Psychological & Educational

Consultancy Services

Autism Spectrum Disorder Diagnostic Assessment Report:

John Example

CONTENTS

This report adheres to the diagnostic criteria outlined in the Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (DSM-5™) for Autism Spectrum Disorder.

BIOGRAPHICAL DETAILS

Name: John Example
Date of Birth: 14/11/2004
Date of Assessment: 29/04/2016
Age at Assessment: 11
Gender: Male
School: Primary School
Grade: 6
Home Address: 123 Fourth Street   SUBIACO   WA   6008
Mothers Name: Jenny
Fathers Name: John
Parent's Phone Number: 0414 234 234
Parent's Email: jennyexample@hotmail.com

REFERRAL INFORMATION

John was referred to Psychological and Educational Consultancy Services (PECS) by Dr James Smith (General Practitioner) for an Autism Spectrum Disorder assessment.

CURRENT CONCERNS

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

- Learning
- Social skills

Background information reported by John's parent(s):

- Was born with no apparent complications
- Reached all of the major developmental milestones (e.g., walking, speaking, toileting) during the expected age ranges
- Is solely right-handed/right-footed
- No major medical or neurological conditions
- Normal auditory acuity reported (last tested in 2010)
- Requires glasses/contact lenses (last tested in 2016)
- Is prescribed Nasonex for allergies
- Has fine motor movement problems – Hypermobility
- John's Hypermobility impedes his physical activity
- OT and Physiotherapy has strengthened John's body and improved his fine/gross motor skills
- Swimming has been beneficial to both his body strength and communication with the teacher – he also likes swimming very much
- John's dominant language is Mandarin
- John has been exposed to 6 months of full time English, following 3 years of 1.5 hours English tutoring per week
- John attends the Intensive English Centre learning programme
- John has difficulty socialising and making friends – he likes to have friends, but his interpersonal skills are poor
- Socialising was a difficulty for John in China, as well as here in Australia
- School teacher has arranged a buddy to help John with daily school activities and play with him - which in turn, has encouraged him to go to school
- John likes to talk with people he is familiar with, but appears to be nervous when facing unfamiliar people under new circumstances
- The teacher in China apparently had no concerns about John's Reading and Mathematics
- Father thinks John can read no problem, but often has difficulty with the 'why' questions
- John can have an unsteady temper at times
- John's parents indicated that they have always found something puzzling about John, but each quirky behaviour John had disappeared with time, without intervention
- John's parents indicated that it is likely that this is now only coming to light, because in China there was more emphasis on John's academic performance than his behaviour and social skills

Background information reported by John's teacher:
- John tends to repeat favoured words such as "margin together" with strange facial expressions
- John used inappropriate scratching and fidgeting to suggest he wants to go to the toilet
- Calming strategies have been used to address John's fidgeting and scratching
- John has difficulties socialising, maintaining friendships, and making eye contact
- Social stories have been used to improve John's social skills and eye contact
- John has an awkward gait and has difficulties with large muscle control
- An IEP is in place to address John's lack of muscle control
- John has comprehension difficulties, linking literal knowledge to inferential, interpretive, and evaluative questions
- John has difficulties identifying line spacing and starting point of letters
- John has excellent recall skills of basic number facts, but has difficulty understanding more complex concepts and problem solving

Past testing:

- OT Assessment (at age 11 years): Further OT intervention was recommended to address fine and gross motor skills, proprioception, strength, independence and assistance in self-care tasks, organisational skills, sensory preferences, and social skills. It was recommended that John be assessed for potential ASD, support for his cultural transition, and social skill intervention.

- School Psychologist Assessment (at age 11 years): Recommendations were made that John be seen by a psychologist for a nonverbal cognitive assessment. Additionally, GP / Paediatrician consultation was recommended to address developmental concerns, particularly comprehension and social communication. Lastly, extra support was recommended to improve English skills in literacy and numeracy.

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

See checklists for more behavioural information.

Please note, a Cognitive Assessment is conducted due to Intellectual Disability/Global Developmental Delay needing to be ruled out (i.e. DSM-F Criteria D in a latter section) before an Autism Spectrum Disorder diagnosis can be given.

Cognitive Test Administered:

Date of Administration

Wechsler Intelligence Scale for Children-Fifth Edition (WISC-V, 2016)   29/04/2016

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 Quantitative Reasoning Index (QRI) is comprised of Figure Weights and Arithmetic, and measures quantitative reasoning skills. Quantitative reasoning is closely related to general intelligence and can indicate a individual's capacity to perform mental math operations and comprehend abstract relationships.

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 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

Test Behaviour and Clinical Presentation Observations:
John engaged in verbal stereotypy and consequent laughing outbursts throughout the assessment

Was observed to be impulsive with decisions during the Analogic Reasoning subtest

John found it difficult to grasp the idea of a 3D image during the Cube Design subtest and was quick to give up. He acknowledged this by saying, "not easy, very hard".

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: 11 years 5 months

Table 1: WISC-V Index Scores

WISC-V Index	Composite Score	Percentile Rank	95% Confidence Interval	Qualitative Intellectual Classification
Verbal Comprehension (VCI)	86	18	79-95	Low Average
Visual Spatial (VSI)	81	10	75-91	Low Average
Fluid Reasoning (FLI)	79	8	73-88	Very Low
Working Memory (WMI)	100	50	93-107	Average
Processing Speed (PSI)	114	82	103-122	High Average
Full Scale (FSIQ)				**Not Valid**

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 children of similar age.
Therefore, a Percentile Rank of 50 indicates that John performed exactly at the average level for his chronological age.
Scores shaded red are considered significantly weaker than the true ability 'or' fall at or below the 15th percentile
Scores shaded orange fall within 10% of the critical value for statistical significance

Table 2: WISC-V Ancillary and Complementary Index Scores

WISC-V Index	Composite Score	Percentile Rank	95% Confidence Interval	Qualitative Intellectual Classification
Ancillary				
Auditory Working Memory (AWMI)	89	23	83-96	Low Average
Nonverbal (NVI)	88	21	83-94	Low Average
General Ability (GAI)	**79**	**8**	**74-86**	**Very Low**
Cognitive Proficiency (CPI)	109	73	101-116	Average

Ancillary index scores are reported using scaled scores and complementary index scores are reported using standard scores.

Table 3: WISC-V Subtest Scaled Scores

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

See Appendix 1 for complete subtest descriptions.   *Secondary subtest*

ADAPTIVE BEHAVIOUR ASSESSMENT

Please note, an Adaptive Behaviour Assessment is conducted due to it providing a wealth of information to address DSM-% Criterion D in a latter section (i.e. clinically significant impairment in important areas of functioning). It is considered by DSC an essential component of a "gold standard" assessment.

Adaptive Behaviour Tests Administered:

Test	*Date of Administration*
Adaptive Behaviour Assessment System–Second Edition (ABAS-II, 2008)	29/04/2016

Adaptive Behaviour Test Results:

(1) Parent Form (Ages 5-21)

Age at Testing: 11 years 5 months

Table 1: Sum of Scaled Scores to Composite Score Conversions

Composite	Sum of Scaled Scores	Composite Score	Percentile Rank	95% Confidence Interval	Qualitative Range
Conceptual	10	63	1	57-69	Extremely Low
Social	3	56	0.2	49-63	Extremely Low
Practical	22	75	5	68-82	Borderline
GAC	**35**	**64**	**1**	**60-68**	**Extremely Low**

Adaptive Domain scores have a mean of 100 (50th percentile) and a standard deviation of 15.
Percentile Rank refers to John's standing among 100 individuals of a similar age.

Table 2: Raw Score to Scaled Score Conversions

Skill Areas	Scaled Scores	Qualitative Range
Communication (Com)	5	Borderline
Community Use (CU)	7	Below Average
Functional Academics (FA)	2	Extremely Low
Home Living (HL)	1	Extremely Low
Health and Safety (HS)	9	Average
Leisure (LS)	2	Extremely Low
Self-Care (SC)	5	Borderline
Self-Direction (SD)	3	Extremely Low
Social (Soc)	1	Extremely Low

Scaled scores have a mean of 10 (50th percentile) and a standard deviation of 3.
Percentile Rank refers to John's standing among 100 individuals of a similar age.

(2) Teacher Form (Ages 5-21)

Age at Testing: 11 years 5 months

Table 1: Sum of Scaled Scores to Composite Score Conversions

Composite	Sum of Scaled Scores	Composite Score	Percentile Rank	95% Confidence Interval	Qualitative Range
Conceptual	4	53	0.1	49-57	Extremely Low
Social	3	58	0.3	54-62	Extremely Low
Practical	4	45	<0.1	41-49	Extremely Low
GAC	**11**	**43**	**<0.1**	**40-46**	**Extremely Low**

Adaptive Domain scores have a mean of 100 (50th percentile) and a standard deviation of 15.
Percentile Rank refers to John's standing among 100 individuals of a similar age.

Table 2: Raw Score to Scaled Score Conversions

Skill Areas	Scaled Scores	Qualitative Range
Communication (Com)	33	1
Community Use (CU)	17	1
Functional Academics (FA)	28	1
Home Living (HL)	30	1
Health and Safety (HS)	22	1
Leisure (LS)	23	2
Self-Care (SC)	13	1
Self-Direction (SD)	35	2
Social (Soc)	26	1

Scaled scores have a mean of 10 (50th percentile) and a standard deviation of 3.
Percentile Rank refers to John's standing among 100 individuals of a similar age.

ASD SYMPTOMOLOGY ASSESSMENT

Checklists Administered:

Date of
Administration

(1) ASRS Parent Rating Scale: Long Form (ASRS -P, 2014)   04/05/2016

(2) ASRS Teacher Rating Scale: Long Form (ASRS -T, 2014)   03/05/2016

ASRS Checklist Results:

(1) ASRS Parent Rating Scale:

The ASRS-P is a reliable and valid instrument that contains 71 items pertaining to their perception of their child's behaviour over the past month.

ASRS-P Summary Results

ASRS Subscales	T-Score*	Percentile	Classification
ASRS TOTAL SCORE	**66**	**95**	**Elevated Score**
ASRS SCALES			
Social/Communication	73	99	Very Elevated Score
Unusual Behaviours	64	92	Slightly Elevated Score
Self-Regulation	57	76	Average Score
DSM-5 SCALE	**66**	**95**	**Elevated Score**
TREATMENT SCALES			
Peer-Socialisation	74	99	Very Elevated Score
Adult Socialisation	56	73	Average Score
Social/Emotional Reciprocity	70	98	Very Elevated Score
Atypical Language	70	98	Very Elevated Score
Stereotypy	56	73	Average Score
Behavioural Rigidity	86	96	Elevated Score
Sensory Sensitivity	47	38	Average Score
Attention	57	76	Average Score

*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.

(2) <u>ASRS Teacher Rating Scale:</u>

The ASRS-T is a reliable and valid instrument that contains 71 items pertaining to their perception of their student's behaviour over the past month.

ASRS-T Summary Results

ASRS Subscales	T-Score*	Percentile	Classification
ASRS TOTAL SCORE	**84**	**99**	**Very Elevated Score**
ASRS SCALES			
Social/Communication	82	99	Very Elevated Score
Unusual Behaviours	83	99	Very Elevated Score
Self-Regulation	66	95	Elevated Score
DSM-5 SCALE	**85**	**99**	**Very Elevated Score**
TREATMENT SCALES			
Peer-Socialisation	81	99	Very Elevated Score
Adult Socialisation	71	98	Very Elevated Score
Social/Emotional Reciprocity	84	99	Very Elevated Score
Atypical Language	80	99	Very Elevated Score
Stereotypy	77	99	Very Elevated Score
Behavioural Rigidity	72	99	Very Elevated Score
Sensory Sensitivity	79	99	Very Elevated Score
Attention	63	90	Slightly Elevated Score

*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.

Summary of ASRS results:
The authors of the ASRS state that *T*-Scores greater than 60 are usually taken to indicate a clinically significant problem.

John's scores exceeded the cut-off for 8 subscales on the Parent-report ASRS checklist, and 13 subscales on the Teacher-report ASRS checklist.

Ratings on the DSM-5 treatment scales indicate how closely John matches the DSM-5 criteria for Autism Spectrum Disorder. This DSM-5 T-score was 66 (95th percentile – Elevated Score) on his parent report, and 85 (99th percentile – Very Elevated Score) on his teacher report.

The Total Score is a summary score and measures the extent to which the individual's behavioural characteristics are similar to the behaviours of youth diagnosed with Autism Spectrum Disorder. It yielded a *T*-Score of 66 (95th percentile – Elevated Score) on his parent report, and 84 (99th percentile – Very Elevated Score) on his teacher report.

AUTISM SPECTRUM DISORDER DIAGNOSTIC CRITERIA AS PER DSM-5

There are seven DSM-5™ criteria for Autism Spectrum Disorder, separated into two domains: **Social Communication and Interaction (A)** and **Restricted, Repetitive Patterns of Behaviour (B)**. To meet the diagnostic criteria for Autism Spectrum Disorder, all three criteria from the Social Communication and Interaction domain (A) and at least two criteria from the Restricted, Repetitive Patterns of Behaviour domain (B) must be met.

The difficulties must have been present in the early developmental period; cause clinically significant impairment in social, occupational, or other important area of functioning; and not be better explained by intellectual disability or global developmental delay.

These criteria are addressed below for John, based on information gathered from direct observation, parent clinical interview, and parent checklist information.

DSM-5 CRITERIA

A. PERSISTENT DEFICITS IN SOCIAL COMMUNICATION AND SOCIAL INTERACTION ACROSS MULTIPLE CONTEXTS, AS MANIFESTED BY THE FOLLOWING, CURRENTLY OR BY HISTORY:

A1. Deficits in social-emotional reciprocity (e.g., abnormal social approach; failure of normal back-and-forth conversation; reduced sharing of interests, emotions, or affect; failure to initiate or respond to social interactions).

Examples of behaviours relevant to this criterion displayed by John:

- John does not appear to share enjoyment, interests, or activities with other people; even though his parents have tried to show him how to engage with others
- John does not appear to be interested in what games others want to play or what others want to do
- John does not often smile back at his mother and father when they smile at him
- When John's parents used to say "I'm going to get you" or cover their eyes for peek-a-boo, John did not get excited for what happens next
- John did not show any interest in playing imitative games such as pat-a-cake, peek-a-boo or "so big" as a child; even though they were introduced by his parents
- As a younger child, John did not imitate his mother and father when they waved bye-bye, clapped their hands for pat-a-cake or shook their head "no"
- John did not make hand gestures or movements to familiar songs such as "itsy-bitsy-spider" or "wheels on the bus
- John does not engage in activities at appropriate times; for example, when his grandmother passed away everyone was very busy and all he wanted to do was read his book. When he was not allowed to read his book, he cried for a long time.
- John is very quiet when he is drawing and does not share his excitement with others after he has finished
- John will not come up and initiate a hug or kiss without being asked
- In a new or disturbing situation, John does not look at his parents for comfort
- John doesn't often recognize how others are feeling, e.g., when they are happy, angry or sad.
- When John's parents are upset, sad or ill, he will not try to comfort them; for example, when his father's mother passed away, he did not comfort him
- He does not understand the expressions of other people's faces
- John's behaviour is dictated by the rules he has to follow rather than the impact it has on other people
- When John is angry or unhappy, he makes noises and doesn't consider the impact on those around him
- John does not seem to understand when he is being teased and bullied

- John tends to ask socially inappropriate questions, e.g., if we take a taxi he will tell the driver private information about our family
- John cannot take turns in a conversation i.e., he likes to talk about his subject of interest and often repeats himself
- Sometimes John has to be forced to change topics because he is only interested in talking about a narrow topic of interest
- John appear to have abnormalities in relation to affection – this was apparent after three years of age
- John does not understand jokes unless they are very simple
- John doesn't appear to do things to try and make others laugh
- John uses language that is immature for his age
- When John is emotionally stable, his tone and pace of voice is consistent

Information collected by the Speech Pathologist as part of their assessment:

Social Approach
- John did not verbally greet the assessor even after waiting. Parents report that John usually needs to be prompted to greet someone.
- John will usually farewell someone spontaneously.
- John's parents report that he will often position his face very close to theirs' when he comes to talk to them.
- Jenny commented that John's cuddles and kisses can be excessively 'strong' and firm. He is also said to have a strong grip when he takes her arm.
- John's parents have observed him using their hand as tool, for example using it to grab a pen.

Sharing of Interests, Emotions or Affect
- John responded to the assessor's introduction with a brief social smile.
- John shared some enjoyment today, such as in response to visual humour (e.g. the doll repeatedly falling off a horse).
- John frequently interrupted the adults' conversation to show the assessor words or symbols he had drawn, each time asking for them to be labelled or read aloud but without engaging in social chat around these (e.g. ignoring questions such as 'is that a street near your house?').
- John will only bring selected items, for which he has a strong interest, to parents to show them (e.g. puzzles, shapes books on planets). When John brings his drawings to his parents, they believe this is for the purpose of seeking praise.
- John's parents report that John rarely seeks to share joint attention by pointing out or commenting on things he notices.
- John's parents report that John has huge difficulty coping with and sharing his emotions when a problem occurs. They can usually infer that he is upset from his behaviour; he will bite his hand without puncturing the skin, shudder slightly, cry, sometimes hit his head and or bang a table or chair repetitively when he is upset. When parents described this at the assessment John commented 'very very rude' as this is what he has been told by his teacher. John rarely approaches his parents for comfort and he doesn't use words to express his feelings.

Initiating and Responding to Social Interactions

- On assessment John presented as very passive, rarely initiating interactions and inconsistently responding to the assessor. When the adults spoke, John sat at the table idly. John preferred to direct comments to his parents and he asked them to interpret for him several times. Overall, John was pleasant and cooperative.
- During language-loaded interactions (e.g. conversation, sharing a book) John often disengaged from the assessor.
- John initiates interactions with parents mostly to 'seek protection' and sometimes to seek assistance with an activity (e.g. to show him the next instruction in a construction).

Conversation

- Back-and-forth conversation could not be developed today.
- John responded to simple, concrete questions most of the time. He displayed anxiety and distress in response to more complex or abstract questions, particularly those around social or emotional content (e.g. 'do you like school?' 'tell me about a time when you felt cross').
- John asked some questions about what words meant (e.g. 'what is pour?') however he did not ask conversational questions or respond to conversational comments (e.g. 'I am not good at drawing…').
- Julie Smith's report from February 2016 states that John *showed some difficulties with social-emotional reciprocity. He mainly responded when asked questions, rather than initiated conversation.*

This criterion is rated as having been Met.

A2. Deficits in nonverbal communicative behaviours used for social interaction (e.g., poorly integrated verbal and nonverbal communication; abnormalities in eye contact and body language; deficits in understanding and use of gestures; total lack of facial expressions and nonverbal communication).

Examples of behaviours relevant to this criterion displayed by John:

- John has abnormalities with regard to mood; for example, he smiles and giggles for no apparent reason
- John showed limited emotion when his grandmother passed away, and did not show empathy at her recent funeral (1st of May 2016)
- John has a delayed reaction to environmental stimuli; for example, he will start laughing at a situation long after it has occurred
- In general, John only looks others in the eye for a moment before looking down when he wants something or when he is talking to them
- John does not like making eye contact with unfamiliar people when they are close in proximity
- At times, John stands too close to people during conversations
- John does not always turn his head to look at others when they start talking to him or doing things next to him; particularly when he is doing something he is interested in
- John responds better to visual instructions than verbal instructions
- John doesn't appear to use words and gestures together regularly (coordinate use of words and gestures); for example, pointing to an object and saying, "look Mommy," waving bye-bye and saying "bye-bye," and shaking his head and saying "no"
- John uses his mother's and father's hand like a tool, to place it on what he wants
- John points to things repetitively to show you that he is excited about something
- John's shows a range of facial expressions; however, they do not often match the situation; for example, when his grandmother fell down in the rain, John just laughed
- John has abnormalities with regard to mood (e.g., giggling or weeping for no apparent reason)
- In 2016, he wet his pants under stressful conditions – an MRI indicated no physical problems

14

- John's social eye gaze was limited. He tended to look ahead, around the room or down at the table rather than at the assessor.
- When objects were present John had difficulty regularly shifting his gaze between these and the adult (though referential eye gaze was observed).
- Frequently John did not integrate eye contact with other forms of communication, such that John was often speaking whilst looking away from the adult.
- John's parents commented that his eye contact is generally poor with unfamiliar people.
- John displayed integrated proximal pointing and referential eye gaze when showing his drawings and writing to the assessor.
- John was unable to use gesture or facial expression in a task requiring him to describe and mime actions associated with brushing his teeth. He briefly brought his index finger to his mouth and made a brushing motion, and briefly imitated a turning tap motion when explicitly asked, however even with significant prompting, John was unable to perform other gestures (e.g. drinking, wiping his face, drying his hands, etc).
- John was observed to use one descriptive gesture; when asked how it felt to be angry, John banged his chest and mimicked the assessor's angry expression.
- John displayed facial expressions indicating emotional extremes only (enjoyment, fear/distress) and generally his facial expression was neutral. This is in keeping with parental reports.
- John did not direct subtle or otherwise facial expressions to share affect (e.g. to share humour, to express confusion, etc).
- John could identify when characters were 'happy' and 'angry' and he commented 'oh!' pointing to the man's fearful expression in the story.
- John was observed to use a learned, 'teacher-like' intonation pattern as he read.
- John raised his voice anxiously but also had frequent difficulty modulating his voice volume on assessment.
- Julie Smith's report from February 2016 states that John:
  - *'tended to look down with reduced eye contact but did look up when excited with noted body tensed and hand flexed)'*
  - *'was noted to grin to himself frequently but was unable to explain why he was smiling'*

This criterion is rated as having been Met.

A3.Deficits in developing, maintaining, and understanding relationships (e.g., difficulties in adjusting behaviour to suit various social contexts; difficulties in sharing imaginative play or in making friends; absence of interest in peers).

Examples of behaviours relevant to this criterion displayed by John:

- At times, John has difficulties adjusting his behaviour to suit social contexts
- John shows an obvious disinterest in other children his own age and prefers to engage in solitary activities (e.g., painting, crosswords, and drawings)
- He has always had difficulty engaging in imaginative play
- Although John likes to play with other children, he lacks interpersonal skills and finds it difficult to make friends
- John finds it easier to communicate with adults than peers his own age
- John does not try to talk to or join other children in their play at school
- John can follow other children but does not understand them and will not follow the rules of games they play
- John said that he has one friend at school, but that boy has been specifically asked to engage with John as part of a buddy program
- The kids John has mentioned as friends, do not see John as their friend
- John has been to other people's houses and has had students over to his house; however, they have all disappeared and never come back.
- He seldom engages in make believe play and only dresses up in costumes if made to for school
- John has difficulty with adjusting his behaviour to suit the varying social contexts – for example smiling at another person getting in trouble at school, or laughing at his grandmother's funeral

Information collected by the Speech Pathologist as part of their assessment:

- John named his friend 'Michael' but did not respond to questions about their friendship other than to say they played soccer together.
- John laughed hysterically about another child getting in trouble at school and parents commented that John will find it funny when others break rules and 'get in trouble.'
- John's parents have observed that their neighbours' children often appear disinterested in playing with John and leave him after a short time.
- John has told his parents that he is unable to understand the rules of games.
- Julie Smith's report from February 2016 states that John has
  - *'difficulties developing and maintaining relationships... he has always had difficulty with making friends and did not socialise much in China, preferring to play on his own and draw.*
  - *'currently has only one friend at school but was unable to describe what they do or talk about'*
  - *'the teacher reports he often demonstrates social inappropriateness in the classroom.'*
- John had significant difficulties engaging in imaginative play today. When presented with dolls and objects from a small world household set, John selected items and labelled them. He engaged the dolls in simple actions (e.g. riding on a horse) and made some comments about what he was doing (e.g. 'haha he fall off'), however he was unable to develop a sequence of events or a coherent story.
- John sometimes tried to imitate the assessor's actions or respond to simple prompts (e.g. 'I'm thirsty' - John gave the doll a drink) but he was largely unable to elaborate on the assessor's ideas in play or engage in joint interactive play.
- John was able to generate a simple story based with objects that largely followed the assessor's model and showed limited spontaneity.

- John's parents have observed that he finds it difficulty to accept one object as representing another.
- John was not able to understand the emotional causality or theory-of-mind elements of the story (e.g., recognising that the man didn't know about the cows approaching behind him) and became distressed when questioned about these.

This criterion is rated as having been Met.

B. RESTRICTED, REPETITIVE PATTERNS OF BEHAVIOUR, INTERESTS, OR ACTIVITIES, AS MANIFESTED BY AT LEAST TWO OF THE FOLLOWING, CURRENTLY OR BY HISTORY:

B1. Stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypes; lining up toys or flipping objects; echolalia; idiosyncratic phrases).

Examples of behaviours relevant to this criterion displayed by John:

- John was observed to have verbal stereotypy that was followed with hysterical laughter throughout the cognitive assessment; for example, "louder: kiss the ball" (was from a TV or movie), "see you on Monday" (was said by teacher before the weekend), "Do you know my name, John" (social story), "Keep safe" (before he went back to China to visit sick family member). John explained what each of these verbals meant to the examiner.
- John was observed to mimic the examiners voice when answering a phone call after the assessment. This was done in the same tone of voice. Following the phone call, John fixated and repeated phone conversations he had mimicked in the past – for example; good morning, how are you, hello.
- John is quite talented at imitation, he can mimic tone of voice and multiple dialects
- John was observed to sing along to the songs and bop to the beat of each song on the radio
- John tends to repeat phrases, jingles, and commercials at home.
- At times, John uses stereotyped and repetitive language; for example, he will repeat 'house' or immediately' over and over again
- When John does not want to do something, he will say "Whoahooh"
- John tends to use language that can only be understood by his parents
- Sometimes John exhibits repetitive whole-body movements
- At times John spins the parts of a toy that rotate
- John used to pull toys apart
- From 12 to 24 months of age, John liked to whirl a plastic basin. After 24 months of age he gradually lost interest in that game
- When John was younger, he liked the outside air conditioning unit because it had fans that rotated
- John flaps his right hand when he is excited or angry

Information collected by the Speech Pathologist as part of their assessment:

- Immediate echolalia was observed on several occasions (e.g. copying the assessor saying 'jump' with the same intonation pattern, during make believe play). Parents have noticed this at home, and more so when John was younger.
- John repeats advertisements and slogans, and recently he has repeated the weather forecast in verbatim.
- John is able to mimic both of his grandmothers' accents, dialects and tones of voice, and he uses these patterns of speech when talking with them.
- John's parents report that he will often list things of interest (e.g. shapes, planets) without communicative purpose.
- John will reportedly engage in non-speech sound making when he is playing (e.g. building constructions) and when he is excited.
- John's parents report that he does occasionally use 'nonsense' words.
- John was confused about what to do with the dolls or objects, and he engaged in repetitive placement of items inside other items, for example he placed a doll's head in a cup, stood the doll in a sink and tried to fit it in a cupboard. Later he tried to place a large bath inside a small cupboard.

This criterion is rated as having been Met.

B2. **Insistence on sameness, inflexible adherence to routines, or ritualised patterns of verbal or nonverbal behaviour (e.g., extreme distress at small changes; difficulties with transitions; rigid thinking patterns; greeting rituals; need to take same route or eat same food every day).**

- John exhibits an inflexible adherence to specific non-functional routines and rituals; for example, John insists on reading the same books every night before bed
- John insists on catching the school bus every day, despite circumstances (i.e., doctors' appointment) that may inhibit him from doing so
- Additionally, John gets very upset and angry for days if the bus driver decides to take a different route
- Books and stationary must remain in the place John put it, otherwise he gets very angry
- If John likes a certain pen, he will insist on using that pen only
- If a toy is lost or broken, John gets extremely angry
- Simple changes are perceived as catastrophic events to John; such that, when situations are changed unexpectedly, he cries and loses his temper

- John perseverated on reading the text in a book despite prompts to describe the pictures, to the extent that the assessor needed to cover the text with paper.
- John often counted items on the pages aloud, interrupting the sharing of the story.
- John commented 'it should be past tense' about a line in the story. John asked about the meaning of 'leap' and when this was explained in the context of the story (the man was jumping), he responded 'leap year.' John's parents reported that John is very interested in the rules of language and makes very literal interpretations of text.
- John's parents report that he seldom understands humour and he will repeat a joke and laugh without appearing to understand why he is laughing.
- At the end of the session John appeared anxious to enquire to his parents about whether he was well behaved during the session. He also asked them on a few occasions what they were talking about with the assessor.
- John's parents reported that he likes to catch the school bus, and if his father should have to take him, he becomes angry, especially if he goes an alternate route.
- John needs to read books every night, if he is not able to do so he becomes distressed. Parents described that in days leading up to John's grandmother's funeral he insisted on reading despite the circumstances preventing this.
- John is said to become distressed if he hears a parent comment that something is 'missing' or lost and he will immediately try to find the said item.

This criterion is rated as having been Met.

B3. Highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to or preoccupation with unusual objects; excessively circumscribed or perseverative interests).

- During the assessment at PECS, John was observed to have a fixated interest on writing the abbreviation of street signs, and mathematical symbols; for example, Reid HWY, Ocean Reef RD, Hodges DR, Shenton AVE, Grand BLVD, Mitchell FWY, %, $, etc.
- John remembers a lot and can write down a driving route from memory
- John's father reported that John is often fixated on a narrow interest; for example, at the moment, he is preoccupied with eight planets in the solar and geometric shapes. He likes the songs, pictures, videos and descriptions of eight planets and geometric shapes. He is now familiar with lots of facts associated with these topics.
- When John was younger, he was very fixated on a particular toy

- John has a very limited range of interests, which include puzzles, crosswords, building lego/other constructions according to the manuals, drawing and writing.
- When John was encouraged to draw, he wrote a series of symbols (e.g. Celcius, Fahrenheit, currency, etc.), number and shape puzzles as well as words, which he frequently showed to the assessor or requested that the assessor read. The text and words included names of streets, traffic signs, shop signs/names, acronyms (e.g. LJBC: Lake Joondalup Baptist College), and school mottos (e.g. 'wisdom justice mercy'). Later he drew circles around many words.

This criterion is rated as having been Met.

B4. Hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment (e.g., apparent indifference to pain/temperature; adverse response to specific sounds or textures; excessive smelling or touching of objects; visual fascination with lights or movement).

- During the assessment, John was observed to run from one side of the room to the other whilst laughing – which may indicate a fascination with the sensation of air or visual movement
- From the ages of 3 to 5 years of age, John disliked the sensation of getting his hair cut. He would often cry and refuse the haircut.
- He still does not like getting his hair cut, but no longer gets upset
- John doesn't like people touching his head
- John cannot stand dirt on his basketball or clothes
- When John was younger, he refused to wear new clothes, due to it itching his skin
- John does not like loud or crowded places; for example, he did not like China because there were "too many people" on the streets
- John has a low pain tolerance
- John has had a fascination with spinning and the circular movement of fans

- None observed.
- Julie Smith's report from February 2016 states that John *'can be a picky eater with food textures.'*

This criterion is rated as having been Met.

C. SYMPTOMS MUST BE PRESENT IN THE EARLY DEVELOPMENTAL PERIOD (BUT MAY NOT BECOME FULLY MANIFEST UNTIL SOCIAL DEMANDS EXCEED LIMITED CAPACITIES, OR MAY BE MASKED BY LEARNED STRATEGIES IN LATER LIFE):

John's parents reported that they have noticed something a little bit "strange" about John's behaviour since he was 2 years of age (e.g., hypersensitivity and repetitive behaviour); however, in China, more emphasis was placed on John's academics than his social skills and behaviour. It is only since moving to Australia that this has become more apparent. At present he is only 11 years of age.

This criterion is rated as having been Met.

D. SYMPTOMS CAUSE CLINICALLY SIGNIFICANT IMPAIRMENT IN SOCIAL, OCCUPATIONAL, OR OTHER IMPORTANT AREAS OF CURRENT FUNCTION.

Observations, parental information and parent/teacher checklist results (i.e., ABAS) indicate that John's difficulties cause significant impairment in multiple important areas of his current functioning.

This criterion is rated as having been Met.

E. THE DISTURBANCE IS NOT BETTER ACCOUNTED FOR BY INTELLECTUAL DISABILITY OR GLOBAL DEVELOPMENTAL DELAY.

John's cognitive profile (GAI= 8th percentile) illustrates that he does not have an intellectual disability.

This criterion is rated as having been Met.

SUMMARY OF THE ASD DSM-5 CRITERIA AND LEVEL OF SUPPORT REQUIRED

A. Social Communication and Interaction		B. Restricted, Repetitive Patterns of Behaviour	
1.	Criterion Met	1.	Criterion Met
2.	Criterion Met	2.	Criterion Met
3.	Criterion Met	3.	Criterion Met
		4.	Criterion Met
Total Met	3	Total Met	4
Severity	Requiring moderate support	Severity	Requiring mild-moderate support
C. Present in Early Developmental Period		**D. Symptoms Cause Clinically Significant Impairment**	
1.	Criterion Met	1.	Criterion Met
E. No Intellectual Disability/Global Delay		**F. Specifiers**	
1.	Criterion Met	1.	Without accompanying Intellectual Impairment
		2.	With accompanying Language Impairment

As indicated in the summary table above, John meets sufficient DSM-5 criteria for a diagnosis of Autism Spectrum Disorder; requiring moderate support for deficits in social communication, and mild-moderate support for restricted, repetitive behaviours.

OBSERVATIONS AND CLINICAL PRESENTATION

Rapport:
- The examiner was able to establish good rapport with John – initially John's father translated verbal instructions, which was followed by the examiner and John communicating through hand signals, writing, and verbal language
- John appeared to be comfortable with examiner immediately, and made an effort to communicate

General Appearance:
- John's physical appearance was neat

Psychomotor Behaviour:
- Was observed as having a normal gait.
- His coordination of movements was observed to be awkward.
- Posture was relaxed.
- Tended to fidget with objects around him
- Had difficulty staying seated – was observed to get up and run from one side of the room to the other repetitively whilst laughing
- Was observed as having poor eye contact

Mood/Affect:
- Was observed as having a happy affect
- John's affect /mood was inconsistent throughout the assessment
- Became emotional during testing when he incorrectly drew a symbol during the Coding subtest – it was the first symbol he drew and become so emotional and agitated that we had to start again on a new piece of paper
- Was observed as being overly excitable during the assessment – would laugh frequently at verbal self-stimulating behaviour and verbal cues of others

Speech:
- His spoken language ability was judged to be below the level expected for someone his age – however it is possible that this is due to exposure – John has only lived in Australia for 6 months
- John did not initiate speech independently – speech was initiated by words that he had written, mimicking others, verbal stereotypy, and responses to questions and hand signals

Cognitive:
- No obvious behaviours were observed that suggest cognitive deficiencies

Attention:
- John put in a reasonable amount of effort throughout the assessment
- John's level of concentration/attention was observed as being sufficient during testing
- John was observed to write down irrelevant complex Mathematic equations, excessive street names, landmarks, and schools – despite being asked to do a specific written task

SUMMARY

Reason for Referral:
John was referred to Psychological and Educational Consultancy Services (PECS) by Dr James Smith (General Practitioner) for an Autism Spectrum Disorder assessment.

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

- Learning
- Social skills

Cognitive Assessment:
Because of John's unusually diverse cognitive abilities, the combined WISC-V Full Scale IQ score is not a valid representation of his general cognitive ability, and therefore was not calculated.

Instead, the GAI (8th percentile; Very Low) was deemed the most appropriate measure of his true cognitive ability.

John achieved index scores at the following levels:
- Verbal Comprehension Index (VCI)   = 18th percentile
- Visual Spatial Index (VSI)   = 10th percentile
- Fluid Reasoning Index (FRI)   = 8th percentile
- Working Memory Index (WMI)   = 50th percentile
- Processing Speed Index (PSI)   = 82nd percentile

The results clearly indicate that an Intellectual Disability is not present.

Adaptive Behaviour:
John's overall level of adaptive behaviour is best described by his ABAS-II General Adaptive Composite score: Parent = (1st percentile; Extremely Low); Teacher = (0.1st percentile; Extremely Low).

John's father's score for John on the Conceptual Domain fell at the 1st percentile, at the 0.2nd percentile for the Social Domain and at the 5th percentile for the Practical Domain.

John's teacher's score for John on the Conceptual Domain fell at the 0.1st percentile, at the 0.3rd percentile for the Social Domain and at the 0.1st percentile for the Practical Domain.

ASD Symptomology Assessment:
Ratings on the DSM-5 treatment scales indicate how closely John matches the DSM-5 criteria for Autism Spectrum Disorder. This DSM-5 T-score was 66 (95th percentile – Elevated Score) on his parent report, and 85 (99th percentile – Very Elevated Score) on his teacher report.

The Total Score is a summary score and measures the extent to which the individual's behavioural characteristics are similar to the behaviours of youth diagnosed with Autism Spectrum Disorder. It yielded a *T*-Score of 66 (95th percentile – Elevated Score) on his parent report, and 84 (99th percentile – Very Elevated Score) on his teacher report.

Autism Spectrum Disorder DSM-5 Criteria:

As indicated in the summary table above, John meets sufficient DSM-5 criteria for a diagnosis of Autism Spectrum Disorder; requiring moderate support for deficits in social communication, and mild-moderate support for restricted, repetitive behaviours.

Main Observations and Clinical Presentation:

- The examiner was able to establish good rapport with John – initially John's father translated verbal instructions, which was followed by the examiner and John communicating through hand signals, writing, and verbal language
- John appeared to be comfortable with examiner immediately, and made an effort to communicate
- His coordination of movements was observed to be awkward.
- Had difficulty staying seated – was observed to get up and run from one side of the room to the other repetitively whilst laughing
- Was observed as having poor eye contact
- Became emotional during testing when he incorrectly drew a symbol during the Coding subtest – it was the first symbol he drew and become so emotional and agitated that we had to start again on a new piece of paper
- Was observed as being overly excitable during the assessment – would laugh frequently at verbal self-stimulating behaviour and verbal cues of others
- His spoken language ability was judged to be below the level expected for someone his age – however it is possible that this is due to exposure – John has only lived in Australia for 6 months
- John did not initiate speech independently – speech was initiated by words that he had written, mimicking others, verbal stereotypy, and responses to questions and hand signals
- John was observed to write down irrelevant complex Mathematic equations, excessive street names, landmarks, and schools – despite being asked to do a specific written task

CONCLUSION AND STATEMENT OF DIAGNOSIS

John meets sufficient DSM-5 criteria for a <u>provisional diagnosis</u> of Autism Spectrum Disorder; requiring moderate support for deficits in social communication, and mild-moderate support for restricted, repetitive behaviours.

A formal diagnosis requires both a Paediatrician and a Speech Pathologist to concur with the findings of this assessment report.

Observations, parental information and checklist results (i.e. ABAS) indicate that John's difficulties cause significant impairment in multiple important areas of his current functioning.

John's cognitive profile confirms that an Intellectual Disability/Global Developmental Delay is <u>not</u> responsible for his difficulties/behaviours.

RECOMMENDATIONS

Please note, PECS does not provide micro-strategies (e.g., sit student at front of classroom, etc) as part of their recommendations. PECS 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 be seen by a Paediatrician for the purpose of a formal decision of a diagnosis of Autism Spectrum Disorder, now that the Psychologist's and Speech Pathologist's assessment have both been completed.

Speech Pathologist Involvement:

(1)   John should continue Speech Pathology to further develop his receptive and expressive language skills.

Occupational Therapist Involvement:

(1)   John should undergo a sensory assessment with an Occupational Therapist to identify and assist his hyper reactivity to sensory input

Disability Services Involvement:

(1)   Should the Paediatrician concur with the Autism Spectrum Disorder diagnosis, confirmation of that in writing should be sent to Disability Services, along with a copy of this report.

School Involvement:

(1)   A case-conference involving John's parents and the key school personnel should be held to discuss John's individual learning requirements.

Social Skills Development:

(1)   John would benefit from a programme of Social Skills training and engaging in more social activities.

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   **Date of Report**
    Managing Director -PECS
    Registered Psychologist

    APS College of Educational & Developmental Psychologists Academic Member

Clinical Cohort: Autism Spectrum Disorder:

With the publication of DSM-5, Autistic Disorder and Asperger's Disorder were conceptualised under a single diagnosis, autism spectrum disorder. Children diagnosed with autism spectrum disorder are characterized by deficits in verbal and nonverbal communication and in social communication and interactions. They also exhibit restricted patterns of behaviour, interests, or activities. Specifiers can be used to more clearly describe a child's symptomology, including severity of symptoms, the presence of intellectual or language impairment, and the presence of other medical, genetic, or environmental factors, or neurodevelopmental, mental, or behavioural disorders. WISC-V was administered to two groups of children with autism spectrum disorder, those with accompanying language impairment (previously classified as Autistic Disorder) and those without accompanying language impairment (previously classified as Asperger's Disorder).

ASD with accompanying language impairment (Autistic Disorder):
A large study comparing children with autism across WISC-III indexes, found that as a group they displayed a profile of **lower Processing Speed Index (PSI) and Freedom Form Distractibility (FDI;** a measure of basic attention, concentration and working memory), relative to their Verbal Comprehension Index (VCI) and Perceptual Organisation Index (POI) scores (Calhoun, & Dickerson Mayes, 2005). Furthermore, a pattern of lower performance on the Coding subtest, relative to the Symbol Search subtest (both of which comprise the Processing Speed Index), has been consistently found, at a group level. This would tend to suggest that these children are more likely to display weaknesses in processing speed, basic attention, as well as writing. Given this it is of importance to assess a child's writing ability, if they are identified as having Autistic Disorder.

There is a high rate of comorbidity between Autistic Disorder and learning disorders, with one study finding that 75% of children with Autistic Disorder also had at least one learning disorder.

WISC-IV Index Interpretation:
When compared with matched controls (n=19) as part of the WISC-IV norming process, children with Autistic Disorder were found to present with significantly lower scores (p<.01) and substantially different (ES>1.00) than their matched controls on all of the WISC-IV Composites.

WISC-IV Subtest Interpretation:
The scaled score differences were significant for **all subtests** except Arithmetic (p = .80) and Block Design (p=.07). In particular, large effect sizes (effect sizes indicate the substantiveness of the significant result) were found between the children with Autistic Disorder and the matched controls for (in descending order) Letter-Number Sequencing (ES=1.83), Comprehension (ES=1.72), and Symbol Search (ES=1.60). Of the core subtests, only the three PRI subtests (ie Block Design, Picture Concepts, and Matrix Reasoning) failed to elicit an ES of greater than 1.

WISC-V Index Interpretation:
Results from studies conducted as part of the WISC-V norming process illustrated that children with ASD with accompanied language impairment have an average composite score of 80.4 for VCI, 82.8 for VSI, 84.3 for FRI, 77.6 for WMI, 75.8 for PSI, and 76.3 for FSIQ. When compared with matched controls, children with ASD with accompanied language impairment were found to present with **significantly lower** ($p= \geq.05$) average scores for all primary indexes. Consistent with previous findings, the FRI and VSI are relatively higher and produce smaller effect sizes, that the VCI. When compared with matched controls, the average VCI (23.68 points lower), and WMI (26.47 points lower) had large effect sizes.

WISC-V Subtest Interpretation:
When compared with matched controls as part of the WISC-V norming process, children with ASD with accompanied language impairment were found to present with **significantly lower scores** ($p= \geq.05$) that their matched control on all primary and secondary subtests. The largest effect size is observed on Comprehension, followed by Letter-Number Sequencing, Arithmetic, Information, and Digit Span. The smallest effect sizes are observed on Figure Weights, Matrix Reasoning, and Block Design

ASD without accompanying language impairment (Asperger's Disorder – no longer in DSM-5):

WISC-IV Index Interpretation:
When compared with matched controls (n=27) as part of the WISC-IV norming process, children with Asperger's Disorder were found to present with **significantly lower scores** (p<.01) and substantially different (ES=0.94) than their matched controls for the WISC-IV PSI Composites.

WISC-IV Subtest Interpretation:
The scaled score differences were significant (p<.05) for the subtests of Picture Concepts, Coding, Comprehension, and Symbol Search. In particular, large effect sizes (effect sizes indicate the substantiveness of the significant result) were found between the children with Asperger's Disorder and the matched controls for (in descending order) Coding (ES=1.06), Comprehension (ES=1.72), and Symbol Search (ES=1.60). Similarities (p=.36; ASD group actually scored higher than the matched controls) and Arithmetic (p=1.00) were found to be the subtests **least effected** by Asperger's Disorder and in this case it was found that John performed very well on these subtests.

Please note that only small sample sizes were used in the above studies, therefore, empirical findings are difficult.

WISC-V Index Interpretation:
Results from studies conducted as part of the WISC-V norming process illustrated that children with ASD without accompanied language impairment have an average composite scores of 102.5 for VCI, 100.7 for VSI, 100.9 for FRI, 95.4 for WMI, 89.4 for PSI, and 98.3 for FSIQ. When compared with matched controls, children with ASD with accompanied language impairment were found to present with non-significant average scores for all primary indexes, except for Working Memory (8.81 points lower). Both the WMI and PSI illustrate medium effect sizes. The results are consistent with previous findings, demonstrating less severe deficits in children with Asperger's than in children with Autistic Disorder (Barbeau et al., 2013 Gilchrist et al., 2001).

WISC-V Subtest Interpretation:
When compared with matched controls as part of the WISC-V norming process, children with ASD without accompanied language impairment were found to present with **significantly lower scores** ($p = \geq.05$) on Vocabulary, Block Design, Picture Span, Letter-Number Sequencing, and Coding. Consistent with previous research, Similarities produced the highest score within the VCI, whilst Comprehension was the lowest.

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 a 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, on 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.