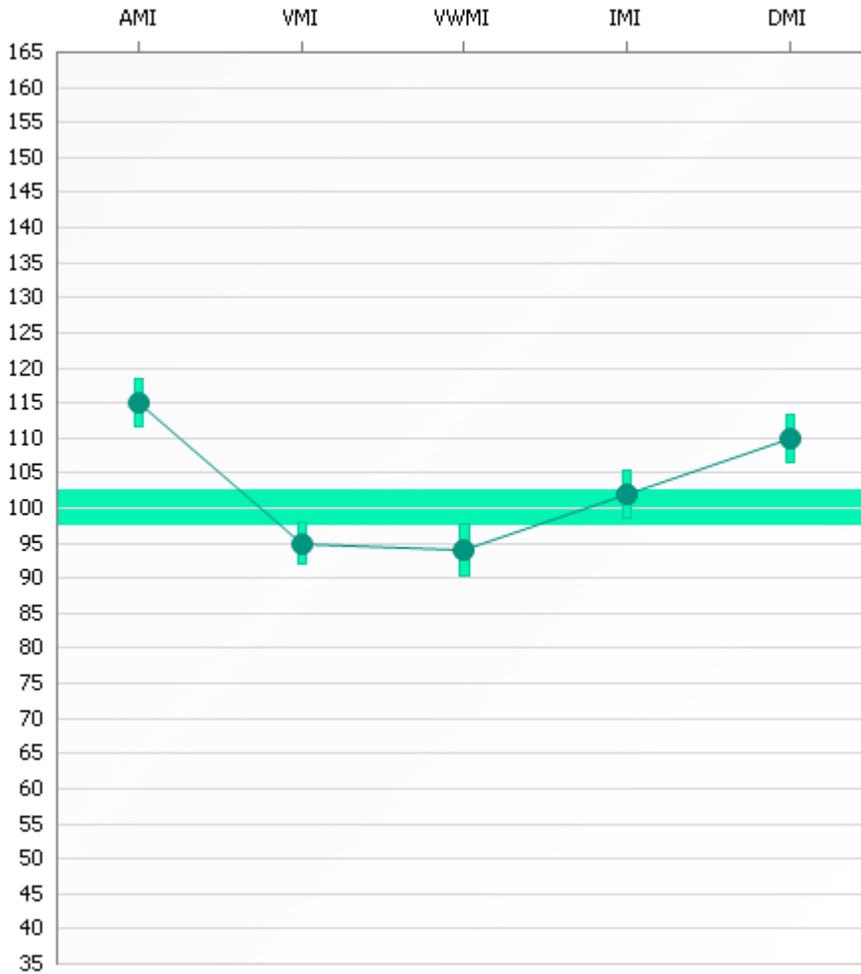
Brief Cognitive Status Exam Classification

| Age | Years of Education | Raw Score | Classification Level | Base Rate |
|-------------------|--------------------|-----------|----------------------|-----------|
| 21 years 2 months | 11 | 53 | Average | 100.0 |

Index Score Summary

| Index | Sum of Scaled Scores | Index Score | Percentile Rank | 95% Confidence Interval | Qualitative Description |
|-----------------------|----------------------|-------------|-----------------|-------------------------|-------------------------|
| Auditory Memory | 50 | AMI 115 | 84 | 108-120 | High Average |
| Visual Memory | 37 | VMI 95 | 37 | 90-101 | Average |
| Visual Working Memory | 18 | VWMI 94 | 34 | 87-102 | Average |
| Immediate Memory | 41 | IMI 102 | 55 | 96-108 | Average |
| Delayed Memory | 46 | DMI 110 | 75 | 103-116 | High Average |

Index Score Profile



Index Scores and Standard Error of Measurement

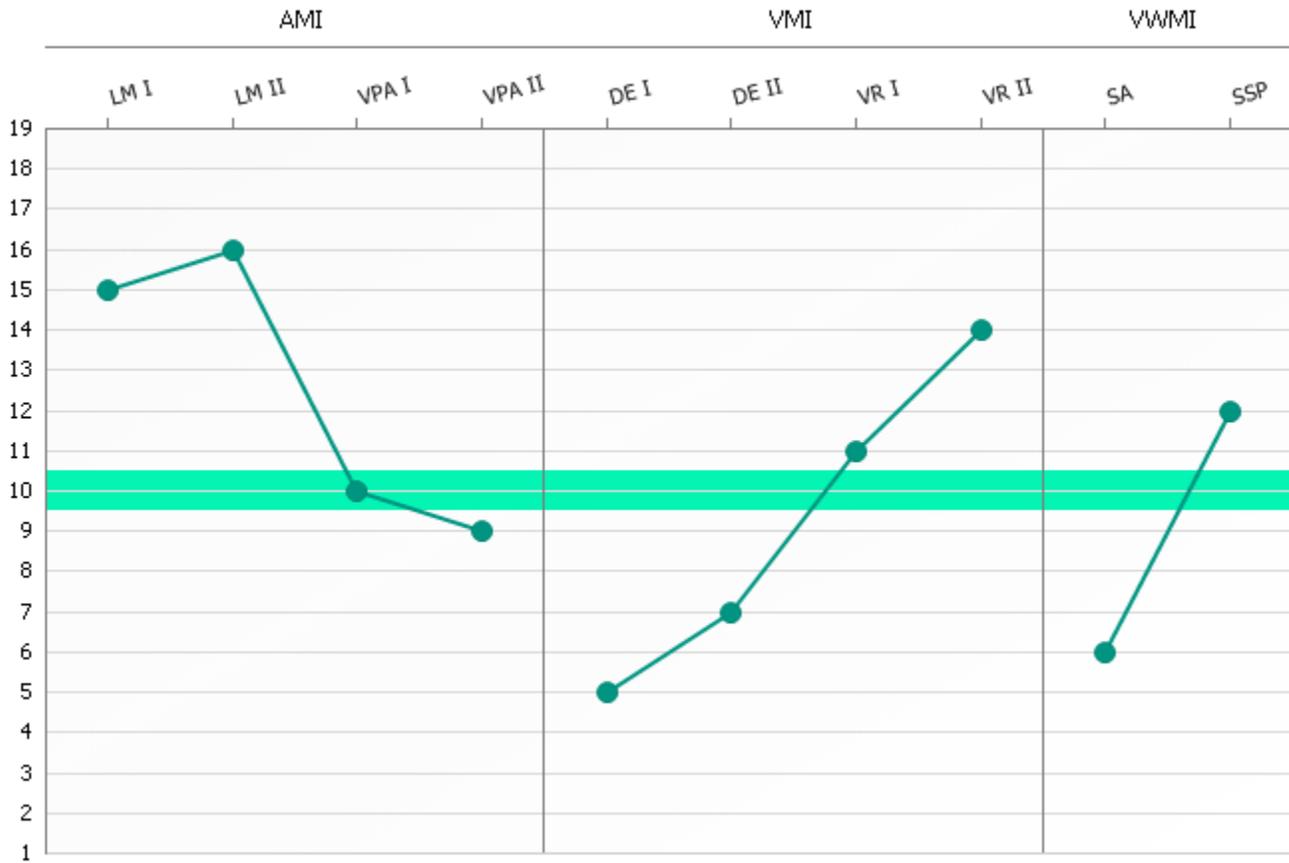
| Index | Score | SEM |
|-------|-------|------|
| AMI | 115 | 3.35 |
| VMI | 95 | 3 |
| VWMI | 94 | 3.67 |
| IMI | 102 | 3.35 |
| DMI | 110 | 3.35 |

The vertical bars represent the standard error of measurement (*SEM*).

Primary Subtest Scaled Score Summary

| Subtest | Domain | Raw Score | Scaled Score | Percentile Rank |
|-----------------------------|--------|-----------|--------------|-----------------|
| Logical Memory I | AM | 39 | 15 | 95 |
| Logical Memory II | AM | 39 | 16 | 98 |
| Verbal Paired Associates I | AM | 40 | 10 | 50 |
| Verbal Paired Associates II | AM | 11 | 9 | 37 |
| Designs I | VM | 53 | 5 | 5 |
| Designs II | VM | 52 | 7 | 16 |
| Visual Reproduction I | VM | 41 | 11 | 63 |
| Visual Reproduction II | VM | 40 | 14 | 91 |
| Spatial Addition | VWM | 10 | 6 | 9 |
| Symbol Span | VWM | 32 | 12 | 75 |

Primary Subtest Scaled Score Profile



Auditory Memory Process Score Summary

| Process Score | Raw Score | Scaled Score | Percentile Rank | Cumulative Percentage (Base Rate) |
|--------------------|-----------|--------------|-----------------|-----------------------------------|
| LM II Recognition | 29 | - | - | >75% |
| VPA II Recognition | 26 | - | - | ≤2% |
| VPA II Word Recall | 16 | 8 | 25 | - |

Visual Memory Process Score Summary

| Process Score | Raw Score | Scaled Score | Percentile Rank | Cumulative Percentage (Base Rate) |
|-------------------|-----------|--------------|-----------------|-----------------------------------|
| DE I Content | 26 | 4 | 2 | - |
| DE I Spatial | 9 | 3 | 1 | - |
| DE II Content | 30 | 7 | 16 | - |
| DE II Spatial | 10 | 7 | 16 | - |
| DE II Recognition | 21 | - | - | >75% |
| VR II Copy | 40 | - | - | 3-9% |

Auditory Memory Index

| Subtest | Scaled Score | AMI Mean | | Critical Value | Base Rate |
|-----------------------------|--------------|----------|----------------------|----------------|-----------|
| | | Score | Difference from Mean | | |
| Logical Memory I | 15 | 12.50 | 2.50 | 2.64 | 15% |
| Logical Memory II | 16 | 12.50 | 3.50 | 2.48 | 2-5% |
| Verbal Paired Associates I | 10 | 12.50 | -2.50 | 1.90 | 15% |
| Verbal Paired Associates II | 9 | 12.50 | -3.50 | 2.48 | 5% |

Statistical significance (critical value) at the .05 level.

Visual Memory Index

| Subtest | Scaled Score | VMI Mean | | Critical Value | Base Rate |
|------------------------|--------------|----------|----------------------|----------------|-----------|
| | | Score | Difference from Mean | | |
| Designs I | 5 | 9.25 | -4.25 | 2.38 | 2% |
| Designs II | 7 | 9.25 | -2.25 | 2.38 | 15-25% |
| Visual Reproduction I | 11 | 9.25 | 1.75 | 1.86 | >25% |
| Visual Reproduction II | 14 | 9.25 | 4.75 | 1.48 | 2-5% |

Statistical significance (critical value) at the .05 level.

Immediate Memory Index

| Subtest | Scaled Score | IMI Mean | | Critical Value | Base Rate |
|----------------------------|--------------|----------|----------------------|----------------|-----------|
| | | Score | Difference from Mean | | |
| Logical Memory I | 15 | 10.25 | 4.75 | 2.59 | 2-5% |
| Verbal Paired Associates I | 10 | 10.25 | -0.25 | 1.82 | >25% |
| Designs I | 5 | 10.25 | -5.25 | 2.42 | 1-2% |
| Visual Reproduction I | 11 | 10.25 | 0.75 | 1.91 | >25% |

Statistical significance (critical value) at the .05 level.

Delayed Memory Index

| Subtest | Scaled Score | DMI Mean | | Critical Value | Base Rate |
|-----------------------------|--------------|----------|----------------------|----------------|-----------|
| | | Score | Difference from Mean | | |
| Logical Memory II | 16 | 11.50 | 4.50 | 2.44 | 5% |
| Verbal Paired Associates II | 9 | 11.50 | -2.50 | 2.44 | 15-25% |
| Designs II | 7 | 11.50 | -4.50 | 2.44 | 5% |
| Visual Reproduction II | 14 | 11.50 | 2.50 | 1.57 | 15-25% |

Statistical significance (critical value) at the .05 level.

Subtest Discrepancy Comparison

| Comparison | Score 1 | Score 2 | Difference | Critical Value | Base Rate |
|--------------------------------|---------|---------|------------|----------------|-----------|
| Spatial Addition – Symbol Span | 6 | 12 | -6 | 2.74 | 8.4 |

Statistical significance (critical value) at the .05 level.

Logical Memory

| Score | Score 1 | Score 2 | Contrast Scaled Score |
|--|---------|---------|-----------------------|
| LM II Recognition vs. Delayed Recall | >75% | 16 | 16 |
| LM Immediate Recall vs. Delayed Recall | 15 | 16 | 13 |

Verbal Paired Associates

| Score | Score 1 | Score 2 | Contrast Scaled Score |
|---|---------|---------|-----------------------|
| VPA II Recognition vs. Delayed Recall | ≤2% | 9 | 16 |
| VPA Immediate Recall vs. Delayed Recall | 10 | 9 | 8 |

Designs

| Score | Score 1 | Score 2 | Contrast Scaled Score |
|--|---------|---------|-----------------------|
| DE I Spatial vs. Content | 3 | 4 | 6 |
| DE II Spatial vs. Content | 7 | 7 | 8 |
| DE II Recognition vs. Delayed Recall | >75% | 7 | 5 |
| DE Immediate Recall vs. Delayed Recall | 5 | 7 | 11 |

Visual Reproduction

| Score | Score 1 | Score 2 | Contrast Scaled Score |
|--|---------|---------|-----------------------|
| VR Copy vs. Immediate Recall | 3-9% | 11 | 15 |
| VR Immediate Recall vs. Delayed Recall | 11 | 14 | 14 |

Index-Level Contrast Scaled Scores

WMS-IV Indexes

| Score | Score 1 | Score 2 | Contrast Scaled Score |
|---|---------|---------|-----------------------|
| Auditory Memory Index vs. Visual Memory Index | 115 | 95 | 8 |
| Visual Working Memory Index vs. Visual Memory Index | 94 | 95 | 10 |
| Immediate Memory Index vs. Delayed Memory Index | 102 | 110 | 13 |