Solving the Mystery of Autism Spectrum Disorders from a School Neuropsychological Perspective

Learning Objectives

1.) Identify Autism Spectrum Disorders (ASD) defined via the Diagnostic and Statistic Manual of Mental Disorders (DSM-5) from an Education/Clinical Perspective.

2.) Identify Informal ASD Screening Approaches to review Pathognomic Neuropsychological signs.

3.) Identify A Formal Assessment of ASD from an Integrated School Neuropsychological Model.

4.) Identify Neuropsychological Strengths/Weaknesses Associated with ASD to aide with educational planning.

5.) Develop a Comprehensive ASD Assessment plan to help solve the Neuroeducational issues involving learning, social-emotional, pragmatics and legal/forensic concerns, among others via case analysis and case vignettes.

“IT TAKES A VILLAGE TO RAISE A CHILD, IT TAKES A CHILD WITH AUTISM TO RAISE THE CONSCIOUSNESS OF THE VILLAGE”

BY

JOHN ELDER ROBINSON
Identify Autism Spectrum Disorders (ASD) defined via the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) from an Education/Clinical Perspective.

1.) Solving the Mystery of Autism Spectrum Disorders from a School Neuropsychological Perspective

First, Let’s Look at Autism Spectrum Disorder from a Parent’s Love and Devotion

Doctors look at me and say I am autistic but my Mommy holds me and says I am perfect.

Let’s Look at the Faces and Impact of ASD

What Actor/Comedian? Famous Singer?
Autism Spectrum Disorder

Famous For???
Produced what Movies???

Bill Gates

Autism Spectrum Disorder

Guess Who?
Who is this?

Autism Spectrum Disorders

Do you know who this is?
Other Famous ASD Individuals

<table>
<thead>
<tr>
<th>Name</th>
<th>Famous For</th>
<th>Diagnosis</th>
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<tbody>
<tr>
<td>Adam Young</td>
<td>Founder and Founder of Out City</td>
<td>Aspergers</td>
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<tr>
<td>Adrian Lewis</td>
<td>Computer Hacker</td>
<td>Aspergers</td>
</tr>
<tr>
<td>Carmella Kale</td>
<td>Musician and Fashion Novelist</td>
<td>High-Functioning</td>
</tr>
<tr>
<td>Dany Dysfoul</td>
<td>Canadian and Former Bodyguard for Blues Brothers and Ghostbusters</td>
<td>Aspergers</td>
</tr>
<tr>
<td>Dan Harmon</td>
<td>American Actor from 60s, 70s, 80s, and 90s</td>
<td>Aspergers</td>
</tr>
<tr>
<td>Gary McVicar</td>
<td>Written into the US Military andNASA computers in 2003/2005</td>
<td>Aspergers</td>
</tr>
<tr>
<td>Judith Sections</td>
<td>Writer and Activist on Americans News Top Medal</td>
<td>Aspergers</td>
</tr>
<tr>
<td>Hironhiko</td>
<td>Japanese composer</td>
<td>High-Functioning</td>
</tr>
<tr>
<td>John Carpenter</td>
<td>American Actor, Screenwriter, and Pop Musician</td>
<td>Aspergers</td>
</tr>
<tr>
<td>Jim Carrey</td>
<td>Comedian and Actor</td>
<td>Aspergers</td>
</tr>
<tr>
<td>Joe McGowan</td>
<td>Scandal 10 points in 4 minutes off his high school basketball</td>
<td>Autism</td>
</tr>
<tr>
<td>Porto Navy</td>
<td>Author of the 1964 hit book that inspired the movie</td>
<td>Autism</td>
</tr>
<tr>
<td>Scott Streeter</td>
<td>Actor who dated fellow actor for 30 years</td>
<td>Autism</td>
</tr>
<tr>
<td>William Butler</td>
<td>Journalist who has written extensively on the subject</td>
<td>Aspergers</td>
</tr>
<tr>
<td>Willy Wonka</td>
<td>Actor, writer, and activist</td>
<td>Aspergers</td>
</tr>
<tr>
<td>Yoko Otani</td>
<td>Video game designer and creator of Pokemon</td>
<td>Aspergers</td>
</tr>
<tr>
<td>Fangs Grindal</td>
<td>Doctor, professor, author, speaker and consultant</td>
<td>High-Functioning</td>
</tr>
<tr>
<td>Tim Ellis</td>
<td>Magician and Author of Australia</td>
<td>Aspergers</td>
</tr>
<tr>
<td>Travis Micks</td>
<td>Lead singer, guitarist, and song writer for Days of the New</td>
<td>Aspergers</td>
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</tbody>
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DSM-5 Criteria for Autism Spectrum Disorder

Currently, or by history, must meet criteria A, B, C, and D

A. Persistent deficits in social communication and social interaction across contexts, not accounted for by general developmental delays, and manifest by all 3 of the following:
   1. Deficits in social-emotional reciprocity
   2. Deficits in nonverbal communicative behaviors used for social interaction
   3. Deficits in developing and maintaining relationships

B. Restricted, repetitive patterns of behavior, interests, or activities, manifested by at least two of the following:
   1. Stereotyped or repetitive speech, motor movements, or use of objects
   2. Repetitive adherence to routines, ritualized patterns of verbal or nonverbal behavior, or excessive resistance to change
   3. Highly restricted, fixated interests that are abnormal in intensity or focus
   4. Hyper- or hypo-reactivity to sensory input or unusual interest in sensory aspects of environment

C. Symptoms must be present in early childhood (but may not become fully manifested until social demands exceed limited capacities)

D. Symptoms together limit and impair everyday functioning.
### DSM 5-Social (Pragmatic) Communication Disorder

<table>
<thead>
<tr>
<th></th>
<th>A. Social Communication Disorder (SCD) is:</th>
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<tbody>
<tr>
<td></td>
<td>. An impairment of pragmatics</td>
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<td></td>
<td>. An impairment on difficulty in the social uses of verbal and nonverbal communication</td>
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<td></td>
<td>B. Low Social Communication Abilities: Results in functional limitations</td>
</tr>
<tr>
<td></td>
<td>C. Rule out Autism Spectrum Disorder</td>
</tr>
<tr>
<td></td>
<td>D. Symptoms must be present in early childhood.</td>
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### DSM 5-Social (Pragmatic) Communication Disorder

- Further and more specific markers to look for:
  - Difficulty adapting communication to content
  - Difficulty following conversation rules and signals of others
  - Difficulty making inferences
  - Difficulty understanding sarcasm, double entendre, pun, playful teasing

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### Looking at the Impact of Diagnostic Changes Under the DSM-V

Who will the DSM-IV Pervasive Developmental Disorder not meet DSM-5 Criteria?

- A Few – 3%
- Rett’s Syndrome – All
- Autistic Disorder – None
- Asperger’s – very few
- PDD-NOS:
  - SCD (Most)
  - Other Psychiatric Disorders did not have PDD in the first place
Areas Researched for Possibly “Implying” ASD

Identify Informal ASD Screening Approaches to Review Pathognomonic Neuropsychological Signs

Introduction to A Case

Solving the Mystery of Autism Spectrum Disorders from a School Neuropsychological Perspective
Nonspecific signs suggestive of neurologic impairment that occur frequently in the normal population, although they do occur with greater frequency in clinical populations.

- Includes motor overflow when performing a motor task (e.g., such as synkinesia).
- Soft neuropsychological signs also refer to mild or subtle findings in a neurologic examination, such as mild pronator drift or mild reflex asymmetry.

**Definition: Pathognomic Signs (Soft Signs)**

Pathognomic signs are what is known as "red flags". They tell us that a child or youth's processing is different from the typical population of the same age. There is a distinction between hard and soft signs.

- **Hard signs**: clear signs of brain damage (e.g., impairment of basic motor, sensory, reflex behavior).
- **Soft signs**: less predictive of brain damage and are quite common in children and youth.

**Pathognomic Signs**

- Marked unilateral sensory or motor deficit, abnormal reflexes, changes in pupil size, eyelid function, visual field loss, and hearing loss can all be symptoms of brain damage.

**Hard Signs**

- Include motor overflow, different limb or finger movements from those of the child or youth attempting to produce.
- Motor incoordination, left-right confusion, motor weakness on one side.
- Distractibility, hypo-hyperactive, and emotional lability.
- All better interpreted as signs of dysfunction rather than damage.
Possible Signs of Pathological Brain Function

**Executive:**
- **Perseveration**—repetitive speech or other motoric behavior
- **Impersistence**—inability to initiate/maintain behavior
- **Confabulation**—distorted thoughts/incongruent associations

(Hui et al., 2012)

**Motor:**
- **Lateralized Differences**—Motor speed and coordination/strength difficulties
- **Gait/balance**—walking/standing difficulties
- **Activity Level**—hyperactivity or hypoactivity

**Somatosensory**

- **Differences**
  - **Lateralized**—Touch sensitivity/symbol recognition difficulties

- **Somatic Complaints**—Abnormal somatosensory experiences

(Hui-Je et al., 2012)

**Possible Signs of Pathological Brain Function**

- **Language**
  - **Dysarthria**—slurred speech
  - **Dysfluency**—articulation problems
  - **Verbal Output**—rambling speech or poverty of speech
  - **Paraphasia**—Letter/word substitutions
  - **Retrieval Difficulties**—Word-finding difficulties

(Hui-Je et al., 2012)
Possible Signs of Pathological Brain Function

Visual-Spatial

**Visual Field Problems** - Loss of one or more visual quadrants

**Constructional Apraxia** - Problems with copying designs (both blocks and drawing)

**Spatial Disorientation** - Location problems/poor spatial judgment

**Right-Left Disorientation** - Self or environment: Left>Right side

Soft Signs of Abnormality

- Astereognosis
- Asymmetries of associated movements
- Choreiform movements
- Diffuse EEG abnormalities
- Dysarthria
- Dysdiadochokinesis
- Hypokinesia
- Labile affect
- Motor Impersistence
- Nystagmus
- Oromotor apraxia
- Drioling, active jaw jerk

Neurodevelopmental Signs - Soft Signs

- Dysarthria
- Inability to move eyes without moving head
- Clumsiness/incoordination
- Drooling
- Ataxia
- Dysphagia
- Nystagmus
- Overflow movements
- Dystonic posturing

Postural and gait abnormalities
- Posturing of hands while walking
- Reflex asymmetries
- Reflex increase or decrease from typical
- Significant coordination
- Tone increase or decrease from typical
- Tremors
- Pathological reflexes

Extensor planter reflex
- Slow/Irregular finger movements
- Agraphesthesia
- Astereognosis
- Extinction to visual and tactile double simultaneous stimulation
Look at Any Dysmorphic Features

- Height/Stature
- Hair-growth pattern
- Ears-placement, size, shape
- Nose size, length, bridge
- Face shape, length, forehead
- Is there evidence of a philtrum
- Mouth, teeth, hand size
- Nails
- Fingers and thumbs
- Feet structure and size
- Eyes—one bigger than the other

Look for Differential Diagnosis

- Retts Syndrome
- Landau-Kleffner Syndrome
- Mitochondrial Disease
- Neurolipidoses
- Angelman Syndrome
- Metachromatic Leukodystrophy
- Adrenoleukodystrophy
- Amino Acidopathies
- CNS infection
- Hypothyroidism
- Gangliosidoses
- Lipofuscinoses
- Seizure Disorder
- Selective Mutism

CASE EXAMPLE

An example of a child with such signs would be the right-handed, average IQ child with significant, assessed reading disability.

The child showed some asymmetrical right-sided incoordination, bilateral associated movements, and very mild word-finding difficulties.

Her EEG finding reported diffuse, nonlocalizing abnormalities, judged as borderline by the EEG technician.

These soft signs of abnormality are not the usual pathognomonic signs encountered by the pediatric neurologist. The etiological or localizing significance of these signs is not always apparent. CT scans are usually within normal limits as is skeletal maturation (e.g., bone age). Some medical personnel would refer to this case as having nonfocal neurological signs in contrast to soft or equivocal signs.
Look at Various Approaches When Assessing:

**Attention**
- Perseveration Tasks:
  - Copy each sequence and continue repeating without lifting your pencil (e.g., MMMM)
  - Make several copies of this sample continuing across the page 3 3 3 3 3 3
  - Draw a daisy similar to the sample
- Motor Impersistence: observe ability to follow prolonged commands during the neuropsychology screening exam—close eyes and keep hands outstretched.
- Rhythmic tapping: have the child/youth mimic your simple tapped rhythms

(Benjamin & Lauterbach, 2010)

**Memory**
- Note intrusions, confabulations, perseverations, strategy in all answers
- Nonverbal Recall:
  - Copying an asymmetric figure
  - Immediate recall and 15 minute recall
- Verbal Recall:
  - Remember 4 items—immediate and 15 minutes delayed

(Benjamin & Lauterbach, 2010)

**Language**
- Ask the student/client to name body parts, colors, letters, objects & parts of objects by pointing
- Emotional prosody (spontaneous): ask student/client to say, "I am going to the movies," as if angry, sad, happy, surprised

3.) Solving the Mystery of Autism Spectrum Disorders from a School Neuropsychological Perspective

Identify A Formal Assessment of ASD from an Integrated School Neuropsychological Model
I. Classroom Observations
II. Basic Sensorimotor Functions
III. Cognitive Processes:
   A. Visuospatial Processes
   B. Auditory/Phonological Processes
   C. Learning and Memory Processes
   D. Executive Functions
IV. Facilitators/Inhibitors:
   A. Allocating and Maintaining Attention
   B. Working Memory
   C. Speed, Fluency, and Efficiency of Processing
V. General Intellectual Functioning (optional)
VI. Acquired Knowledge:
   A. Acculturation Knowledge
   B. Language Skills
   C. Reading Achievement
   D. Written Language Achievement
   E. Mathematics Achievement

These classifications are based on the broad and narrower constructs tests are designed to measure.

Suggested Formal Assessments
**Behavioral Observations**

### Thoughts

Beyond the usual of looking at appearance, awareness, attitude, and demeanor, look at the following:
- Thought forms - speed, flow, bradyphrenia, poverty of speech/thought, word finding pauses, circumlocution
- Racing thoughts

### Language/Verbal Production

Look at evidence of the following: word salad, accent-odd language, echolalia, dysarthria, vocal tics, coprolalia, neologisms, cursing and its content

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### Affect:

- Conveyed by body posture, facial expression, prosody and gesture
- Tearful, anxious, sad, blunted, flat, angry, irritable, hostile, silly, happy
- Alexithymia, appropriateness to mood or situation

### Mood:

- Depressed, Dysphoric, euphoric, expansive elated, anxious, hostile, engaged, euthymic

### Relatedness and Empathy:

- Relatedness to examiner
- Relatedness to persons around him or her
- Empathy, Theory of Mind

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### Abnormal Perceptions

- Abnormal Perceptions: Hallucinations - auditory and/or visual involving simple vs. complex
  - Somatosensory/textile, gustatory, olfactory, kinesthetic, proprioception
- Depersonalization/
- Derealization, time distortion
- Look at insight of one’s effect on others
- Look at judgment
- Look at black & white thinking vs. appreciation of gray areas

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Suggested Autism Spectrum Disorders Screeners:
- Autism Diagnostic Interview-Revised (ADI-R)
- Autism Diagnostic Observation Schedule, Second Edition (ADOS-2)
- Childhood Autism Rating Scale, Second Edition (CARS2)
- Gilliam Autism Rating Scale, 3rd Edition (GARS-3)
- Social responsiveness Scale, Second Edition (SRS-2)
- Social Communication Questionnaire (SCQ)
- Pervasive Developmental Disorder Behavior Inventory (PDDBI) and Autism Spectrum Disorder Decision Tree (ASD-DT) (Fein et al., 2011 and updated by Leonard-Zabel, 2017)
- Asperger Syndrome Diagnostic Scale (ASDS)
- Autism Spectrum Rating Scales (ASRS)
- Sensory Profile-2
- Autism Screening Instrument for Educational Planning
- Checklist for Autism Spectrum Disorder
- ARAS-III Adaptive Behavior Assessment System-Third Edition
- Psychoeducational Profile-Third Edition

Suggested Cognition Measures:
- Bayley Scales of Infant Development-Third Edition
- Differential Ability Scales, Second Edition (DAS II)
- Ravens Standard Progressive Matrices
- Leiter International Performance Scale-Third Edition
- Neuropsi-Attention and Memory, 2nd Ed.
- Universal Nonverbal Intelligence Test-Second Edition (UNIT-2)
- Wechsler Preschool and Primary Scale of Intelligence-Fourth Edition (WPPSI-IV)
- Wechsler Nonverbal Scale of Intelligence (WVNI)
- Woodcock-Johnson, Fourth Edition (WJ IV)
- Comprehensive Test of Nonverbal Intelligence, Second Edition (CTONI-2)
- Naglieri Nonverbal Ability Test-Individual

Suggested Visual-Perception and Constructional Praxis Measures:
- NEPSY 2: Arrows, Block Construction, Design Copy, Route Finding, Clocks
- Wechsler Scales: Block Design, Matrix Reasoning,
- Rey-Osterreith Complex Figure Test & Recognition Trial-Developmental Scoring System (DSS-ROCF)
- Benton Visual Form Discrimination Test
- NEPSY 2: Finger Discrimination
- Dean Woodcock Neuropsychological Battery: Lateral Preference Palm Writing Finger Identification

Suggested Perceptual/Sensory Perception Measures:
- NEPSY 2: Finger Discrimination
- Dean Woodcock Neuropsychological Battery: Lateral Preference Palm Writing Finger Identification
Suggested Auditory-Linguistic/Language Function

- NEPSY II:
  - Auditory Attention and Response Test
  - Comprehension of Instructions
  - Verbal Fluency Test
  - Phonological Processing
- Wechsler Scales:
  - Vocabulary, Similarities, Comprehension
- California Verbal Learning Test-Children's Version (CVLT-C)
- Comprehensive Test of Phonological Processing
- Test of Auditory Comprehension of Language, Third Edition (TACL-3)
- Test of Pragmatic Skills-Second Edition (TOPL-2)
- Test of Auditory Perceptual Skills (TAPS)

Suggested Learning & Memory Measures

- NEPSY II:
  - Sentence Repetition
  - Memory for Names
  - Memory for Faces
  - List Learning
  - Story Recall
- Wechsler Scales:
  - Digit Forward
  - Digit Span Backward
  - Spatial Span—Forward/Backward
  - Letter-Number Sequencing
- TOMAL-2:
  - Digit Span Forward
  - List Learning
  - Memory for Faces
  - Paired Associate Recall
  - Story recall
  - Spatial Location
- WRAML-2:
  - List Learning
  - Story recall
  - Rey Auditory Verbal Learning

Suggested Executive Functioning Measures

- Behavior Rating Inventory of Executive Function-Second Edition (BRIEF-2)
- Comprehensive Executive Function Inventory (CEFI)
- Matching Familiar Figures Test
- Tower Test-Tower of Hanoi
- Tower of London DX
- Tower - D-KEFS
Suggested Processing Speed/Tracking Measures
- Cancellation Tasks
- Digit Symbol/Coding
- Rapid Naming
- Color-Word Interference
- Symbol Search

Suggested Attention/Concentration Measures
- NEPSY-2: Attention Attention & Response Set Visual Attention
  - Test of Everyday Attention for Children-TEA-CH
  - D-KEFS-Trail Making Test
  - D-KEFS Comprehensive Behavior Rating Scale (DSM-V)
  - Conners 3rd Edition (DSM-V)
- D-KEFS-Color Word Interference
- Digit Span Tasks
- Continuance Performance Tests
- Cancellation Tasks
  - Children’s Embedded Figures Test

Suggested Motor Functions Measures
- NEPSY-2: Design Copy
  - Finger Tapping Test
  - Imitating Hand Positions
  - Manual Motor Sequences
  - Oromotor Sequences
  - Bender Gestalt Visual Motor Gestalt II
- Dean-Woodcock Neuropsychological Battery:
  - Romberg Construction Test
  - Finger Tapping Test
  - Gait and Station

References:
- Goldstein et al., 2009
- Riccio et al., 2010
- Fein et al., 2012
- Leonard-Zabel, 2017
Suggested Motor Functions

BENDER VISUAL MOTOR GESTALT TEST-II
BERRY DEVELOPMENTAL TEST OF VISUAL MOTOR INTEGRATION TEST—SIXTH EDITION
GROOVED PEGBOARD TEST
KABC-2 HAND MOVEMENTS

(Schirmer, et al., 2009; Riccio, et al., 2010; Fein, et al., 2012 and updated by Leonard Zabel, 2017)

Suggested Academic Achievement Tests

- Achievement Tests:
  - Woodcock Johnson Tests Achievement-IV (WJ IV ACH)
  - Wechsler Individual Achievement Test, Third Edition (WIAT-III)
  - Kaufman Test of Educational Achievement, Third Edition (KTEA-3)
  - Gray Oral Reading Test-Fifth Edition (GORT-5)
  - Test of Written Language, Fourth Edition (TOWL-4)
  - Peabody Individual Achievement Test-NU (PIAT-NU)
  - Basic Achievement Skills Inventory

- Curriculum Based Assessments:
  - Brigance Diagnostic Inventory of Basic Skills, The Assessment of Basic Language and Learning
  - The Verbal Behavior Milestones Assessment and Placement Program
  - Assessment of Social and Communication Skills for Children with Autism/Hawaii Early Learning Profile

- Criterion Referenced Assessment (can be formal and informal):

Suggested Emotional/Behavioral Functioning

- Achenbach System of Empirically Based Assessment (ASBERA)
- MMPI-Adolescent – RF Version
- Personality Inventory for Children-Second Edition
- Personality Inventory for Youth
- Million Clinical Multiaxial Inventory-IV (MCMI-IV)
- Adolescent Psychopathology Scale
- Behavior Assessment System for Children–3rd Edition

(Schirmer, et al., 2009; Riccio, et al., 2010; Fein, et al., 2012 and updated by Leonard Zabel, 2017)
Addressing Suggested Emotional/Behavioral Functioning Corticolimbic Functions

Corticolimbic System specifics

- Vineland Adaptive Behavior Scales—3rd Edition
- Adaptive Behavior Assessment Scale, Second Edition (ABAS-2)
- Social Skills Rating Scale
- Social responsiveness Scale
- Diagnostic Interview for Psychiatric Syndromes (CHIPS) Direct Observation
- Roberts Appreciation Test for Children—2nd Ed.
- Revised Children’s Manifest Anxiety Scales: end Ed.
- Reynolds adolescent Depression Scale, 2nd Ed. (RADS-2 TM) and Reynolds Adolescent Depression Scale, 2nd Ed. Short Form (RADS-2 TM:SF)

Identify Neuropsychological Strengths/Weaknesses Associated with ASD to Aide in Educational Planning

School Neuropsychology

4.) Solving the Mystery of Autism Spectrum Disorders from a School Neuropsychological Perspective

First, Let’s Identify Neuropsychological Strengths

- Asperger’s :
  Strengths exist in the following:
  Auditory perception
  Attention and memory
  Simple motor production
  Rote memory
  Deficits in the following:
  Problem-solving, visual perception and memory, pragmatics and prosody

- Memory Spared in ASD:
  Typical recall-larger recency effects
  Organizing concepts in memory
  Intact associative memory
  Words encoded semantically but not in an organized, efficient manner
### Neuropsychological Strengths in ASD

- Working memory is intact for basic tasks
- Typical word recognition skills
- Typical ability to differentiate faces by basic physical traits and structure
- Typical delayed memory as long as not experiencing cognitive overload
- In general expressive language is stronger than receptive language
- Language tends to be stronger than comprehension of or attention to language
- In some individuals with ASD, the ability to understand language can surpass the ability to produce words or sentences
- Visual-spatial functions appear to be intact
- Achieve average to above average scores on Block Design subtest such as the WISC-V, WAIS-4
- Achieve average to above average scores on Object Assembly (e.g., WMS-ages 4-70), and on the Embedded Figures Test which requires nonverbal reasoning skills (an executive functioning skill)

### Neuropsychological Strengths in ASD

- Individuals with ASD may be able to accurately produce spoken grammar and vocabulary.
- ASD individuals do best in structured situations
- HFA individuals demonstrate superior accuracy in a map mapping task related to test recall and short latency
- Super performance is often find in ASD individuals in the area of visual-spatial involving enhanced discrimination, detection, and memory for simple visual stimuli
- High functioning children with autism perform as well on computation tasks as typically developing peers do
- Children with ASD as a group tend to have spared phonology and syntax, impaired prosody and pragmatics, and a complex semantic picture in which word meanings may be a strength, but meta-statements (e.g., and certain classes of words with social content are limited.
- ASD individuals show unusual patterns in visual processing. For example, when searching targets, they are usually faster and more accurate than typical individuals suggesting enhanced visual discrimination.

### Neuropsychological Strengths in ASD

Children in preschool who present with Autism may show deficits in understanding object permanence and spatial relations.

However, there is evidence that by adolescence, these children demonstrate strengths in visual perceptual and visual spatial areas in conjunction to deficits on tasks requiring verbal skills. Simultaneous performance of multiple operations, and complex language and memory skills.

Children with ASD’s are known to be extremely knowledgeable about specific topics and can develop a memory for extensive minute details or facts regarding their restricted topic interests.
Neuropsychological Strengths in ASD

- In the Go/Nogo task, participants are asked to give a button-press response to frequently presented to a similar distractor stimulus, but to inhibit this simple response to a similar distractor stimulus.

- While Go/Nogo studies of ASD are few in number, they are consistent in demonstrating intact performance for individuals on the spectrum.

- ASD individuals have relatively intact sustained attention but not with disengaging and shifting attention.

Now, Let’s look at the Neuro Profiles of Syndromes with Social Incompetencies under the Umbrella of the Diagnosis of Autism Spectrum Disorders

Neuro Profiles of Syndromes with Social Incompetencies Exercise Activity

Select the answer to a given question on the next several slides

- Autism
- Right Hemisphere Syndrome
- High Functioning Autism
- Hyperlexia
- NVLD
- Asperger’s Syndrome
### Neuro Profiles of Syndromes with Social Incompetencies

#### Case 1?

- Performance V-P: typical to superior intellect (V can be quite superior)
- Early speech and vocabulary development with poor prosody and pragmatics
- Left-hemi inattention/neglect
- Decreased visuospatial skills
- Difficulty with nonverbal communication
- Difficulty with understanding language nuances
- Naive and unable to flow or wing it.

- Dysgraphia-Fine Motor skills weak
- Decreased gesture use
- Flat or abnormal modulated affect
- Social Skills weak-shy, poor eye contact
- Can experience recurrent depression
- Weak Fine Motor-Clumsy
- Auditory-Nonverbal Learning

#### Case 2?

- Speech delays
- Intellectual Deficiency
- PIQ > VIQ
- 75% diagnosed with Intellectual Deficiency (ID)
- Fine motor problems vs. gross motor intact-relative strength
- Conducts flapping, water play, toe walking, spinning, play impaired
- Ten percent are savant

- No language delays but poor pragmatic and prosody skills
- VIQ > PIQ (typical to superior scores)
- Fine motor poor & gross motor is good.
- Peculiar difficulties in socialization/interaction
- Restricted interests and perseverative behaviors

#### Case 3?

- Difficulty using maps
- Lost Easily
- Difficulty with drawing & aligning writing/printing
- Setting priorities especially with emotional issues
- Emotional aprosodia
- Hemi-attention and neglect
- Prosopagnosia
- Difficulty with idioms, sacarism, etc.
Neuro Profiles of Syndromes with Social Incompetencies

Guess Case 5?
- Speech delayed
- Typical IQ overall with PIQ>VIQ
- Gross motor relative strength
- Fine Motor difficulties
- Aloof
- Inappropriate contact and/or touch of other
- Legal issues possible in teens/early adulthood

Neuro Profiles of Syndromes with Social Incompetencies

Guess Case 6?
- Delayed speech development
- Strong echolalia
- Prosody abnormal
- Early word reading
- Superior auditory and visual memory
- Superior motor coordination—runs fast. Climbs almost anything well
- Obsessive-Compulsive interests in certain topics
- Difficulty listening and complying with rules.
- Difficulty interacting with peers.

Neuropsychological Weaknesses/Deficits in ASD

- In a study by Hooper et al, 2006, HFA children scored lower on the NEPSY following NEPSY subtest: Tower, Phonological Processing, Auditory Attention and Response Set, Imitation of Hand Positions, Visuomotor Precision, Arrows, Comprehension of Instructions and Narrative Memory.
- Several studies have compared the intellectual profile of individuals with HFA and individuals with AS (Asperger’s Syndrome). Individuals with (AS) Asperger’s Syndrome must have language skills in the average range or higher. They have higher verbal IQ scores than individuals with HFA.
A study by Ozonoff et al., 2005 found significant deficits in planning on the D-KEFS Tower Task. In addition, scores for flexibility, with the WCST and Trails, and Response Inhibition from the California Stroop tasks were strongly associated with restrictive and repetitive behaviors.

Another study by Kleinhans et al., 2005 showed lower overall EF scores, relative to the normative database, with notable impairments in complex verbal tasks requiring efficient strategies and problem-solving techniques but with no impairment in design fluency.

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Theory of Mind difficulties are viewed by the research literature as the core deficits in ASD and may underlie the social and communicational impairments characteristic of ASD.

Individuals with Asperger’s Disorder or HFA have difficulties on measures requiring the integration of cross-modal information from faces, voices, and context to understand mental states and complex emotions of others.

Table 1: Functional brain imaging studies investigating theory of mind in autism.

<table>
<thead>
<tr>
<th>Study</th>
<th>Autism patients</th>
<th>Controls</th>
<th>Methods</th>
<th>Findings</th>
<th>Rating</th>
</tr>
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<tbody>
<tr>
<td>Happen et al. (2008)</td>
<td>24-pd group (2.5)</td>
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<td>Bache et al. (2008)</td>
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<td>26 normal controls</td>
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Reference: Leonard Zabel, 2017 (Pinel, 2014)
# Let's Explore Neuropsychological Domains and Specific Deficits in ASD

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<td><strong>Cognition</strong></td>
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</tr>
<tr>
<td></td>
<td>Expressive (verbal and nonverbal)</td>
</tr>
<tr>
<td></td>
<td>Prosody</td>
</tr>
<tr>
<td></td>
<td>Pragmatics</td>
</tr>
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## Auditory-Linguistic Language Function
- Global decreased functioning with 40 to 60 percent below the average range
- Comprehension (verbal and nonverbal)
- Expressive (verbal and nonverbal)
- Prosody
- Pragmatics

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<td>May be hypervigilant and cannot shift attention</td>
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<tr>
<td>Motor Function</td>
<td>Perseverative and/or repetitive behaviors, graphomotor difficulties</td>
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</tbody>
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<td>Achievement/Academic Skills</td>
<td>Hyperlexia, Dyscalculia, Dyslexia, Dysgraphia</td>
</tr>
<tr>
<td>Emotional/Behavioral Functioning</td>
<td>Joint attention, imitation, face recognition/memory, discrimination, empathy, mentalizing, and perspective taking</td>
</tr>
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### Frontal Lobe/Dysexecutive Syndrome Learning Exercise

Select the answer below to given questions on the next several slides

- Dorsolateral Prefrontal Syndrome
- Dysexecutive Syndrome/EF Deficits
- Medial Frontal Syndrome (Akinetic Mutism)
- Orbitofrontal Syndrome
Frontal Lobe/Dysexecutive Syndromes

Which Syndrome?

- Abulic, unmotivated
- Apathetic (occasional outbursts)
- Psychomotor slowing
- Concrete, stimulus-bound
- Perseverative, poor problem-solving

Which Syndrome?

- Child-like euphoria
- Facetious humor
- Shallow, labile affect
- Social disinhibition
- Impulsive, distractible
- Difficulty maintaining set
- Impaired judgment, tact, foresight

Frontal Lobe/Dysexecutive Syndromes

Which Syndrome?

- Paucity of spontaneous movement & gesture
- Spared verbal output (repetition may be preserved)
- Lower extremity weakness & loss of sensation
- Incontinence
- Apathy, emotional emptiness, false sense of well-being

Which Syndrome?

- Decreased Motivation
- Decreased Anticipation
- Decreased Goal selection
- Decreased Planning
- Decreased Monitoring (self-talk)
- Decreased Sequencing: motor, visuospatial, verbal

Since we have identified the Neuropsychological Strengths And Weaknesses Associated with ASD we will review how to Aide Educational Planning.
### To Aide Educational Planning – Some Examples:

#### Sensory Issues and Environment Factors:
Sensory Integration problems may result in hyper- or hypo sensitivity to the environment. Lighting, noise, smells, animals, crowds pose sensory discomfort for ASD individuals. By taking into account these conditions, maladaptive and agitation behaviors may reduce increasing the likelihood of learning and skill mastery.

(Ben-Sasson et al., 2008)
(Zager & Feinman, 2013)

#### Social Interactions:
Problem is understanding behaviors and feelings of others can result in inappropriate responses that can be upsetting to both the individual with ASD and the recipient of such unusual behavior. Scripted social stories and role-playing in actual situations can increase understanding of other’s feelings and reactions, teach socially expected behavior and alleviate potential problems stemming from misunderstanding.

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#### Information Processing:
While language processing skills may improve with maturity, communication challenges tend to persist into adulthood and may interfere with social interaction. Individual planning should take into account the difficulty that persons with ASD have in understanding abstract language and concept.

(Zager et al., 2013)

#### Executive Functioning:
Executive Functioning pertains to a set of neurologically broad skills that involves the process of managing oneself and one’s activities in order to accomplish goals. Executive Dysfunction can impact self-regulation and the ability to control attention to task, language, social behavior and functional skills.

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To Aide in Educational Planning – Some Examples:

**Established Practices:**
- Antecedent Package
- Behavioral Package
- Comprehensive Behavioral treatment for Young Children
- Joint Attention Intervention
- Naturalistic Teaching Strategies
- Peer Training Package
- Pivotal Response Treatment
- Schedules
- Self-Management
- Story-Based Intervention Package

**Emerging Practices:**
- Augmentative and Alternative Communication Devices
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To Aide in Educational Planning – Some Examples: Strong Model Development: Partial Model Development:

- Denver Model
- Learning Experiences: An Alternative Program for Preschoolers and Parents
- Lovass Institute
- May Institute
- Princeton Child Development Institute
- Autism Partnerships
- Center for autism and related Disorders
- Children’s Toddler Program
- DIR/Floor-time (Developmental, Individual difference, relationship-based Model)
- Douglass
- Pivotal Response Training
- Responsive Training
- STAR and TEACCH
Several Technology Solutions to Aide in Educational Planning

<table>
<thead>
<tr>
<th>Technology to Increase Access to Curriculum:</th>
<th>Technology As Instructional Tool:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Tech: Physical, Speech, or O.T.</td>
<td>Systematic Teaching Procedures</td>
</tr>
<tr>
<td>Low Tech: Pencil with rubber grip, Velcro</td>
<td>Flashboards, overhead projector,</td>
</tr>
<tr>
<td>fastener, raised desk to accommodate</td>
<td>chalkboard</td>
</tr>
<tr>
<td>wheelchair</td>
<td>Calculators, Instructional Video</td>
</tr>
<tr>
<td>Medium Tech: Wheelchair/Hearing Aid</td>
<td>Tape</td>
</tr>
<tr>
<td>High Tech: Adaptive Keyboards, Speech</td>
<td>Instructional computer software,</td>
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<tr>
<td>Synthesizer, Virtual Reality Devices</td>
<td>Interactive Multimedia Systems,</td>
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<tr>
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<td>Computer Text With Hypermedia</td>
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<tr>
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(Boutot, 2017)

Closing the Gap offers a variety of articles, resources, and interactive activities to assistive technology. [http://www.closingthegap.com/index.lasso](http://www.closingthegap.com/index.lasso)

Information on creating literacy-based communication boards along with an extensive resource list on Augmentative and Alternative Communication (AAC). [http://www.aaintervention.com](http://www.aaintervention.com)

Technology Interventions to Aide in Educational Planning

Augmentative and alternative communication resource guide for young children. [http://aac.unl.edu/yack/toc.html](http://aac.unl.edu/yack/toc.html)

The TAM (Technology and Media) Division of the Council for Exceptional Children offers a variety of information about assistive technology and special education instructional technology. [http://www.tamcec.org](http://www.tamcec.org)

Trace Research and Design Center includes software toolkits and many disability-related articles and papers. [http://trace.wisc.edu/world/computer_access/mult/shares/war.htm](http://trace.wisc.edu/world/computer_access/mult/shares/war.htm)

The Family Village is a Web site designed to provide information for families with children with disabilities. It offers extensive resources on AT. [http://www.familyvillage.wisc.edu/](http://www.familyvillage.wisc.edu/)
CAST researches and develops ways to support all learners according to their individual strengths and needs through Universal Design for Learning (UDL).
http://www.cast.org

Selected links on ASD including articles and sites with practical strategies.
http://www.lburkhart.com/index.html

This site contains information and resources and free printable picture symbols and charts to sue for visual schedules and steps within tasks.
http://www.dotolearn.com/

This is a weekly newspaper for ACC users and emergent readers. Communication symbols are used along with the text.
http://news-2-you.com/

The Wisconsin Assistive Technology Initiative (WATI) is a recognized leader in the provision of statewide support for assistive technology services and offers a wealth of practitioner friendly resources.
http://www.watt.org

The National Assistive Technology Research Institute conducts AT research, translates theory to practice, and provides resources.
http://natri.uky.edu

The Quality Indicators for Assistive Technology (QIAT) is a Web site included very recent work to develop a comprehensive set of quality indicators for effective assistive technology services.
http://www.qiat.org

This is a general site with information and resources for a range of assistive technology.
http://www.abilityhub.com

—
ABLEDATA provides objective information about assistive technology products and rehabilitation equipment available from domestic and international sources.
http://www.abledata.com/

—
This project provides information and consultation to AT programs. Please locate the AT program in your state and read articles relating to legislation and AT.
http://www.resna.org/
This site primarily serves as a location for providing information and supports related to the SEFT Framework but also included links to other areas of interest, particularly QIAT, UDL, and AIM.

http://www.joyzabala.com/home.php

Matrices are provided to serve as a resource that match technology tools with supporting literature on promising practices for the instruction of K-8 mathematics and reading for students with disabilities.

http://www.techmatrix.org

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### Resources for Educational Planning and Intervention

- **National Institute of Mental Health:**

- **Autism Speaks:**
  http://www.autismspeaks.org

- **Division TEACCH:**
  http://www.teach.com/welcome.html

- **National Autism Center:**
  http://www.nationalautismcenter.org

- **National Professional Development Center on Autism Spectrum Disorder**
  http://autismpdc.fpg.unc.edu/content/briefs

- **Autism Society of America**
  http://www.autismsociety.org/site/PageServer

- **Families for Early Autism Treatment**

- **The SCERTS Model**
  http://www.scerts.com/

- **Augmentative and Alternate Communication Connecting Young Kids**
  http://aac.unl.edu/yaack/index.html

- **Division on Autism and Developmental Disabilities (DADD):**
  http://daddcec.org

- **AFLS assessment:**
  http://www.parringtonbehavioral.com/page/afls-74.html

- **Center for Instruction**
  http://www.centeroninstruction.org

- **Reading Rockets:**
  http://www.readingrockets.org

- **National Center for Intensive Intervention:**
  http://www.intensiveintervention.org
Develop comprehensive ASD assessment plans to help solve the Neuroeducational issues involving learning, social-emotional, pragmatics and legal/forensic concerns, among others.

First, know the major brain systems to assist with accomplishing a comprehensive School Neuropsychological Assessment viewing Slides 99 & 100.
Next, look at the various possible comorbidities

Medications You May See in Medical Reports:

- **Revia** (Naltrexone) for aggression and self-injurious behavior (inconclusive therapeutic effect at times)
- **Resperdal** (Risperidone) for aggression, irritability, hyperactivity, stereotypy (positive results as a whole)
- **Haldol** (Haloperidol)
- **Anafranil** (clomipramine and hydrochloride)
- **Depakote** (sodium valproate)
- **Lamictal** (lamotrigine) (all treatment for aggression and self-injurious—but can have adverse effects depending on the individual issues)
Medications You May See in Medical Reports:

- **Prozac (fluoxetine)**
- **Ritalin, Concerta** (methylphenidate)
- **Strattera** (atomoxetine) for repetitive behavior, hyperactivity
  (Inconclusive therapeutic effect at times)
- Promising Medications under research:
  - Aripiprazole reduces repetitive behaviors in ASD
  - Augmentation Example: Modular El (JASPER) possibly enhances development of language over time
- Preclinical EEG Effects of AZD7325, a GABAa, X2, X3 Selective Positive Modulator to help activate effects under conditions of task demands or sensory processing

Look at Any Hints of Depression, Anxiety and/or Agitation along with Aggression

- Established vs. New/Novel Aggression: A medical workup for seizure like activity—temporal area
- Episode length: time of day, week, look at clear beginning—anteceident and ending—consequences of behavior
- Look at sleep deprivation, hyperphagia, hysersexuality, depression, panic issues, psychotic symptoms, psychomotor agitation, increase in autistic rituals/rigidity
- Look at pattern of behavior toward self-abuse/object abuse/or toward others
- Observe purpose of behavior whether directed or non-directed

Begin To Thinking If ASD What Interventions?
This is What a Typical Basic Neuropsychological Battery for ASD Beyond a Rating Scale & Observations Scale:

- WASI: Vocabulary & Matrix Reasoning
- WISC-5: Arithmetic, Digit Span, Letter-Number Span, Digit Symbol, Coding, Symbol Search
- WRAT-5: Arithmetic
- D-KESF: Color-Word and Tower
- TOWRE-2: Sight Word and Phonemic Decoding

Then there is the report shell which provides a variety of tests/subtests to pick and choose from to assist with conceptualization of the diagnostic presentation and interventions needed.

Tests Administered

- BASC Developmental History & Review Records and screen for soft/hard signs
- Wechsler Intelligence Scale for Children-Fifth Edition (WISC-V)
- Woodcock-Johnson IV Tests of Achievement-standard battery
- Developmental Test of Visual Motor Integration, 6th Edition (DTVMI-6)
- Motor-Free Perception Test – Fourth Edition (MVPT-4)
- Delis-Kaplan Executive Function System (D-KESF) & NEPSY II
- Grooved Pegboard Test
- Rey Complex Figure Test (RCFT)
- Wide Range Assessment of Memory and Learning (WRAML-2)
- Wisconsin Card Sort (WCST)
- Behavior Rating Inventory of Executive Functioning – Second Edition (BRIEF-2)
- Achenbach Child Behavior Checklist (CBCL) Parent & Teacher Versions

Case of Jack

Age 13

Past History-Asperger Syndrome (age 10) based on behavioral criteria in the area of pragmatic communication, social-emotional relationships, stereotypy/restricted behaviors by a professional specializing in ASD. He is currently enrolled in the 7th grade and receives Section 504 accommodations and tutoring for math.

Parents concerned that he is experiencing decline in the past 10 months in the areas of speech/language, vision, academic functioning especially in mathematics, and in social-emotional functioning—such as withdrawal, social rejection, possibly being bullied in school and has random outbursts at home.
Tests

<table>
<thead>
<tr>
<th>WISC-5 (convert to 5)</th>
<th>DTVMI-V, MVPT, Grooved Pegboard Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal Comp           = 92</td>
<td>DTVMI = 76</td>
</tr>
<tr>
<td>Perceptual Reasoning  = 86</td>
<td>MVPT = 81</td>
</tr>
<tr>
<td>Fluid Reasoning       = 82</td>
<td>Grooved Pegboard Test = 57</td>
</tr>
<tr>
<td>Working Memory        = 91</td>
<td></td>
</tr>
<tr>
<td>Processing Speed      = 70</td>
<td></td>
</tr>
</tbody>
</table>

WRAML-2

- General Memory Index = 76
- Verbal Memory Index = 97
- Visual Memory Index = 76
- Attention & Concentration Index = 73
- Story Memory = 11
- Design Memory = 5
- Verbal Learning = 8
- Picture memory = 7
- Finger Windows = 1
- Numbers/Letters = 10
- Story Memory Recall = 11
- Verbal Learning Recall = 7
- Design Recognition = 9

BRIEF-2****

<table>
<thead>
<tr>
<th>Clinical Scales</th>
<th>T Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhibit</td>
<td>T=45</td>
</tr>
<tr>
<td>Shift</td>
<td>T=59</td>
</tr>
<tr>
<td>Emotional Control Initiate</td>
<td>T=42</td>
</tr>
<tr>
<td>Working Memory Plan/Organize</td>
<td>T=62</td>
</tr>
<tr>
<td>Organization of Materials</td>
<td>T=61</td>
</tr>
<tr>
<td>Monitor</td>
<td>T=60</td>
</tr>
</tbody>
</table>

- Indices
  - Behavioral regulation Index = 48
  - Metacognition Index = 61
  - General Executive Functioning = 57
### Woodcock-Johnson Test of Achievement Fourth Edition (WJ IV Ach.)

<table>
<thead>
<tr>
<th>Test</th>
<th>Score</th>
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</thead>
<tbody>
<tr>
<td>Letter-Word Identification</td>
<td>126</td>
</tr>
<tr>
<td>Calculations</td>
<td>105</td>
</tr>
<tr>
<td>Spelling</td>
<td>138</td>
</tr>
<tr>
<td>Passage Comprehension</td>
<td>107</td>
</tr>
<tr>
<td>Applied Problems</td>
<td>100</td>
</tr>
<tr>
<td>Writing Samples</td>
<td>103</td>
</tr>
</tbody>
</table>

### Wechsler Individual Achievement Test, Second Edition (WIAT-III)

<table>
<thead>
<tr>
<th>Test</th>
<th>Score</th>
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</thead>
<tbody>
<tr>
<td>Reading Composite</td>
<td>93</td>
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<tr>
<td>Word Reading</td>
<td>122</td>
</tr>
<tr>
<td>Pseudoword Decoding</td>
<td>120</td>
</tr>
<tr>
<td>Numerical Mathematical Reasoning</td>
<td>64</td>
</tr>
<tr>
<td>Numerical Operations</td>
<td>76</td>
</tr>
</tbody>
</table>

### D-KEFS

#### Color Word Interference Test

- Inhibition: 04
- Inhibition/Switching: 05
- Color Naming: 09
- Word Reading: 08
- Auditory Attention: 06

### D-KEFS

#### Verbal Fluency Test

- Letter Fluency: 07
- Category Fluency: 12
- Category Switching Total: 08

#### Trail Making Test

- Letter Sequencing: 07
- Number Sequencing: 05
- Letter-Number Switching: 06
- Visual Search: 11
- Motor Speed: 09
### NEPSY II, Social-Emotional, and Resulting Impressions

<table>
<thead>
<tr>
<th>Test</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed Naming</td>
<td>66</td>
</tr>
<tr>
<td>Auditory Attention &amp; Response Set</td>
<td>20</td>
</tr>
<tr>
<td>Animal Sorting</td>
<td>14</td>
</tr>
<tr>
<td>Vismotor Precision</td>
<td>5</td>
</tr>
</tbody>
</table>

**Social/Emotional Screening:**
- Attention problems along with thought problems and anxiety.
- Themes of depression, somatic complaints, social interaction, and attention problems.

**Rey-Osterrieth Complex Figure Test & Recognition Trial (DSS-ROCF)**: Attempted.

### Results:
- Asperger’s Syndrome now known as Autism Spectrum Disorder (ASD) - Level 2.
- Dyscalculia.
- Social-Emotional – themes of poor motivation, limited social interaction, attention and anxiety concerns.

Behavior Observations pointed to flat affect, poor eye contact, and limited conversation.

*Will share more thought at beyond this slide-confidential information not appropriate for slide inclusion.*

### Further Review of Helpful Material Will Be Provided

### Solving the Mystery of Autism Spectrum Disorders from a School Neuropsychological Perspective

### Closing Comments

“WHAT IS IMPORTANT IS TO TREAT EVERYONE LIKE AN INDIVIDUAL AND LEARNING NOT TO GENERALIZE AUTISM. WITH AUTISM, PEOPLE MAKE ASSUMPTIONS, BUT IT’S VERY BROAD, AND EVERYONE’S SO DIFFERENT. YOU HAVE TO TREAT EACH PERSON AS AN INDIVIDUAL.”

**By Nikki Reed**
Thank you
Welcomed Contact Information

dramlz@yahoo.com

References

Upper Saddle River, N.J: Prentice-Hall.
Please Note:

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