**INTELLECTUAL FUNCTIONING**

As part of the evaluation John was administered the **WISC-V**, a standardized test of intellectual functioning. His performance was compared to peers his age in Canada. The WISC-V is composed of sixteen subtests, ten of which must be completed to derive the five Index scores and seven of those ten combine to provide a full-scale intelligence quotient (FSIQ). The additional subtests are supplementary and can provide additional information. John completed **14 of the sixteen** subtests.

In addition to the Normative Category for each global ability score or broad index, a determination regarding Cohesion is provided along with additional analysis regarding whether the index or score is clinically meaningful or not. Note that when a score is deemed to be clinically meaningful, it is defined as having sufficient cohesion to accurately represent the ability it is intended to measure. Conversely, when a score is deemed not to be clinically meaningful, it indicates substantial subtest variability such that it may not be a good representation of the ability it is intended to measure.

John exhibited significant disparity in his cognitive profile and as such his full-scale intelligence quotient (FSIQ) is not representative of his overall abilities. His index scores will need to be considered separately, and a GAI and CPI may be calculated for consideration and are explained in more detail.

|  |  |  |  |
| --- | --- | --- | --- |
| **Index/Subtest** | **Percentile** | **Qualitative Descriptor** | **Unitary Concept** |
| **Verbal Comprehension (VCI)** | **{{VCI Percentile}}** | **{{VCI Classification}}** |  |
| **Similarities** | **{{Similarities Percentile}}** | **{{Similarities Classification}}** |
| **Vocabulary** | **{{Vocabulary Percentile}}** | **{{Vocabulary Classification}}** |
| Information | {{Information Percentile}} | {{Information Classification}} |
| Comprehension | {{Comprehension Percentile}} | {{Comprehension Classification}} |
| **Visual Spatial (VSI)** | {{VSI Percentile}} | {{VSI Classification}} |  |
| **Block Design** | {{Block Design Percentile}} | {{Block Design Classification}} |
| **Visual Puzzles** | {{Visual Puzzles Percentile}} | {{Visual Puzzles Classification}} |
| **Fluid Reasoning (FRI)** | **{{FRI Percentile}}** | **{{FRI Classification}}** |  |
| **Matrix Reasoning** | **{{Matrix Reasoning Percentile}}** | **{{Matrix Reasoning Classification}}** |
| **Figure Weights** | **{{Figure Weights Percentile}}** | **{{Figure Weights Classification}}** |
| Picture Concepts | {{Picture Concepts Percentile}} | {{Picture Concepts Classification}} |
| Arithmetic | {{Arithmetic Percentile}} | {{Arithmetic Classification}} |
| **Working Memory (WMI)** | **{{WMI Percentile}}** | **{{WMI Classification}}** |  |
| **Digit Span** | **{{Digit Span Percentile}}** | **{{Digit Span Classification}}** |
| **Picture Span** | **{{Picture Span Percentile}}** | **{{Picture Span Classification}}** |
| Letter-Number Sequencing | {{LetterNumber Seq Percentile}} | {{LetterNumber Seq Classification}} |
| **Processing Speed (PSI)** | **{{PSI Percentile}}** | **{{PSI Classification}}** |  |
| **Coding** | **{{Coding Percentile}}** | **{{Coding Classification}}** |
| **Symbol Search** | **{{Symbol Search Percentile}}** | **{{Symbol Search classification}}** |
| **Full-Scale Intelligence Quotient (FSIQ)** | **{{FSIQ Percentile}}** | **{{FSIQ Classification}}** |  |
| **General Ability Index (GAI)** | **{{GAI Percentile}}** | **{{GAI Classification}}** |  |
| **Cognitive Proficiency Index (CPI)** | **{{CPI Percentile}}** | **{{CPI Classification}}** |  |

**Verbal Comprehension Index (VCI)**

The VCI provides an estimate of Crystallized Intelligence (Gc). Gc refers to an individual’s knowledge base (or general fund of information) that develops as a result of exposure to language, culture, general life experiences, and formal schooling. This index measures one’s ability to access and apply acquired word knowledge. The application of this knowledge involves verbal concept formation, reasoning, and expression. This index is comprised of four subtests, two of which are primary subtests and two of which are secondary.

***Similarities (SI)*** is a primary subtest, and it presents the individual with two words that represent common objects or concepts that they have to describe how they are similar. This measures verbal concept formation and abstract reasoning. John scored at the {{Similarities Percentile\*}} percentile and in the {{Similarities Classification}} range.

***Vocabulary (VC)*** is a primary subtest, and it has the individual define a word that is read aloud and measures word knowledge and verbal concept formation. John scored at the {{Vocabulary Percentile\*}} percentile and in the {{Vocabulary Classification}} range.

***Information (IN)*** is a secondary subtest and asks questions about a broad range of general-knowledge topics and measures one’s ability to acquire, retain, and retrieve general factual knowledge. John scored at the {{Information Percentile\*}} percentile and in the {{Information Classification}} range.

***Comprehension (CO)*** is a secondary subtest and has the individual answer questions based on their understanding of general principles and social situations and measures verbal reasoning and conceptualisation, verbal comprehension and expression, the ability to evaluate and use experience, and the ability to demonstrate practical knowledge and judgement. John scored above the {{Comprehension Percentile\*}} percentile and in the {{Comprehension Classification}} range.

The difference between the scores that comprise the VCI is not significant and considered common in the general population. However, this domain was not cohesively developed. This means that the VCI is likely a good summary of Verbal Comprehension. However, individual subtests should be considered when evaluating results.

The VCI is classified as in the {{VCI Classification}} range and is ranked at the {{VCI Percentile\*}} percentile, indicating performance as good as or better than {{VCI Percentile}}% of same age peers from the general population. The difference between the VCI and the average of all five primary index scores is not significant and considered uncommon in the general population. Overall, one or more of John’s Verbal Comprehension abilities may facilitate learning, particularly the abilities that are at least average.

**Visual Spatial Index (VSI)**

The VSI provides an estimate of Visual Processing (Gv). Gv refers to an individual’s ability to generate visual images and perceive and analyze visual patterns and visual information. The VSI provides an estimate of Visual Processing (Gv). This index measures one’s ability to evaluate visual details and to understand visual spatial relationships to construct geometric designs from a model, which requires visual spatial reasoning, integration and synthesis of part-whole relationships, attentiveness to visual detail, and visual-motor integration. This index is comprised of two subtests, both of which are primary subtests.

***Block Design (BD)*** has an individual view a model and/or picture and utilises two-colour blocks to recreate the design or pattern within a time limit and measures the ability to analyse and synthesise abstract visual stimuli. John scored at the {{Block Design Percentile\*}} percentile and in the {{Block Design Classification}} range.

***Visual Puzzles (VP)*** has the individual view a completed puzzle and selects three response options from six that when combined reconstruct the puzzle within a time limit. This measures mental, non-motor construction ability, which requires visual and spatial reasoning, mental rotation, visual working memory, understanding part-whole relationships, and the ability to analyses and synthesise abstract visual stimuli. John scored at the {{Visual Puzzles Percentile\*}} percentile and in the {{Visual Puzzles Classification}} range.

The difference between the scores that comprise the VSI is not significant, and a difference of this size is considered common in the general population. This means that the VSI is a good summary of Visual Processing.

The VSI is classified as in the {{VSI Classification}} range and is ranked at the {{VSI Percentile\*}} percentile, indicating performance as good as or better than {{VSI Percentile}} % of same age peers from the general population. The difference between the VSI and the average of all five primary index scores is not significant and considered common in the general population. Overall, one or more of John’s Visual Spatial abilities may facilitate learning, particularly the abilities that are at least average.

**Fluid Reasoning Index (FRI)**

The FRI provides an estimate of Fluid Reasoning (Gf). Gf refers to a type of thinking that an individual may use when faced with a relatively new or novel task that cannot be performed automatically. This index measures one’s ability to detect the underlying conceptual relationship among visual objects and to use reasoning to identify and apply rules which requires inductive and quantitative reasoning, broad visual intelligence, simultaneous processing, and abstract thinking. This index is comprised of four subtests, two of which are primary subtests and two of which are secondary.

***Matrix Reasoning (MR)*** is a primary subtest and has an individual view an incomplete matrix or series and selects the response option from five possibilities that completes the matrix or series. It requires the individual to use visual-spatial information to identify the underlying conceptual rule that links all the stimuli and then apply the underlying concept to select the correct response. It measures fluid intelligence, broad visual intelligence, classification and spatial ability, knowledge of part-whole relationships, and simultaneous processing. John scored at the {{Matrix Reasoning Percentile\*}} percentile and in the {{Matrix Reasoning Classification}} range.

***Figure Weights (FW)*** is a primary subtest and has an individual view a scale with missing weight(s) and select the response option that keeps the scale balanced. It requires an individual to apply the quantitative concept of equality to understand the relationship among objects and apply the concepts of matching, addition, and/or multiplication to identify the correct response. It measures quantitative fluid reasoning and induction. John scored at the {{Figure Weights Percentile\*}} percentile and in the {{Figure Weights Classification}} range.

***Picture Concepts (PC)*** is a secondary subtest and has an individual view two or three rows of pictures and select one picture from each row to form a group with a common characteristic. It requires an individual to use the semantic representation of nameable objects to identify the underlying conceptual relationship among the objects and to apply that concept to select the correct response. This is not timed. It measures fluid and inductive reasoning, visual-perceptual recognition and processing, and conceptual thinking. John scored at the {{Picture Concepts Percentile\*}} percentile and in the {{Picture Concepts Classification}} range.

***Arithmetic (AR)*** is a secondary subtest that has an individual solve arithmetic problems within a time limit. It involves mental manipulation, concentration, brief focussed attention, working memory, short- and long-term memory, numerical reasoning ability, applied computational ability, and mental alertness. John scored at the {{Arithmetic Percentile\*}} percentile and in the {{Arithmetic Classification}} range.

The difference between the scores that comprise the FRI is not significant and a difference of this size is considered common in the general population. This means that the FRI is a good summary of Fluid Reasoning.

The FRI is classified as {{FRI Classification}} and is ranked at the {{FRI Percentile\*}} percentile, indicating performance as good as or better than {{FRI Percentile}} % of same age peers from the general population. The difference between the FRI and the average of all five primary index scores is not significant and common in the general population. Overall, one or more of John’s Fluid Reasoning abilities may facilitate learning, particularly the abilities that are at least average.

**Working Memory Index (WMI)**

The WMI provides an estimate of Short-term Working Memory (Gsm). Gsm refers to the ability to hold information in immediate awareness and then manipulate or transform it in some way within a few seconds. This index measures one’s ability to register, maintain (i.e., the process by which information is kept active in conscious awareness), and manipulate (i.e., the mental resequencing of information based on the application of a specific rule) visual and auditory information in conscious awareness, which requires attention, auditory and visual discrimination, and concentration. This index is comprised of three subtests, two of which are primary subtests and one of which is secondary.

***Digit Span (DS)*** is a primary subtest that has an individual listen to a sequence of numbers read to them and they must recall them in the same order (Forward task), reverse order (Backward task), and ascending order (Sequencing task). The shift from one task to another requires cognitive flexibility and mental alertness. All tasks require registration of information, brief focussed attention, auditory discrimination, and auditory rehearsal. John scored at the {{Digit Span Percentile\*}} percentile and in the {{Digit Span Classification}} range.

***Picture Span (PS)*** is a primary subtest and has an individual view a stimulus page with one or more pictures of nameable objects for a specified time and then select the picture(s) in sequential order from options on a response page. It measures visual working memory and working memory capacity. John scored at the {{Picture Span Percentile\*}} percentile and in the {{Picture Span Classification}} range.

***Letter-Number Sequencing (LN)*** is a secondary subtest and has an individual listen to a sequence of numbers and letters read to them and recall the numbers in ascending order and then the letters in alphabetical order. It requires auditory discrimination, brief focussed attention, concentration, registration, and auditory rehearsal. John scored at the {{LetterNumber Seq Percentile\*}} percentile and in the {{LetterNumber Seq Classification}} range.

The difference between the scores that comprise the WMI is significant and a difference of this size is seen in only 20.9% of the general population. This means that the WMI is not necessarily a good summary or Working Memory. Individual subtests should be considered when evaluating scores.

The WMI is classified as {{WMI Classification}} and is ranked at the {{WMI Percentile\*}} percentile, indicating performance as good as or better than {{WMI Percentile}}% of same age peers from the general population. The difference between the WMI and the average of all five primary index scores is significant and considered uncommon in the general population. This indicates that Working Memory is an area of **weakness** for John.

**Processing Speed Index (PSI)**

The PSI provides an estimate of Processing Speed (Gs). Gs refers to the efficiency of cognitive processing or speed of mental activity. It involves the ability to perform simple clerical-type tasks quickly, especially when under pressure to maintain attention and concentration. This index measures the speed and accuracy of visual identification, decision-making, and decision implementation, which is related to visual scanning, visual discrimination, short-term visual memory, visuomotor coordination, and concentration. This index is comprised of two primary subtests.

***Coding (CD)*** has an individual work within a time limit and use a key to copy symbols that correspond with simple geometric shapes or numbers. It measures short-term visual memory, procedural and incidental learning ability, psychomotor speed, visual perception, visual-motor coordination, visual scanning ability, cognitive flexibility, attention, concentration, and motivation. John scored at the {{Coding Percentile\*}} percentile and in the {{Coding Classification}} range.

***Symbol Search (SS)*** has an individual scan search groups and indicate whether target symbols are present, within a specified time limit. It involves short-term visual memory, visual-perceptual identification and matching and decision-making speed, visual-motor coordination, inhibitory control, visual discrimination, psychomotor speed, sustained attention, and concentration. John scored at the {{Symbol Search Percentile\*}} percentile and in the {{Symbol Search Classification}} range.

The difference between the scores that comprise the PSI is not significant, and a difference of this size is considered common in the general population. This means that the PSI is a good summary of Processing Speed.

The PSI is classified as {{PSI Classification}} and at the {{PSI Percentile\*}} percentile, indicating performance as good as or better than {{PSI Percentile}}% of same age peers from the general population. The difference between the PSI and the average of all five primary index scores is not significant and common in the general population.

**Ancillary Indexes and Clinical Composites**

The table below presents a summary of the Normative Category and Cohesion for the Ancillary Indexes and Clinical Composites. There are five scales at the Ancillary Index level. The Ancillary Index scores are derived from combinations of primary and secondary subtests. They provide additional information regarding cognitive ability.

It should be noted that nearly 70% of the population obtains standard scores on norm referenced tests that fall “Within Normal Limits” (16th to 84th percentiles). Therefore, scores that fall in this range should be considered as indicative of expected performance relative to most people. However, scores that fall at the lower end of this range (i.e., 16th to 23rd percentiles; Low Average) may represent areas of difficulty. As such, multiple data sources should be considered prior to suggesting that a Low Average score is problematic for the individual.

**John had -- to -- scores.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Ancillary Index/Subtest** | **Percentile** | **Qualitative Descriptor** | **Unitary Concept** |
| Quantitative Reasoning (QRI) | {{QRI Percentile}} | {{QRI Classification}} |  |
| Auditory Working Memory (AWMI) | {{AWMI Percentile}} | {{AWMI Classification}} |  |
| Nonverbal (NVI) | {{NVI Percentile}} | {{NVI Classification}} |  |
| General Ability (GAI) | {{GAI Percentile}} | {{GAI Classification}} |  |
| Cognitive Proficiency (CPI) | {{CPI Percentile}} | {{CPI Classification}} |  |

**Quantitative Reasoning Index (QRI)**

The QRI is derived from the sum of scaled scores for the Figure Weights (FW) and Arithmetic (AR) subtests.

QR is an indicator of an individual’s quantitative reasoning skills, which is closely related to general intelligence. Assessing QR assists in potentially more accurately predicting both reading and mathematics achievement scores, creativity, and future academic success. This index provides additional information regarding John’s reasoning skills, specifically those involving numeric information. It is often helpful in assisting to identify learning issues around math problem solving.

The difference between the scores that comprise the composite is not significant and is common in the general population. The composite is, therefore, cohesive meaning that it is likely to be a good summary of the theoretically related abilities it was intended to represent.

John is performing consistently at the {{QRI Percentile\*}} percentile in the {{QRI classification}} range.

**Auditory Working Memory Index (AWMI)**

The AWMI is derived from the sum of scaled scores for the Digit Span (DS) and Letter-Number Sequencing (LN) subtests and is an indicator of an individual’s auditory working memory skills.

The WMI as discussed previously provides a composite measure of working memory across mixed modalities (auditory and visual) while the AWMI provides a purer measure of auditory working memory. This index allows for a comparison with the Working Memory Index, which assesses complex visual-spatial working memory versus auditory working memory. AWMI tasks are generally more related to academic achievement than are visual working memory tasks especially for reading, math problem solving, and written expression. The two modalities of working memory may be differentially sensitive to specific learning disorders.

The difference between the scores that comprise the composite is not significant and is common in the general population. The composite is, therefore, cohesive meaning that it is likely to be a good summary of the theoretically related abilities it was intended to represent.

John is performing in the {{AWMI Classification}}range at the {{AWMI Percentile\*}} percentile. The difference between his WMI ({{WMI Percentile\*}} percentile) and AWMI ({{AWMI Percentile\*}} percentile) was not significant.

**Nonverbal Index (NVI)**

The NVI is derived from the sum of six subtest scaled scores (BD, MR, CD, FW, VP, & PS) from tasks that do not require any verbal responses and can be interpreted as a measure of general intellectual ability that minimises expressive demands.

The Fluid and Visual Spatial domains assess a single primary cognitive construct: Reasoning with Nonverbal Visual Material. While the NVI should not be conceptualised as a language-free measure, it may be more accurately described as language-reduced as it is derived from subtests that require an individual to understand instructions in English.

John scored in the {{NVI Classification}} range at the {{NVI Percentile\*}}percentile. While his score was cohesively developed it is not necessarily a good representation of their abilities.

**General Ability Index (GAI)**

The GAI is based on the Verbal Comprehension, Visual Spatial, and Fluid Reasoning subtests that contribute to the FSIQ (BD, SI, MR, VC, & FW), it was specifically developed to assist with the identification of relative strengths and weaknesses based on comparisons.

Conceptually, the GAI provides an estimate of general intellectual ability that is less reliant on working memory and processing speed relative to the FSIQ, which includes these measures in its overall calculation. The GAI is often considered a better estimate of overall intellectual ability than the FSIQ because it contains only high g-loaded tests, whereas the FSIQ contains high g-loaded tests as well as moderate to low g-loaded tests (e.g., Coding). The most g-loaded tests involve complex cognitive operations (e.g., inductive and deductive reasoning, as well as abstraction) while tests with low g-loadings involve less complex cognitive operations (e.g., sensory discriminations, reaction times to simple stimuli, and rote memory).

John’s GAI was at the {{GAI Percentile\*}} percentile in the {{GAI Classification}} range. His score was not cohesively developed and may not be the best representation of his skills in this area. The difference between John’s stronger GAI and his uninterpretable FSIQ, which would have been at the {{GAI Percentile\*}} percentile was not significant

**Cognitive Proficiency Index (CPI)**

The CPI is based on the subtests that contribute to the WMI and the PSI (DS, CD, PS, & SS).

Conceptually, the CPI provides an estimate of the efficiency with which information is processed in the service of learning, problem-solving, and higher-order reasoning. This index looks at proficient processing and how it facilitates fluid reasoning and the acquisition of new material by reducing the cognitive demands of novel or higher order tasks. The CPI provides an estimate of John’s cognitive information processing efficiency. Quick processing speed facilitates information processing before decay from working memory occurs.

This index is most useful in the context of a pairwise difference comparison with the GAI. John’s CPI is in the {{CPI Classification}} range at the {{CPI Percentile\*}} percentile. His CPI was cohesively developed.

The difference between his {{GAI Classification}} GAI ({{GAI Percentile\*}} percentile) and his {{CPI Classification}} CPI ({{CPI Percentile\*}} percentile) was not significant.

**Summary of Intellectual Test Results**

The pattern of intellectual testing indicates that John