

EXAMPLE REPORT



**Psychological
& Educational**
Consultancy Services

Suite 9 / 336 Churchill Avenue SUBIACO WA 6008
PO Box 502 SUBIACO WA 6904
Phone: (08) 9388 8044
www.pecs.net.au

PECS Example Comprehensive ADHD Report:
John Smith

Strictly Confidential

RATIONALE

*This **Example Comprehensive ADHD Psychological Report** is provided to act as an example of the breadth and thoroughness of an assessment performed by Psychological & Educational Consultancy Services (PECS).*

The assessment components provide practitioners with assessment evidence to complement their clinical opinion when addressing the Department of Health / Stimulant Committee requirements for ADHD.

This example report also reflects changes relating to the release of the DSM-5 (APA, 2013).

BRIEF BIOGRAPHY OF THE AUTHOR

Dr Shane Langsford is a highly qualified and very experienced psychologist who has conducted more than 3000 assessments since opening his private practice in 1999.

Dr Langsford's qualifications include a PhD, Bachelor of Education with First Class Honours, and a Bachelor of Psychology.

Dr Langsford is fully registered with the Psychology Board of Australia (PBA) and the Australian Health Practitioners Regulation Agency (AHPRA).

Dr Langsford is an APS College of Educational & Developmental Psychologists Full Academic Member

Dr Langsford is also a full member of the Australian Psychological Society (APS), Australian Association of Psychologists (AAPi), Australian ADHD Professionals Association (AADPA), and ADHD Australia.

In 2015, Dr Langsford was personally selected from a shortlist by the then Federal Minister of Health (the Hon Sussan Ley) to be part of the 13-member Mental Health Expert Reference Group (MHERG). The group was formed to provide advice to the Commonwealth Department of Health in relation to the government's response to the National Review of Mental Health Programmes and Services. Dr Langsford was the only practising psychologist in Australia appointed to the group, and the only member in the group from Western Australia. (For more information, see www.pecs.net.au/pecs-profile)

With regards to ADHD, Dr Langsford has conducted over 1500 ADHD assessments for various Psychiatrists and Paediatricians, was asked in 2014 to be on the National Shire ADHD Expert Panel for the "A Snapshot of ADHD: A Consumer and Community Discussion", and in April 2018 was the only Psychologist from Australia participating in the ADHD Institute's invite-only "Meeting of the Minds" forum in Madrid (Spain). (For more information, see www.adhd-institute.com)

Dr Langsford's extensive knowledge of a wide range of disorders led to the creation of the award-winning PsychProfiler, which is oriented to the DSM-5 and has been the most widely used Australian global psychiatric/psychological/educational assessment tool since 2004 and is in the top five global screening instruments internationally. (For more information, see www.psychprofiler.com)

WHAT IS A COMPREHENSIVE PSYCHOLOGICAL REPORT?

A Comprehensive Psychological Assessment (CPA) is the systematic collection, analysis developmental, behavioural, socioemotional, cognitive and/or educational for the purpose of making inferences about underlying brain function.

These inferences are achieved by investigating an individual's strengths and weaknesses across the aforementioned areas and identifying any patterns that may exist.

Ultimately, the investigation's aim is to rule out the presence of any clinically significant afflictions, or if indeed present, to facilitate diagnosis of the core underlying problem, identify its aetiology and impact on the individual, and identify any comorbid concerns that may exist.

The large majority of subsequent diagnoses are genetic, hereditary and familial in nature, with a significant minority environmental/experiential in origin.

A Comprehensive Psychological Report (CPR) contains the information garnered from the CPA and is primarily compiled to convey the information to other medical, health, and educational professionals (often the referrer) for the purpose of specialist diagnosis, and/or the implementation of intervention/treatment.

Please Note: This Example ADHD Report is for a 13yo. Reports for younger children and adults are almost identical, with the only difference being that the appropriate age tests are used.

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BIOGRAPHICAL DETAILS

Name:	John Smith
Date of Birth:	14/02/2005
Gender:	Male
Age:	13 years
Grade:	9
School:	Local High School
Address:	123 West Coast Drive, TRIGG WA 6029
Parent's Phone Number:	0444 444 444
Parent's Email Address:	smith@example.net.au

REFERRAL INFORMATION

John was referred to Psychological and Educational Consultancy Services (PECS) by Dr Jane Brown (Consultant Paediatrician) for a *Comprehensive Psychological Assessment* and indication of whether the results are reflective of an individual with Attention-Deficit/Hyperactivity Disorder (ADHD).

CURRENT CONCERNS

From a presented list, John's parents identified concerns in the following areas:

- Academic
- Attention
- Learning
- Schoolwork/homework
- Suspected hyperactivity
- Memory

BRIEF BACKGROUND INFORMATION

Relevant information reported during the initial interview session:

- Was born with no apparent complications.
- Reached most of the major developmental milestones (e.g., crawling, walking, toileting) during the expected age ranges; speaking short sentences was achieved late.
- No major medical or neurological conditions.
- Normal visual and auditory acuity reported.
- No prescription medication use.
- Is a mix of right and left-handed/footed; John's older brother is left-handed.
- John's mother reported she was also late to speak, experienced similar academic difficulties during schooling and received English remediation.
- John's older brother has been diagnosed with Dyslexia and ADHD.
- Past assessments and interventions include;
 - Speech Therapy (at age 3 to 6 years) for an articulation error with /th/ sounds (e.g. "fwee" for three, "bofe" for both, and "fing" for thing).
 - Occupational Therapy (at age 7 years) to help with poor coordination and pencil grip.
 - Literacy remediation (Reading Recovery Programme) since Grade 1, however, this has produced little improvement.
- Was retained in Pre-Primary due to; "not being academically ready and having obvious difficulty with speech".
- John's mother reported John;
 - Was a very active 2 to 3-year-old.
 - Is very impulsive, fails to listen to or follow instructions; will not sit within a group.
 - Had problems learning the alphabet; still reverses letters and words.
 - Inaccurate and slow reading; further concerns regarding his reading comprehension.
 - Difficulties with spelling and transferring ideas onto paper (e.g. essay writing).
 - Is better at Maths than English.
 - Runs out of time during timed assessments.
- John's English teacher reported John;
 - Struggles with un-structured activities, both in the classroom and at recess and lunchtime. He fidgets constantly in the classroom, calls out, leaves his seat, and hastily completes work. He is generally interested in what is happening in the classroom and is curious about different subjects.

Past testing:

- NAPLAN Year 5:
 - Reading – just below average
 - Writing – well below average
 - Spelling – just below average
 - Grammar & Punctuation – just below average
 - Numeracy – average
- NAPLAN Year 7:
 - Reading – well below average
 - Persuasive Writing – well below average
 - Spelling – well below average
 - Grammar & Punctuation – just below average
 - Numeracy – well above average

Please note that only a brief overview was obtained due to John and his parents already having provided more detailed background information to Dr Brown.

See checklists for more behavioural information.

Global Screening Test Administered:

Date of Administration

**Child & Adolescent PsychProfiler* (CAPP; Langsford, Houghton, & Douglas, 2014)

11/09/2018

CAPP Outline:

The CAPP is a reliable and valid instrument that comprises 126 items and utilises three separate screening forms; the Self-Report Form (SRF: 126 items), Parent-report Form (PRF: 126 items), and Teacher-report Form (TRF: 126 items) for the simultaneous screening of 14 of the most prevalent disorders in children and adolescents.

The CAPP comprises screening criteria that closely resemble the diagnostic criteria of the *Diagnostic and Statistical Manual of Mental Disorders–Fifth Edition* (DSM-5: American Psychiatric Association, 2013).

Disorders included in the CAPP:

Anxiety Disorders:

- ★ Generalised Anxiety Disorder
- ★ Separation Anxiety Disorder

Attention-Deficit/Hyperactivity Disorder:

- ★ Attention-Deficit/Hyperactivity Disorder

Autism Spectrum Disorder:

- ★ Autism Spectrum Disorder

Communication Disorders:

- ★ Language Disorder
- ★ Speech Sound Disorder

Depressive Disorders:

- ★ Persistent Depressive Disorder

Disruptive, Impulse-Control, & Conduct Disorders:

- ★ Conduct Disorder
- ★ Oppositional Defiant Disorder

Feeding and Eating Disorders:

- ★ Anorexia Nervosa
- ★ Bulimia Nervosa

Obsessive-Compulsive and Related Disorders:

- ★ Obsessive-Compulsive Disorder

Specific Learning Disorders:

- ★ Specific Learning Disorder – Reading, Mathematics, and Written Expression

Trauma and Stressor-Related Disorders:

- ★ Posttraumatic Stress Disorder

Global Behavioural Assessment Results:

In order to provide more conclusive information, John, John’s parents, and John’s teacher all completed separate CAPP Forms.

John self-reported positive screens for:

- Attention-Deficit/Hyperactivity Disorder: Combined Presentation
- Specific Learning Disorder – with Impairment in Reading
- Specific Learning Disorder – with Impairment in Written Expression

John’s parents reported positive screens for:

- Attention-Deficit/Hyperactivity Disorder: Combined Presentation
- Specific Learning Disorder – with Impairment in Reading
- Specific Learning Disorder – with Impairment in Written Expression

John’s teacher reported positive screens for:

- Attention-Deficit/Hyperactivity Disorder: Predominantly Hyperactive/Impulsive Presentation
- Oppositional Defiant Disorder
- Specific Learning Disorder – with Impairment in Reading
- Specific Learning Disorder – with Impairment in Written Expression

A copy of the CAPP Report is included as an Appendix, as are the completed CAPP Forms.

Please refer to the CAPP Report for the individual behaviours which were responsible for the positive screens elicited.

ADHD BEHAVIOURAL ASSESSMENT

Checklists Administered:

<i>Checklists</i>	<i>Date of Administration</i>
(1) Conners' 3 Parent Rating Scale: Long Form (Conners 3-P, 2014)	23/09/2018
(2) Conners' 3 Teacher Rating Scale: Long Form (Conners 3-T, 2014)	23/09/2018

Conners' Subscales:

Conners' Parent and Teacher Report Subtest Descriptions

A: Aggression	Are likely to be physically and verbally aggressive, may show tendencies that are destructive and demonstrate poor control over their anger/aggression. May bully others, be argumentative, and break rules.
B: Inattention	Have poor concentration, attention and difficulty focusing their mind on work. Often make careless mistakes, have difficulty starting and completing tasks, and tend to be easily bored.
C: Hyperactivity/Impulsivity	Have difficulty sitting still for very long, feel restless and impulsive. May be easily excited and talk too much.
D: Peer Relations	May have poor social skills, limited social connections and difficulty with friendships. Appears to be unaccepted by their peers.
E: Learning Problems¹	Tend to struggle academically. May have difficulty learning and/or remembering new concepts and need more help and explanation.
F: Executive Functioning¹	Have poor planning, organisational and prioritising skills. Have difficulty starting or finishing tasks.
G: Conners 3 ADHD Index	Identifies children/ adolescents "at risk" for ADHD
H: Conners 3 GI Total	The CGI Score reflects general problematic behaviour. High scores tend to indicate hyperactivity, but the problems can also be emotional, social, academic or behavioural.
I: DSM-5 ADHD Inattentive	High scores indicate an above average correspondence with the DSM-5 diagnostic criteria for Inattentive type ADHD
J: DSM-5 ADHD Hyperactive-Impulsive	High scores indicate an above average correspondence with the DSM-5 diagnostic criteria for Hyperactive-Impulsive type ADHD
K: DSM-5 Conduct Disorder	High scores indicate an above average correspondence to DSM-5 criteria for Conduct Disorder.
L: DSM-5 Oppositional Defiant Disorder	High scores indicate an above average correspondence to DSM-5 criteria for Oppositional Defiant Disorder.

¹Learning Problems and Executive Functioning are subscales of Learning Problems/Executive Functioning on the Conners' 3-T.

An additional 8 screening items for anxiety and depression, as well as critical behaviour questions are also included in the Conners' Parent & Teacher Report Scales.

Conners' 3 Interpretive Guidelines:

The authors of the Conners' 3 Rating Scales (Conners' 3) state that *T*-Scores greater than 60 are usually taken to indicate a **clinically significant problem**.

Interpretive Guidelines for Conners' T-Scores and Percentiles

<i>T</i> -Score	Percentile	Interpretive Guidelines
<30	<2	Markedly Atypical (Low Scores are Good: Not a Concern)
30-34	2-5	Moderately Atypical (Low Scores are Good: Not a Concern)
35-39	6-15	Mildly Atypical (Low Scores are Good: Not a Concern)
40-44	16-26	Slightly Atypical (Low Scores are Good: Not a Concern)
45-55	27-73	Average (Typical Score: Should Not Raise a Concern)
56-60	74-85	Slightly Atypical (Borderline: Should Raise a Concern)
61-65	86-94	Mildly Atypical (Possibly Significant Problem)
66-70	95-98	Moderately Atypical (Indicates Significant Problem)
>70	>98	Markedly Atypical (Indicates Significant Problem)

Furthermore, the greater number of subscales that show clinically relevant elevation (i.e *T*-Scores above 60), the greater likelihood that the Conners 3 scores indicate a moderate to severe problem.

High scores on the ADHD Index are considered by the checklist authors to be useful for differentiating **clinical ADHD** individuals from **non-clinical** individuals. Please note, that the ADHD Index score reported is a probability % figure, not a *T*-score like the other Indexes.

Checklist Results:

(1) Conners' 3 Parent Rating Scale:

The Conners' 3-P is a reliable and valid instrument that contains 110 items pertaining to their perception of their child's behaviour over the past month.

Conners' 3-P Summary Results

Conners' Subscales	<i>T</i> -Score*
Inattention	83
Hyperactivity/Impulsivity	52
Learning Problems	68
Executive Functioning	77
Aggression	89
Peer Relations	64
Conners Global Index: Total	77
DSM-5 Symptoms: Inattentive	77
DSM-5 Symptoms: Hyperactive-Impulsive	55
DSM-5 Symptoms: Conduct Disorder	82
DSM-5 Symptoms: Oppositional Defiant Disorder	75
ADHD Index	96

**T*-scores have a mean of 50 and a standard deviation of 10

**T*-scores above 60 are deemed by the checklist authors to be clinically significant

ADHD Index score reported is a probability % figure, not a *T*-score like the other Indexes.

(2) Conners' 3 Teacher Rating Scale:

The Conners' 3-T is a reliable and valid instrument that contains 110 items pertaining to their perception of the student's behaviour over the past month.

Conners' 3-T Summary Results

Conners' Subscales	T-Score*
Inattention	75
Hyperactivity/Impulsivity	54
Learning Problems	68
Executive Functioning	77
Aggression	67
Peer Relations	64
Conners Global Index: Total	74
DSM-5 Symptoms: Inattentive	82
DSM-5 Symptoms: Hyperactive-Impulsive	55
DSM-5 Symptoms: Conduct Disorder	75
DSM-5 Symptoms: Oppositional Defiant Disorder	72
ADHD Index	98

**T-scores have a mean of 50 and a standard deviation of 10*

**T-scores above 60 are deemed by the checklist authors to be clinically significant*

ADHD Index score reported is a probability % figure, not a T-score like the other Indexes.

Summary of Conners' results:

The authors of the Conners' 3 state that T-Scores greater than 60 are usually taken to indicate a clinically significant problem.

Furthermore, the greater number of subscales that show clinically relevant elevation (i.e T-Scores above 60), the greater likelihood that the Conners' 3 scores indicate a moderate to severe problem.

John's scores exceeded the cut-off for **9** subscales on the Parent-report Conners' checklist and **9** subscales on the Teacher-report.

John's parent-report score on the ADHD Index indicates that there is a **96% probability** that he has ADHD, (unless another factor/diagnosis better explains the behaviours reported).

John's teacher-report score on the ADHD Index indicates that there is a **98% probability** that he has ADHD, (unless another factor/diagnosis better explains the behaviours reported).

DSM-5 CRITERIA ADHD ASSESSMENT:

Checklists Administered:

Date of Administration

(1) ADHD DSM-5 Criteria–Parent Completion (American Psychiatric Association, 2013) 03/09/2018

INATTENTION (Only behaviours occurring for 6 months or more are ticked)		Yes (✓)
A1	Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or during other activities (e.g., overlooks or misses details, work is inaccurate).	✓
A2	Often has difficulty sustaining attention in tasks or play activities (e.g., has difficulty remaining focused during lectures, conversations, or lengthy reading).	
A3	Often does not seem to listen when spoken to directly (e.g., mind seems elsewhere, even in the absence of any obvious distraction).	✓
A4	Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (e.g., starts tasks but quickly loses focus and is easily side-tracked).	✓
A5	Often has difficulty organizing tasks and activities (e.g., difficulty managing sequential tasks; difficulty keeping materials and belongings in order; messy, disorganised work; has poor time management; fails to meet deadlines).	✓
A6	Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (e.g., schoolwork or homework; for older adolescents and adults preparing reports, completing forms, reviewing lengthy papers).	✓
A7	Often loses things necessary for tasks or activities (e.g., school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile telephones).	
A8	Is often easily distracted by extraneous stimuli (for older adolescents and adults, may include unrelated thoughts).	✓
A9	Is often forgetful in daily activities (e.g., doing chores, running errands; for older adolescents and adults, returning calls, paying bills, keeping appointments).	✓
TOTAL		7

HYPERACTIVITY AND IMPULSIVITY (Only behaviours occurring for 6 months or more are ticked)		Yes (✓)
A10	Often fidgets with or taps hands or feet or squirms in seat.	
A11	Often leaves seat in situations when remaining seated is expected (e.g., leaves his or her place in the classroom, in the office or other workplace, or in other situations that require remaining in place).	✓
A12	Often runs about or climbs in situations where it is inappropriate. (Note: In adolescents or adults, may be limited to feeling restless).	
A13	Often unable to play or engage in leisure activities quietly.	✓
A14	Is often “on the go,” acting as if “driven by a motor” (e.g., is unable to be or uncomfortable being still for extended time, as in restaurants, meetings; may be experienced by others as being restless or difficult to keep up with).	
A15	Often talks excessively.	
A16	Often blurts out an answer before a question has been completed (e.g., completes people’s sentences; cannot wait for turn in conversation).	
A17	Often has difficulty waiting his or her turn (e.g., while waiting in line).	✓
A18	Often interrupts or intrudes on others (e.g. butts into conversations, games or activities; may start using other people’s things without asking or receiving permission; for adolescents and adults, may intrude into or take over what others are doing).	
TOTAL		3

	Clinically significant symptoms	Yes	No	NA
B	Have the several inattentive or hyperactive-impulsive symptoms been present prior to age 12 years?	✓		
C	Are the several inattentive or hyperactive-impulsive symptoms present in two or more settings (e.g., at home, school, or work; with friends or relatives; in other activities)?	✓		
D	Is there clear evidence that the inattentive or hyperactive-impulsive symptoms interfere with, or reduce the quality of, social, academic, or occupational functioning?	✓		
E	Do the symptoms occur exclusively during the course of schizophrenia or another psychotic disorder; and/or are not better explained by another mental disorder (e.g., mood disorder, anxiety disorder, dissociative disorder, personality disorder, substance intoxication or withdrawal)?		✓	

SUMMARY OF CRITERIA:

Criteria A: Six or more inattention and/or hyperactive-impulsive symptoms have persisted for at least 6 months to a degree that is inconsistent with developmental level and that significantly impacts directly on social and academic/occupational activities.

Total number of Inattention criterion met = 7
Total number of Hyperactive-Impulsive criterion met = 3

This criterion is rated as having been Met.

Criteria B: The inattentive or hyperactive-impulsive symptoms have been present prior to age 12 years?

This criterion is rated as having been Met.

Criteria C: The inattentive or hyperactive-impulsive symptoms present in two or more settings (e.g., at home, school, or work; with friends or relatives; in other activities)?

This criterion is rated as having been Met.

Criteria D: There is clear evidence that the inattentive or hyperactive-impulsive symptoms interfere with, or reduce the quality of, social, academic, or occupational functioning?

This criterion is rated as having been Met.

Criteria E: The disturbance is not better explained by another mental disorder.

This criterion is rated as having been Met.

DSM-5 CRITERIA CONCLUSION:

John meets the DSM-5 criteria for a diagnosis of Attention-Deficit/Hyperactivity Disorder: Predominantly Inattentive Presentation (ADHD-PIP).

SOCIO-EMOTIONAL ASSESSMENT

Checklists Administered:

Checklists

Date of Administration

Beck Youth Inventories of Emotional and Social Impairment (Beck: BYI-II: 2005)

23/09/2018

Checklists Results:

Beck Youth Inventories of Emotional and Social Impairment (Beck: BYI-II: 2005)

The BYI is a reliable and valid self-report instrument that contains 5 subscales pertaining to self-concept, anxiety, depression, anger, and disruptive behaviour.

BYI Subscales	Raw Score	T-Score	Interpretive Guidelines
Self-Concept	34	42	Lower than Average
Anxiety	26	62	Moderately Elevated
Depression	40	82	Extremely Elevated
Anger	31	65	Moderately Elevated
Disruptive Behaviour	22	66	Moderately Elevated

The BYI results indicate that the areas of Self-Concept, Anxiety, Depression, Anger, and Disruptive Behaviour **warrant further investigation**.

COGNITIVE BATTERY ASSESSMENT

Cognitive Test Administered:

Date of Administration

Wechsler Intelligence Scale for Children-Fifth Edition (WISC-V, 2016)

11/12/2018

WISC-V Overview:

The Wechsler Intelligence Scale for Children- Fifth Edition (WISC-V) is an individually administered, comprehensive clinical instrument for assessing cognitive ability of children between the ages of 6 years through to 16 years 11 months.

The WISC-V provides primary index scores that represent intellectual functioning in specified cognitive areas (i.e., Verbal Comprehension Index, Visual Spatial Index, Fluid Reasoning Index, Working Memory Index, and Processing Speed Index), a composite score that represents general intellectual ability (i.e., Full Scale IQ), ancillary index scores that represent the cognitive abilities in different groupings based on clinical needs (e.g., Nonverbal Index, General Ability Index) and complementary index scores that measure additional cognitive abilities related to academic achievement and learning-related issues and disorders (e.g., Naming Speed Index).

The WISC-V has Australian norms and Australian language adaptation and takes approximately 60 minutes for the core subtests.

WISC-V Subtests:

Please see Appendix for full subtest descriptions.

WISC-V Primary Indexes:

The **Verbal Comprehension Index (VCI)** measure's the client's ability to access and apply acquired word knowledge. More specifically the VCI is designed to measure the client's ability to verbalise meaningful concepts, think about verbal information, and express themselves using words.

The **Visual Spatial Index (VSI)** measure's the client's ability to evaluate visual details and understand visual spatial relationships in order to construct geometric designs from a model. This skill requires visual spatial reasoning, integration and synthesis of part-whole relationships, attentiveness to visual detail, and visual-motor integration.

The **Fluid Reasoning Index (FRI)** measure's the client's ability to detect the underlying conceptual relationship among visual objects and use reasoning to identify and apply rules. Identification and application of conceptual relationships in the FRI requires inductive and quantitative reasoning, broad visual intelligence, simultaneous processing, and abstract thinking.

The **Working Memory Index (WMI)** measure's the client's ability to register, maintain, and manipulate visual and auditory information in conscious awareness, which requires attention and concentration, as well as visual and auditory discrimination.

The **Processing Speed Index (PSI)** measure's the client's speed and accuracy of visual identification, decision making, and decision implementation. Performance on the PSI is related to visual scanning, visual discrimination, short-term visual memory, visuomotor coordination, and concentration. The PSI assesses the client's ability to rapidly identify, register, and implement decisions about visual stimuli.

The **Full Scale (FSIQ)** is derived from seven subtests and summarises ability across a diverse set of cognitive functions. This score is typically considered the most representative indicator of general intellectual functioning, unless there is marked variability among the Index Composite Scores (ie 18+ difference between the Indexes). Subtests are drawn from five areas of cognitive ability: verbal comprehension, visual spatial, fluid reasoning, working memory, and processing speed.

WISC-V Ancillary Indexes:

The **Auditory Working Memory Index (AWMI)** is derived from the sum of scaled scores for the Digit Span and Letter-Number Sequencing subtests. These subtests require the client to listen to numbers and letters presented verbally, then recall or sequence them aloud. This index score measures the client's ability to register, maintain, and manipulate verbally presented information.

The **Nonverbal Index (NVI)** is derived from six subtests that do not require verbal responses. This index score can provide a measure of general intellectual functioning that minimises expressive language demands for individuals with special circumstances or clinical needs. Subtests that contribute to the NVI are drawn from four of the five primary cognitive domains (i.e., Visual Spatial, Fluid Reasoning, Working Memory, and Processing Speed).

The **General Ability Index (GAI)** is comprised of five subtests that provides an estimate of general intelligence that is less impacted by working memory and processing speed, relative to the FSIQ. The GAI consists of subtests from the verbal comprehension, visual spatial, and fluid reasoning domains.

The **Cognitive Proficiency Index (CPI)** comprises of four subtests, drawn from the working memory and processing speed domains. The CPI measures the client's ability to process cognitive information in the service of learning, problem solving, and higher-order reasoning

WISC-V Qualitative Descriptions:

Standard Score	Percentile	WISC-V-Qualitative Description
<70	<2	Extremely Low
70-79	2-8	Very Low
80-89	9-23	Low Average
90-109	25-73	Average
110-119	75-90	High Average
120-129	91-97	Very High
130+	98+	Extremely High

WISC-V Examiner's Details:

EXAMINER: Dr Shane Langsford
QUALIFICATIONS: BPsych, BEd(First Class Hons), PhD
TITLE: Senior Practitioner and AHPRA Registered Psychologist
TEST SITE: Psychological & Educational Consultancy Services– Subiaco Office

WISC-V Test Behaviour:

John had significant difficulty remaining still (e.g. fidgeting) and focussed (e.g. looking around the room) throughout the testing period. He was also observed to “give up” easily as the items increased in difficulty.

John demonstrated articulation error with /th/ sounds (e.g “fwee” for three, “bofe” for both, and “fing” for thing).

It is my opinion that the scores that John achieved on the WISC-IV are an accurate reflection of his cognitive functioning at this particular point in time.

WISC-V Test Results:

Age at Testing: 13 years 9 months

Table 1: WISC-V Index Scores

WISC-V Indexes	Composite Score	Percentile Rank	95% Confidence Interval	Qualitative Description
PRIMARY INDEXES				
Verbal Comprehension Index (VCI)	95	37	87-103	Average
Visual Spatial Index (VSI)	115	84	106-122	High Average
Fluid Reasoning Index (FRI)	115	84	106-122	High Average
Working Memory Index (WMI)	77	6	71-88	Very Low
Processing Speed Index (PSI)	78	7	72-91	Very Low
Full Scale Intelligence Quotient (FSIQ)	96	39	91-102	Average
ANCILLARY INDEXES				
Auditory Working Memory Index (AWMI)	78	7	73-85	Very Low
Nonverbal Index (NVI)	97	42	91-103	Average
General Ability Index (GAI)	105	63	99-111	Average
Cognitive Proficiency Index (CPI)	78	7	72-87	Very Low

Index scores have a mean Composite Score of 100 (50th percentile) and a standard deviation of 15.

Percentile Rank refers to John's standing among 100 individuals of similar age.

Therefore, a Percentile Rank of 50 indicates that John performed exactly at the average level for his chronological age. Composite scores and Confidence Intervals are intentionally removed from parent copies of the report as per APS policy

Table 2: WISC-V Primary Index Discrepancy Summaries

WISC-V Index	Difference	Critical Cutoff	Exceeds .05 Statistical Significance	Base Rate
Verbal Comprehension – Visual Spatial	-20	9.29	Yes	8.0%
Verbal Comprehension – Fluid Reasoning	-20	10.17	Yes	10.3%
Verbal Comprehension – Working Memory	18	10.99	Yes	7.6%
Verbal Comprehension – Processing Speed	17	12.81	Yes	17.2%
Visual Spatial – Fluid Reasoning	0	9.29	No	
Visual Spatial – Working Memory	38	10.18	Yes	1.1%
Visual Spatial – Processing Speed	37	12.12	Yes	1.5%
Fluid Reasoning — Working Memory	38	10.99	Yes	0.0%
Fluid Reasoning – Processing Speed	37	12.81	Yes	0.4%
Working Memory — Processing Speed	-1	13.47	No	50.4%

Bolding appears where a significant difference between the Indexes has been elicited

Scores referred to as 'Almost' fall within 10% of the critical value for statistical significance

Base rate refers to the clinical significance (vs Ability Sample) - <15% = clinically significant.

Below is a set of characteristic difficulties relevant to lower ability in each Index. These are generic difficulties and are not provided as an illustration of John's individual difficulties.

Verbal Comprehension weaknesses can cause difficulty learning in the classroom and performing to ability in exams by:

- Trouble understanding verbal directions and/or instructions. This will be more so with complex language, or when multiple steps are included in an instruction.
- Increased difficulty completing exams that require a large written output (i.e. essays, long answer questions).
- Being seen as 'poor listeners'. These individuals can appear to be easily distracted and inattentive at times, especially when faced with high verbal task demands.
- Difficulty with 'word-based Mathematics problems' –generally these individuals will have adequate Mathematics abilities, but the individual will find it difficult to demonstrate this when the Mathematics questions are buried in text.
- Being stronger at Mathematics, and science, where they can 'show' what they know in ways that are not heavily language based.
- Improved learning from charts, visual materials, diagrams, videos, or hands-on learning demonstrations.
- Difficulty in terms of reading comprehension – they may need to re-read a given text in order to fully understand the meaning.
- Difficulty in understanding abstract concepts, particularly when asked to perform tasks that rely heavily on verbal abstract reasoning.
- Difficulty in understanding social conventions (i.e. what should you do if you find a wallet in a store).

Working Memory weaknesses can cause difficulty learning in the classroom and performing to ability in exams by:

- Difficulty absorbing teacher's instructions, particularly if they contain more than one step
- Wide ranging difficulties in both Mathematics and reading, both of which are activities that place high demand on working memory ability.
- May show overall lower achievement across classroom activities, due to the impact of working memory weaknesses on efficiency in terms of learning new information. These individuals appear to be slower than peers in terms of learning new skills.
- Difficulty performing mental Mathematics calculations
- Struggling to copy information from the board, both accurately and quickly
- Frequent errors across tasks that involve the individual to recall small amounts of information, while at the same time performing another task.
- Difficulty performing tasks with a number of steps, they may miss out steps or make mistakes in terms of not carefully paying attention to the details.
- Appearing to have a relatively short attention span, they may appear inattentive or distractible.

Processing Speed weaknesses can cause difficulty learning in the classroom and performing to ability in exams by:

- Difficulty processing large amounts of information, or being able to understand long, complex instructions.
- Poorer performance across timed tasks/exams relative to peers. These individuals need more time to be able to show what they do know.
- Being overall slower to complete tasks in class or for homework
- Being slower at copying information down from the board or writing down what the teacher is saying.
- Written work is very time consuming, it takes these individuals a long time to write down what they know.
- Easy to fatigue; these individuals need to use more cognitive resources to complete the same amount of work as their peers.

Table 3: WISC-V Subtest Scaled Scores

Subtests	Scaled Score	Percentile Rank	Age Equivalent
Verbal Comprehension Index			
Similarities	10	50	12:10
Vocabulary	8	25	10:6
*Information	9	37	11:6
*Comprehension	9	37	11:6
Visual Spatial Index			
Block Design	13	84	>16:10
Visual Puzzles	11	61	11:8
Fluid Reasoning Index			
Matrix Reasoning	12	75	>16:10
Figure Weights	11	61	11:8
*Picture Concepts	12	75	>16:10
*Arithmetic			
Working Memory Index			
Digit Span	7	16	8:10
Picture Span	6	9	8:03
*Letter-Number Sequencing	5	5	7:10
Processing Speed Index			
Coding	5	5	8:2
Symbol Search	9	37	11:10

See Appendix 1 for complete subtest descriptions. * Supplementary Subtest

Table 5: WISC-V WMI and PSI Subtest Discrepancies From GAI Index Subtest Mean

Please note, the statistics provided in this table are not standard WISC-IV analyses and are provided as a guide only

Subtest	Subtest Scaled Score	GAI Mean Score	Difference From GAI Mean	Nominal Critical Cutoff	.05 Strength or Weakness
Working Memory					
Digit Span	7	10.8	-3.8	2.50	Weakness
Picture Span	6	10.8	-4.5	2.50	Weakness
* Letter-Number Sequencing	5	10.8	-5.8	2.50	Weakness
Processing Speed					
Coding	5	10.8	-5.8	2.50	Weakness
Symbol Search	9	10.8	-1.8	2.50	

Scores referred to as 'High' or 'Low' fall within 20% of the critical value for statistical significance *Non-core subtest.

SUMMARY

REASON FOR REFERRAL:

John was referred to Psychological and Educational Consultancy Services (PECS) by Dr Jane Brown (Consultant Paediatrician) for a *Comprehensive Psychological Assessment* and indication of whether the results are reflective of an individual with an Attention-Deficit/Hyperactivity Disorder (ADHD).

CURRENT CONCERNS:

From a presented list, John's parents identified concerns in the following areas:

- Academic
- Attention
- Learning
- Schoolwork/homework
- Suspected hyperactivity
- Memory

GLOBAL BEHAVIOURAL ASSESSMENT:

In order to provide more conclusive information, John, John's parents, and John's teacher all completed separate CAPP Forms.

John self-reported positive screens for:

- Attention-Deficit/Hyperactivity Disorder: Combined Presentation
- Specific Learning Disorder – with Impairment in Reading
- Specific Learning Disorder – with Impairment in Written Expression

John's parents reported positive screens for:

- Attention-Deficit/Hyperactivity Disorder: Combined Presentation
- Specific Learning Disorder – with Impairment in Reading
- Specific Learning Disorder – with Impairment in Written Expression

John's teacher reported positive screens for:

- Attention-Deficit/Hyperactivity Disorder: Predominantly Hyperactive/Impulsive Presentation
- Oppositional Defiant Disorder
- Specific Learning Disorder – with Impairment in Reading
- Specific Learning Disorder – with Impairment in Written Expression

ADHD BEHAVIOURAL ASSESSMENT:

The authors of the Conners' 3 state that *T*-Scores greater than 60 are usually taken to indicate a clinically significant problem. Furthermore, the greater number of subscales that show clinically relevant elevation (i.e *T*-Scores above 60), the greater likelihood that the Conners' 3 scores indicate a moderate to severe problem.

John's scores exceeded the cut-off for **9** subscales on the Parent-report Conners' checklist and **9** subscales on the Teacher-report.

John's parent-report score on the ADHD Index indicates that there is a **96% probability** that he has ADHD, (unless another factor/diagnosis better explains the behaviours reported).

John's teacher-report score on the ADHD Index indicates that there is a **98% probability** that he has ADHD, (unless another factor/diagnosis better explains the behaviours reported).

DSM-5 ADHD CRITERIA:

John meets the DSM-5 criteria for a diagnosis of Attention-Deficit/Hyperactivity Disorder: Predominantly Inattentive Presentation (ADHD-PIP).

SOCIO-EMOTIONAL ASSESSMENT:

The BYI results indicate that the areas of Self-Concept, Anxiety, Depression, Anger, and Disruptive Behaviour **warrant further investigation**.

COGNITIVE BATTERY ASSESSMENT:

WISC-V Indexes	Composite Score	Percentile Rank	95% Confidence Interval	Qualitative Description
PRIMARY INDEXES				
Verbal Comprehension Index (VCI)	95	37	87-103	Average
Visual Spatial Index (VSI)	115	84	106-122	High Average
Fluid Reasoning Index (FRI)	115	84	106-122	High Average
Working Memory Index (WMI)	77	6	71-88	Very Low
Processing Speed Index (PSI)	78	7	72-91	Very Low
Full Scale Intelligence Quotient (FSIQ)	96	39	91-102	Average
ANCILLARY INDEXES				
Auditory Working Memory Index (AWMI)	78	7	73-85	Very Low
Nonverbal Index (NVI)	97	42	91-103	Average
General Ability Index (GAI)	105	63	99-111	Average
Cognitive Proficiency Index (CPI)	78	7	72-87	Very Low

CONCLUSION

Please note, this conclusion is based on the assessment results and background information currently available. Often, it is necessary/wise to perform follow-up confirmatory testing before definitive conclusive statements are made.

ADHD:

John's cognitive profile (i.e. depreciated Working Memory, Processing Speed, Auditory Working Memory, and Cognitive Proficiency), high DSM-5 checklist results, and high parent and teacher Conners Rating Scale behavioural results, suggest ADHD is a possibility and warrants further investigation/consideration.

Please note, ADHD can only be diagnosed by a Paediatrician, Psychiatrist or Clinical Neurologist. Therefore, if an individual's cognitive and/or behavioural results suggest that ADHD is a possibility, it is deemed appropriate of PECS to recommend that the appropriate medical professional be consulted for their expert opinion. PECS does not make the recommendation on the basis that they believe the individual has ADHD.

Please note that a GP referral is required to see a specialist.

DEPRESSION:

Depression warrants further investigation.

ANXIETY:

Anxiety warrants further investigation.

DYSLEXIA/SPECIFIC LEARNING DISORDER:

John's cognitive profile also suggests Dyslexia/Specific Learning Disorder is likely. Testing of the academic areas should be initiated.

RECOMMENDATIONS

Please note, PECS does not provide micro-strategies (e.g., sit student at front of classroom, etc) as part of their recommendations. PECS's provides recommendations on what further assessment is required, what intervention is necessary, and who is the most appropriate to provide the assessment/intervention recommended.

PAEDIATRIC INVOLVEMENT:

- (1) John should once again be seen by Dr Brown, now that this new information is available for incorporation into his paediatric assessment.
- (2) John should continue regular appointments with Dr Brown as part of a multimodal intervention plan.

SCHOOL INVOLVEMENT:

- (1) A case-conference involving John's parents, the school psychologist, and key school personnel should be held to discuss John's individual learning requirements.
- (2) In light of these new assessment results, an Individual Education Plan (IEP) / Curriculum Adjustment Plan (CAP) should be initiated / amended by John's teachers in an attempt to maximise John's access to the curriculum.
- (3) On-going case management should be carried out by the school, and at the school's discretion, appropriate special examination arrangements (as per School Curriculum and Standards Authority guidelines) be granted to John for time-restricted tasks due to possible ADHD (Paediatrician appointment to come), and subsequent severe, Working Memory and Processing Speed Deficits.
- (4) If deemed necessary by the school, at the time of his WACE examinations, an application should be made to the School Curriculum and Standards Authority for Special Examination Arrangements.

Please note, in the event of a successful application for the above-mentioned SEAs, John may be required to sit his WACE exams at a location designated by the School Curriculum and Standards Authority, rather than at his regular school.

PSYCHOLOGICAL INVOLVEMENT:

- (1) John would benefit from on-going counselling given the levels of Self-Concept, Anxiety, Depression, Anger, and Disruptive Behaviour being reported.
- (2) A psycho-educational test could be conducted to investigate the possibility of Dyslexia / Specific Learning Disorders.

BEHAVIOURAL STRATEGIES:

- (1) John's parents may wish to contact Dr Michele Toner for assistance with ADHD management strategies.

Dr Michele Toner
ADHD Consultant and Life Coach
Suite 3, 82 Reserve Street, WEMBLEY WA 6014
0411 067 541
coach@micheletoner.com www.micheletoner.com

Please note that strategies to assist with poor concentration, low attention and distractibility are beneficial to people with these characteristics even if they are not formally diagnosed with ADHD.

SPEECH PATHOLOGIST INVOLVEMENT:

- (1) A current speech and language assessment is recommended. This formal speech and language assessment would help to pinpoint John's language weakness and ensure more targeted intervention.
- (2) John's parents may wish to access the Speech Pathology Australia website for assistance with locating a Speech Pathologist. This is the national peak body for the speech pathology profession in Australia, striving for excellence and recognition for the profession and representing the interests of members and their clients with communication and swallowing difficulties.

<http://www.speechpathologyaustralia.org.au/>

Please note, this assessment can be organised through the school (see School Involvement) or through a private Speech Pathologist.

PARENTAL INVOLVEMENT:

- (1) John's parents may wish to access the ADHD WA library for assistance with ADHD and behaviour management resources.

ADHD WA

Suite B, 11 Aberdare Rd (cnr) Hospital Ave, NEDLANDS WA 6009
(08) 6457 7544 hello@adhdwa.org www.adhdwa.org
Open 9.30am to 12.30pm, Monday to Friday

ADHD WA is a support, information and advocacy agency, founded in 1993 for people with ADHD and associated conditions. They work with individuals, teenagers and adults living with learning differences their families and partners. They also support those who treat, teach and work with people living with ADHD.

Please note these resources assist individuals that display similar traits without actually meeting a diagnosable condition.

- (2) John's parents may also wish to access further information from the following organisation:

ADHD Australia

info@adhdaustralia.org.au www.adhdaustralia.org.au

ADHD Australia aims to be a voice for positive change for people living with ADHD and to help build a community that fully supports, understands, and accommodates ADHD.

Please note these resources assist individuals that display similar traits without actually meeting a diagnosable condition.

HEALTH & WELL-BEING:

- (1) John needs to continue/implement regular exercise and maintain a healthy diet.

Please note, the above is a generic recommendation that should be followed by all and is not a recommendation specific to John due to any of his results or reported behaviours.

Dr Shane Langsford Managing Director -PECS Registered Psychologist APS College of Educational & Developmental Psychologists Academic Member	Date of Report
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Clinical Cohort: Attention Deficit/Hyperactivity Disorder (Children)

Attention Deficit/Hyperactivity Disorder (ADHD) is characterised by a child displaying a persistent pattern of inattention and/or hyperactivity-impulsivity, which occurs in at least 2 different settings (eg. school, home). ADHD symptoms, which lead to functional impairments (social, behavioural and academic), must be present from before seven years old, although the child need necessarily not be diagnosed before that age. ADHD symptoms will tend to worsen in group situations, situations which require sustained effort and attention and situations which are not novel or interesting to the individual.

There are three subtypes of ADHD;

- ADHD, Predominantly Inattentive Type
- ADHD; Predominantly Hyperactive-Impulsive Type
- ADHD; Combined Type

ADHD tends to be more prevalent in males than females, particularly the Hyperactive-Impulsive Type, which has a 9:1 male to female ratio, relative to the 2:1 male to female ratio seen in the Inattentive Type. It has been estimated that ADHD is prevalent in 3-7% of school aged children.

Individuals with primarily inattentive symptoms often fail to pay close attention to details or will tend to make careless mistakes. These individuals tend to find it difficult to sustain their attention long enough to complete a task, in which case they will often rush the task or complete it quickly and with little care. They will tend to start tasks and not complete them, continuously shifting on to something new and more interesting. These individuals will often appear as though they are not listening or are paying attention to something else, appearing distracted and disinterested. These difficulties with sustained attention will often lead to the individual displaying a strong dislike for and avoiding such tasks which require prolonged concentration, (e.g. homework, writing a letter etc), as they have difficulties with attention that make completing such tasks difficult for them.

Individuals with hyperactive symptoms are often observed as being unable to sit still, fidgeting in their chair, or by running/climbing when it is inappropriate. These children appear as though they have boundless energy, moving and talking excessively, and will struggle to be able to stay still and engage in sedentary activities, such as sitting and reading a book. With age they will appear to be increasingly restless and have considerable difficulty completing and engaging in quiet and sedentary activities.

Individuals with impulsive symptoms can be characterised as being excessively impatient and displaying difficulty in delaying their responses (calling out answers in class) or waiting their turn. These children will seem to say things without thinking, and others may feel as though it is difficult to get a word in the conversation. This impulsivity may lead to an increased risk of accidents, with the individual rushing in and touching or doing things without allowing time to be careful and consider the potential risks that may be associated. The diagnosis of ADHD needs to be made in consideration of the child's developmental level, as children can be very active and noisy at times, thus a diagnosis needs to consider what is expected of a child at a given age.

Cognitive

Research (e.g., Barkley et al., 2001; Calhoun, & Dickerson Mayes, 2005; Doyle et al., 2000; Wilcutt et al., 2001) has indicated that children with ADHD typically achieve scores near the normative range of intellectual functioning but may perform worse on measures of processing speed and working memory, relative to measures of verbal and non-verbal abilities. This would tend to suggest that these children are more likely to display weaknesses in processing speed, basic attention, as well as writing (Calhoun, & Dickerson Mayers, 2005). Given this it is of importance to assess a child's writing ability, if they are identified as having ADHD. Children with ADD appear to have a greater level of impairment in processing speed, as measured on the WISC-III, relative to children with ADHD, suggesting that comparison of processing speed performance may be a useful indicator of differentiating clinically between subtypes of ADHD.

WISC-IV Index Interpretation:

Results from studies conducted as part of the WISC-IV norming process illustrated that children with ADHD, when compared with matched controls ($n=89$), were found to present with significantly lower ($p<.01$) average scores on the Working Memory Index (5.6 points lower) and the Processing Speed Index (7.3 points lower) **than their Full-Scale IQ**.

Evidence for the ADHD characteristics of poor working memory and processing speed is best investigated by the comparison between the individual's own WMI and VCI, and between the PSI and PRI. The WISC-IV norming studies of individuals with ADHD have shown that they tend to score on average 3 points lower on the WMI than they do on the VCI, and 7 points lower on the PSI than the PRI.

WISC-IV Subtest Interpretation:

When compared with matched controls as part of the WISC-IV norming process, children with ADHD were found to present with **significantly lower scores** ($p<.01$) than their matched controls on Vocabulary, Comprehension, Information, Digit Span, Arithmetic, Symbol Search and Coding subtests.

In particular, large effect sizes (effect sizes indicate the substantiveness of the significant result) were found between the children with ADHD and the matched controls for (in descending order) the Coding and Arithmetic subtests. Picture Concepts ($p=.80$), and Similarities ($p=.42$) were found during the norming procedure to be the subtests **least effected by ADHD**.

WISC-V Index Interpretation:

Results from studies conducted as part of the WISC-V norming process illustrated that children with ADHD have an average composite score of 97.8 for VCI, 97.3, 97.6 for FRI, 94.8 for WMI, 94.2 for PSI, and 95.6 FSIQ. When compared with matched controls, children with ADHD were found to present with **significantly lower** ($p= \geq .05$) average scores on the Verbal Comprehension Index (4.90 points lower), Working Memory Index (6.91 points lower), Processing Speed Index (5.70 points lower), and Full Scale IQ (6.66 points lower).

Evidence for the ADHD characteristics of poor working memory and processing speed is best investigated by the comparison between the individuals WMI and VCI, and between the PSI and VSI/FRI. The WISC-V norming studies of individuals with ADHD have shown that they tend to score on average 3 points lower on the WMI than they do on the VCI, and 3 points lower on the PSI than the VSI and FRI.

WISC-V Subtest Interpretation:

When compared with matched controls as part of the WISC-V norming process, children with ADHD were found to present with **significantly lower scores** ($p= \geq .05$) than their matched control on Vocabulary, Matrix Reasoning, Picture Concepts, Arithmetic, Digit Span, Picture Span, and Coding.

Behavioural

During social interactions these children tend to frequently change conversation topics, to appear as though they are not listening to what others are saying, for they tend to lose track of the conversation, as well as being easily distracted by non-relevant stimuli. These children tend to not be well liked by others, as they are often unable to follow the rules of games or social situations, they may interrupt others' conversations or appear as though they are constantly trying to be the centre of attention. Children who display predominantly inattentive symptoms tend to be passive in social interactions and they tend to be ignored by their peers, rather than being actively avoided.

Children with ADHD tend to leave school early, and obtain a poorer education, than their peers. These children also tend to have fewer employment opportunities, as a consequence of a poor education, their inability to sustain their attention and being generally impulsive and overactive individuals.

Psychological

ADHD commonly co-occurs with a number of other externalising disorders, including Conduct Disorder and Oppositional Defiant Disorder, which often have similar behavioural manifestations. The child with ADHD may develop secondary oppositional behaviours, at school or when faced with tasks which require high levels of self-focus, as a means of avoiding these tasks and the sense of failure associated with them. Children with ADHD often tend to place little emphasis on education and academic achievement, which can lead to difficulties and conflict, both at school and at home. The child's behaviour can be seen by both parents and teachers as being deliberately defiant, which can lead to poor interactions between the child and adults. There is a high rate of comorbidity between ADHD and learning disorders, with one study finding that 75% of children with ADHD also had at least one learning disorder.

Children with ADHD also experience high rates of anxiety, learning, communication and depressive disorders, as well as low self-esteem. ADHD is seen in around 50% of individuals diagnosed with Tourette's Disorder, although only a small number of individual's with ADHD will have co-morbid Tourette's Disorder. When the two disorders are co-morbid, ADHD onset will tend to be earlier than the onset of Tourette's Disorder.

Clinical Cohort: Left-Handedness and Cognitive Difficulties

A study assessing handedness in pre-school children was administered to a Viennese sample of 120 children of the ages 4 to 6.5 (18 left-handed, 17 ambidextrous and 85 right-handed).

For the purpose of validation, the handedness of the children was assessed via a questionnaire given to parents, observation of the hand used to draw and testing of visual-motor skills as well as general level of development using the Viennese Development Test (WET, Kastner-Koller & Deimann, 2002).

Compared to ambidextrous and right-handed children, **left-handed** children were found to have **significantly lower visual-motor skills**.

Goez & Zelnik (2008) investigated the distribution of hand dominance in 98 children (aged 5.5-17.0 years) with developmental coordination disorder.

Thirty children (30.6%) were found to be left-handed and 13 (13.3%) were identified as ambidextrous. The prevalence of left-handedness among their parents and siblings was found to be similar to that of the general population.

The results suggest that children with developmental coordination disorder present with a **higher frequency of left-hand dominance** compared with the general population.

Other studies have found that left-handedness is significantly over-represented among children with Dyslexia, ADHD, Learning Disabilities, and Autism (Goez & Zelnik 2008).

APPENDIX: WISC-V SUBTEST DESCRIPTIONS

VERBAL COMPREHENSION	
Similarities (PIS, FSIQ, GAI)	The Similarities subtest involves the child being presented with two words that represent common objects or concepts and describing how they are similar. It is designed to measure verbal concept formation and abstract reasoning. It also involves crystallized intelligence, word knowledge, cognitive flexibility, auditory comprehension, long-term memory, associative and categorical thinking, distinction between nonessential and essential features, and verbal expression.
Vocabulary (PIS, FSIQ, GAI)	The Vocabulary subtest comprises both picture and verbalised items. For picture items, the individual names the depicted object. For verbal items, the individual defines the word that is read aloud. Vocabulary is designed to measure word knowledge and verbal concept formation. It also measures crystallized intelligence, fund of knowledge, learning ability, verbal expression, long-term memory, and degree of vocabulary development. Other abilities that may be used during this task include auditory perception and comprehension, and abstract thinking.
Comprehension	The Comprehension subtest requires the individual to answer questions based on their understanding of general principles and social situations. Comprehension is designed to measure verbal reasoning and conceptualization, verbal comprehension and expression, the ability to evaluate and use past experience, and the ability to demonstrate practical knowledge and judgement. It also involves crystallized intelligence, knowledge of conventional standards of behaviour, social judgment, long-term memory, and common sense.
Information	The Information subtest involves the individual answering verbally presented questions that address a broad range of general knowledge topics. The subtest is designed to measure an individual's ability to acquire, retain, and retrieve general factual knowledge. It involves crystallized intelligence, long-term memory, and the ability to retain and retrieve knowledge from the environment and/or formal instruction. Other skills used include verbal perception, comprehension, and expression
VISUAL SPATIAL	
Block Design (PIS, FSIQ, GAI)	All items of the Block Design subtest require the individual to view a constructed model and/ or a picture on the client's iPad/ Stimulus Book and use red-and-white blocks to re-create the design within a specified time limit. This subtest measures the individual's ability to analyses and synthesise abstract visual stimuli. It also involves nonverbal concept formation and reasoning, broad visual intelligence, visual perception and organisation, simultaneous processing, visual-motor coordination, learning, and the ability to separate figure-ground in visual stimuli.
Visual Puzzles (PIS)	The Visual Puzzles subtest requires the individual to view a completed puzzle and select three response options that together would reconstruct the puzzle. The subtest is designed to measure mental, non-motor construction ability, which requires visual and spatial reasoning, mental rotation, visual working memory, understanding part-whole relationships, and the ability to analyse and synthesize abstract visual stimuli. Visual Puzzles measures visual processing and acuity, spatial relations, integration and synthesis of part-whole relationships, nonverbal reasoning, and trial-and-error learning.

FLUID REASONING	
Matrix Reasoning (PIS, FSIQ, GAI)	The individual views an incomplete matrix and selects the missing portion from five response options on the Matrix Reasoning test. The task 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. The subtest is designed to measure fluid intelligence, broad visual intelligence, classification, and spatial ability, knowledge of part-whole relationships, and simultaneous processing. Additionally, the subtest requires attention to visual detail and working memory.
Figure Weights (PIS, GAI)	The Figure Weights subtest involves the individual viewing a scale, which is missing weight(s) and then they have to select the response option which balances that scale. This task requires the 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. The subtest measures quantitative fluid reasoning and induction. Quantitative reasoning tasks involve reasoning processes that can be expressed mathematically, emphasising inductive or deductive logic.
Picture Concepts	Picture Concepts involves the individual being presented with two or three rows of pictures and them choosing one picture in each row to form a group with a common characteristic. This test requires the individual to use the semantic representations of nameable objects to identify the underlying conceptual relationship among the objects and to apply that concept to select the correct answer. No image appears more than once within the subtest. The subtest is designed to measure fluid and inductive reasoning, visual-perceptual recognition and processing, and conceptual thinking. Additionally, this task requires visual scanning, working memory, and abstract reasoning. It may also involve crystallized knowledge.
Arithmetic	The individual mentally solves a series of orally presented Arithmetic problems within a specified time limit on the Arithmetic subtest. For both the picture and verbal items, Arithmetic involves mental manipulation, concentration, brief focussed attention, working memory, short- and long- term memory, numerical reasoning ability, applied computational ability, and mental alertness. It may also involve sequential processing; fluid, quantitative, and logical reasoning; and quantitative knowledge. Additionally, this task requires intact auditory/ linguistic processes, including auditory discrimination and comprehension, and to a lesser degree verbal expression.

WORKING MEMORY	
Digit Span (PIS, FSIQ)	For Digit Span, the individual is read a sequence of numbers and recalls the numbers in the same order (Forward task), reverse order (Backward task), and ascending order (Sequencing task). The shift from one Digit Span task to another requires cognitive flexibility and mental alertness. All Digit Span tasks require registration of information, brief focussed attention, auditory discrimination, and auditory rehearsal. Digit Span Forward measures auditory rehearsal and temporary storage capacity in working memory. Digit Span Backward involves working memory, transformation of information, mental manipulation, and may involve visuospatial imaging. Digit Span Sequencing is designed to measure working memory and manipulation. Digit Span Sequencing is included to increase the cognitive complexity demands of the subtest. Both the backward and sequencing tasks require the resequencing of information; the primary difference is how the sequence is determined. In the backward task, the location of the number in the sequence must be maintained in working memory for proper resequencing to occur. In the sequencing task, the quantitative value of the number must be maintained in working memory and compared to numbers before and after its occurrence. In this task, the individual does not know where the number will occur in the response until all numbers are administered.
Picture Span (PIS)	The Picture Span subtest requires the individual to memorise one or more pictures presented on the client's iPad/ stimulus book and then identify the correct pictures (in sequential order, if possible) from options on a response page. Picture Span measures visual working memory and working memory capacity. Similar tasks also involve attention, visual processing, visual immediate memory, and response inhibition. The subtest is constructed similarly to existing visual working memory tasks but is relatively novel in its use of semantically meaningful stimuli. The use of these stimuli may activate verbal working memory as well.
Letter-Number Sequencing	Letter-Number Sequencing requires the individual to read a sequence of numbers and letters and recall the numbers in ascending order and the letters in alphabetical order. Like the Digit Span tasks, Letter-Number Sequencing requires some basic cognitive processes, such as auditory discrimination, brief focussed attention, concentration, registration, and auditory rehearsal. Additionally, the task involves sequential processing, the ability to compare stimuli based on quantity or alphabetic principles, working memory capacity, and mental manipulation. It may also involve information processing, cognitive flexibility, and fluid intelligence. The higher order skills represent executive control and resource allocation functions in working memory.
PROCESSING SPEED	
Coding (PIS, FSIQ)	The Coding subtest involves the individual using a key to copy symbols that correspond with simple geometric shapes. Using a key, the individual selects each symbol in its corresponding box within a specified time limit. In addition to processing speed, the subtest measures short-term memory, visual-motor coordination, visual scanning ability, cognitive flexibility, attention, concentration, and motivation. It may also involve visual sequential processing and fluid intelligence.
Symbol Search	The Symbol Search subtest requires the individual to scan a group of symbols and indicate whether the target symbol is present within a specified time limit. In addition to visual-perception and decision-making speed, the subtest involves short-term visual memory, visual-motor coordination, inhibitory control, visual discrimination, psychomotor speed, sustained attention, and concentration. It may also measure perceptual organization, fluid intelligence, and planning and learning ability.
Cancellation	For Cancellation, the individual scans two arrangements of objects (one random, one structured) and marks target objects while working within a specified time limit. The subtest measures rate of test taking, speed of visual-perceptual processing and decision making, visual scanning ability, and visual-perceptual recognition and discrimination. It may also involve attention, concentration, and visual recall.