

# On and Off the Autism Spectrum

Friday, July 22, 2022, 7:30 a.m. – 8:00 a.m



Alison Schonwald MD  
Associate Professor, Harvard Medical School  
Dept. of Pediatrics, Cambridge Health Alliance  
Touchstone Neurodevelopmental Center

## **Disclosure**

I have no relevant financial relationships with the manufacturers of any commercial products and/ or commercial services discussed in this CME activity.

I do not intend to discuss off-label (unapproved) uses of medications in this CME activity.

# Objectives

1. Learners will distinguish autism spectrum disorders from other overlapping neurodevelopmental profiles.
2. Learners will recognize a wider range of ASD presentations

# Nat

7-year-old October of 1<sup>st</sup> grade with mood and behavior concerns:

1. *He is anxious, unhappy, and doesn't want to go to school.  
We don't know what to do.*
2. *Does he have nonverbal learning disabilities?*

Full term

No trauma

Family history

Autism

Anxiety Disorders

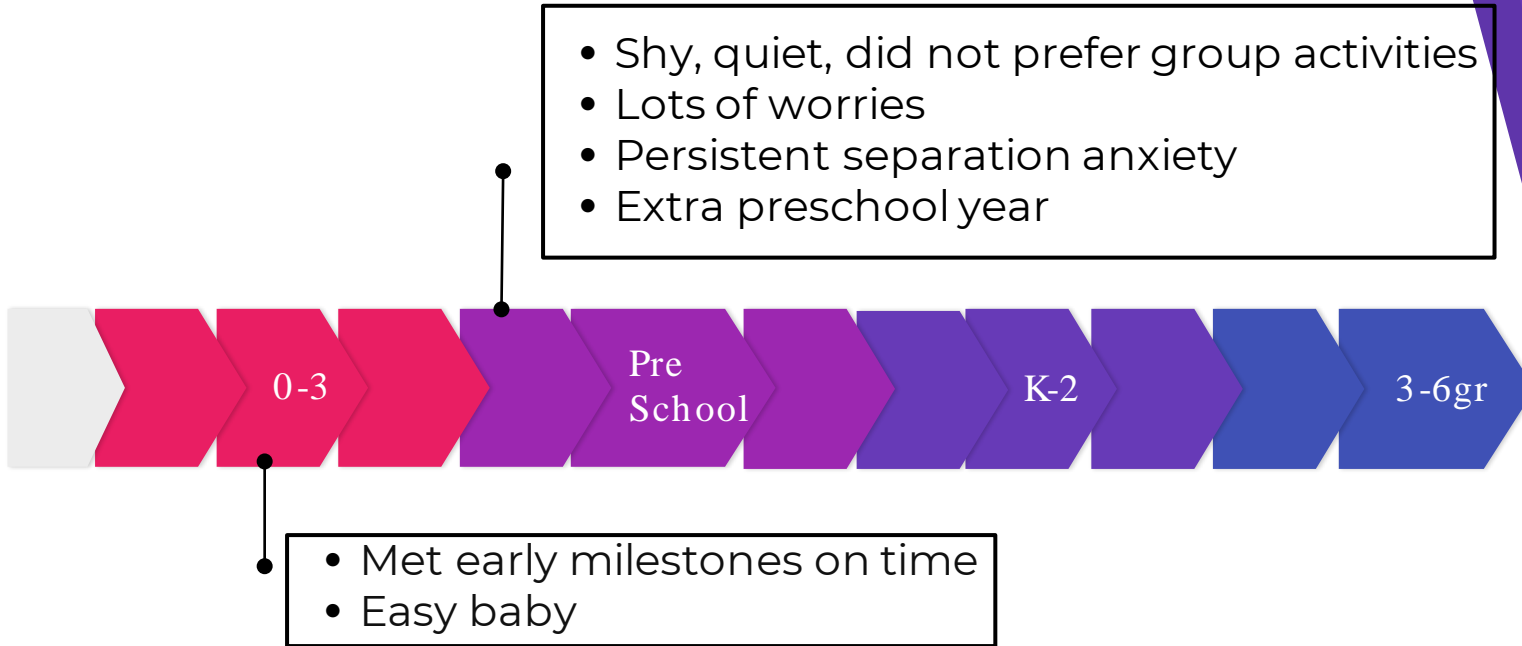
Social history

Lives with parents and younger brother

Uses he/him pronouns



# TIMELINE



# TIMELINE

- On IEP: OT, counseling, and **in-class special ed support**
- School psychologist starts the day with him
- Has friends

0-3

Pre  
School

K-2

3-6gr

- Learning fine
- Playdates: “hit or miss,” had to do what he wanted to do
- Rule follower (so good behavior at school)
- Home: crying for hours, “I hate this day,”
- Struggled with transitions

## Nat's current symptoms

### **Anxiety/Depression:**

Most afternoons & weekends: cries, doesn't want to do anything

- ▶ Frequent "I hate my life," often angry
- ▶ No suicidal ideation

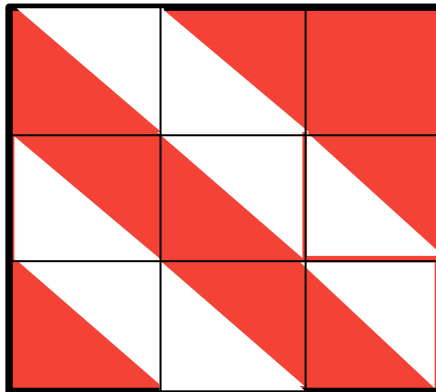
### **ADHD:**

Trouble with sustained attention  
Not hyper/impulsive

### **ASD:**

- + Great pretend play
- \* Sensitive to loud noises
- \* Obsessive focus on single topics for months at a time (currently: fish)
- \* Does not read his mother's social cues accurately
- \* Mother prompts him with every social press
- \* Does not understand knock knock joke

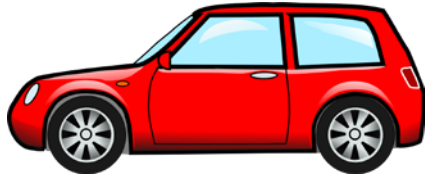
## Visual Spatial: Block Design





## Fluid Reasoning: Picture Concepts

Choose pictures with a common trait



Higher order  
cognitive skills  
that allow for  
goal-directed  
behavior

# Executive Functions

Plan

Initiate

Monitor

Shift

Inhibit

Organize

Sequence

Working Memory

Cognitive Flexibility

# Stroop

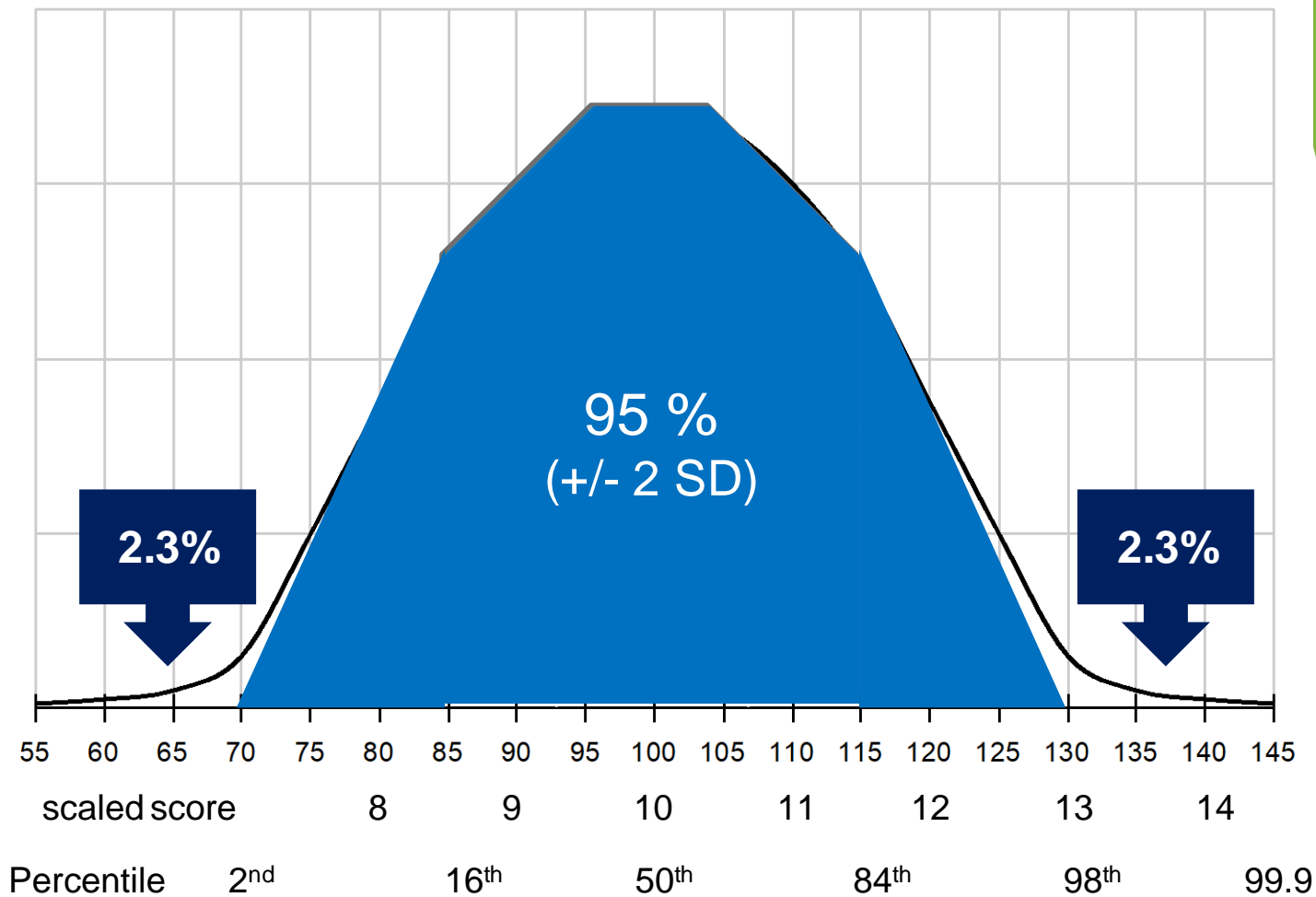
BLUE GREEN RED YELLOW

GREEN BLUE GREEN RED

YELLOW BLUE RED YELLOW

BLUE YELLOW GREEN RED

GREEN RED YELLOW BLUE



## Nat's IQ Testing: 6 yrs, May of pre-K

At 6 years:

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

Standard Score (mean = 100, average range = 90-109)

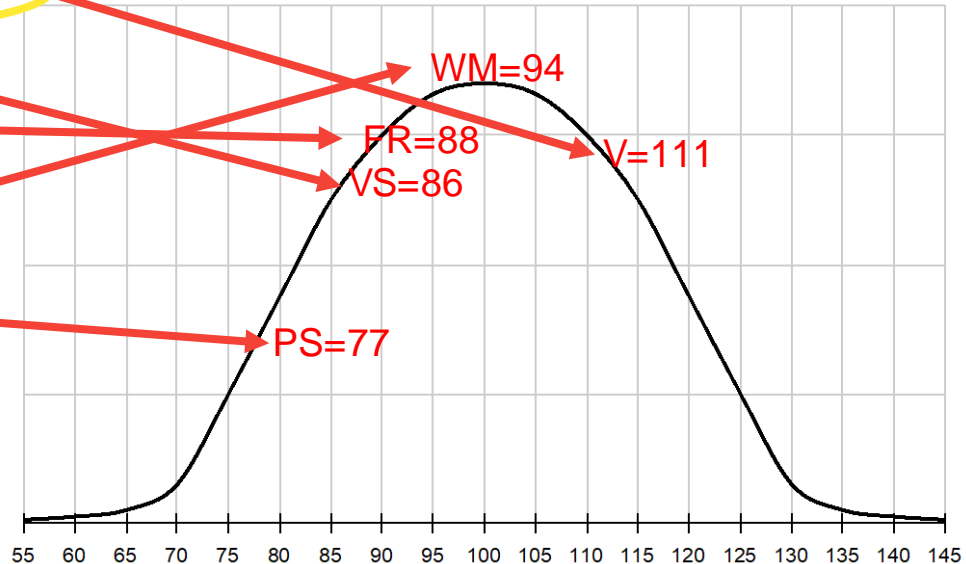
**Verbal Comprehension** = 111

**Visual Spatial** = 86

**Fluid Reasoning** = 88

**Working Memory** = 94

**Processing Speed** = 77



## Nat's Academic Testing: 6 yrs, May of pre-K

Academic Testing

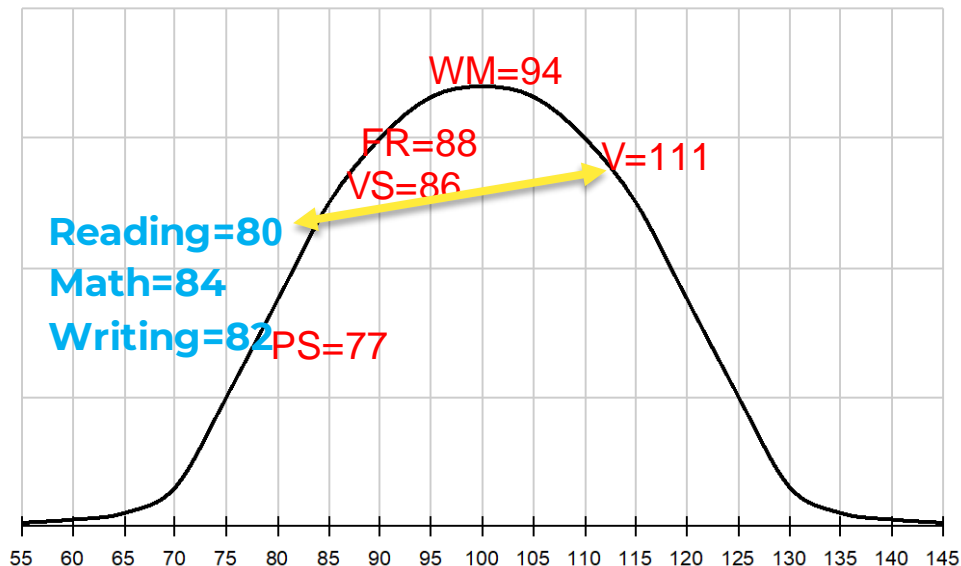
Woodcock Johnson IV

**Academic Skills = 77**

**Reading = 80**

**Math calculation skills= 84**

**Written Language = 82**



# **School IEP and Independent Neuropsychological Testing include fine motor, social and emotional function assessments**

Fine motor: average

Parent/teacher ratings: concerns for anxiety, depression, atypicality, \*withdrawal, attention, adaptability, social skills, functional communication

Executive function intact

No concerns with social skills or pragmatic language

**What diagnosis or  
diagnoses do you think  
he has?**



Reading/Writing  
Disabilities

Depression

? Autism

# Is this Nonverbal Learning Disability?

## What is a Nonverbal Learning Disability?

1. Poor visuospatial abilities
  - Resulting poor fine motor skills
  - Motor incoordination
2. Decoding (good) better than math (poor)
3. Deficits in pragmatic language
4. Social emotional difficulties
5. Executive function deficits



# Are Nonverbal Learning Disabilities separate from other LDs?

- ▶ NVLD is NOT in the current DSM-5
- ▶ Commonly used term to describe this cluster of symptoms
- ▶ Varying prevalence estimates (.05-3.75%)
- ▶ Lack of consistent definition but definitions converge



## Nonverbal Learning Disability vs. Autism Spectrum Disorder

### NVLD

Visual spatial deficits

Discrepant vs. verbal

↓Math calculation

↓Fine motor

### Both

Deficits in

- Executive Function
- Pragmatics

### ASD

Restricted, repetitive behaviors & interests

Sensory differences  
Defined social deficits

## Nat's Testing: 6 yrs, May of pre-K

Academic Testing

Woodcock Johnson IV

Academic Skills = 77

Reading = 80

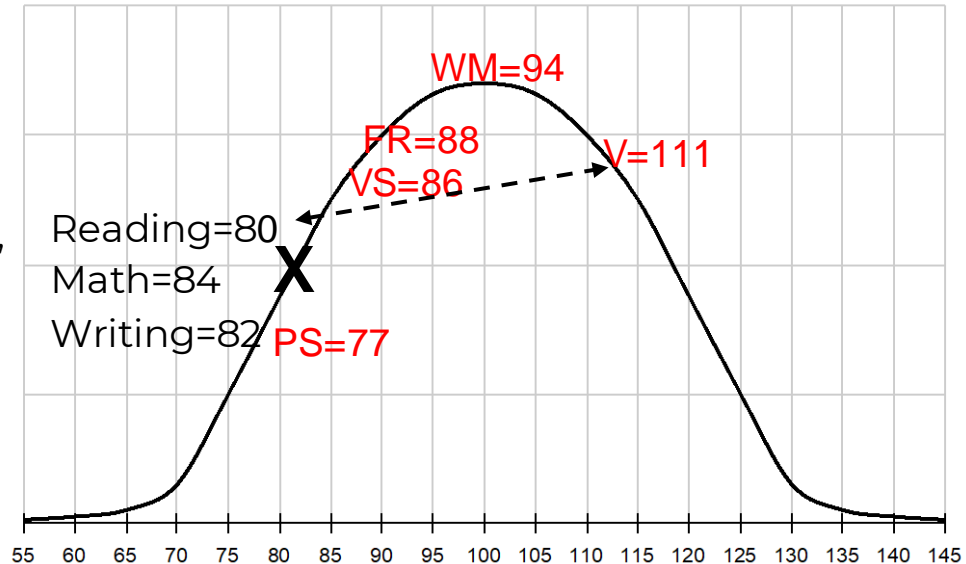
Math calculation skills = 84

Written Language = 82

Fine motor: average

Parent/teacher ratings: concerns  
for anxiety, depression, atypicality,  
\*withdrawal, attention, adaptability,  
social skills, functional  
communication

Executive function intact  
No concerns with social or  
pragmatics





**Does Nat have NVLD?**  
**Does Nat have ASD?**  
**What would you do?**

**Nat at 6**

## **NVLD**

Visual spatial deficits

Discrepant vs. verbal

↓Math calculation

↓Fine motor

## **Both**

Deficits in

- Executive Function
- ? Pragmatics

## **ASD**

Restricted, repetitive behaviors & interests

Sensory differences  
?Defined social deficits

## Nat at 7 seems anxious

What I did:

1. SPENCE Anxiety Scales (↑↑↑)
2. Vanderbilt Attention Scales
3. Recommend Therapy
4. Start sertraline
5. Start to discuss NVLD vs. ASD

Follow up:

- 1. Mood better:
  - \*happier, fewer anxious comments
  - \*more engaged
  - \*sleeping in his own room
- 2. Increasing difficulties with peers
  - \*cannot take their perspective
  - \*inconsistent back and forth conversation

Symptoms	Never	Occasionally	Often	Very Often
1. Fails to give attention to details or makes careless mistakes in schoolwork	0	0	2	3
2. Has difficulty sustaining attention to tasks or activities	0	0	2	3
3. Does not seem to listen when spoken to directly	0	0	2	3
4. Does not follow through on instructions and fails to finish schoolwork (not due to oppositional behavior or failure to understand)	0	0	2	3
5. Has difficulty organizing tasks and activities	0	0	2	3
6. Avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort	0	0	2	3
7. Loses things necessary for tasks or activities (school assignments, pencils, or books)	0	0	2	3
8. Is easily distracted by extraneous stimuli	0	0	2	3
9. Is forgetful in daily activities	0	0	2	3
10. Fidgets with hands or feet or squirms in seat	0	1	2	3
11. Leaves seat in classroom or in other situations in which remaining seated is expected	0	1	2	3
12. Runs about or climbs excessively in situations in which remaining seated is expected	0	1	2	3
13. Has difficulty playing or engaging in leisure activities quietly	0	1	2	3
14. Is "on the go" or often acts as if "driven by a motor"	0	1	2	3
15. Talks excessively	0	1	2	3
16. Blurts out answers before questions have been completed	0	1	2	3
17. Has difficulty waiting in line	0	1	2	3
18. Interrupts or intrudes on others (eg, butts into conversations/games)	0	1	2	3
19. Loses temper	0	1	2	3
20. Actively defies or refuses to comply with adult's requests or rules	0	1	2	3
21. Is angry or resentful	0	1	2	3
22. Is spiteful and vindictive	0	1	2	3
23. Bullies, threatens, or intimidates others	0	1	2	3
24. Initiates physical fights	0	1	2	3
25. Lies to obtain goods for favors or to avoid obligations (eg, "cons" others)	0	1	2	3
26. Is physically cruel to people	0	1	2	3



# Nat was retested end of 1<sup>st</sup> grade, 8 yrs

## Cognitive and Academic

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

Verbal Comprehension = 92

Visual Spatial = 94

Fluid Reasoning = 88

Working Memory = 85

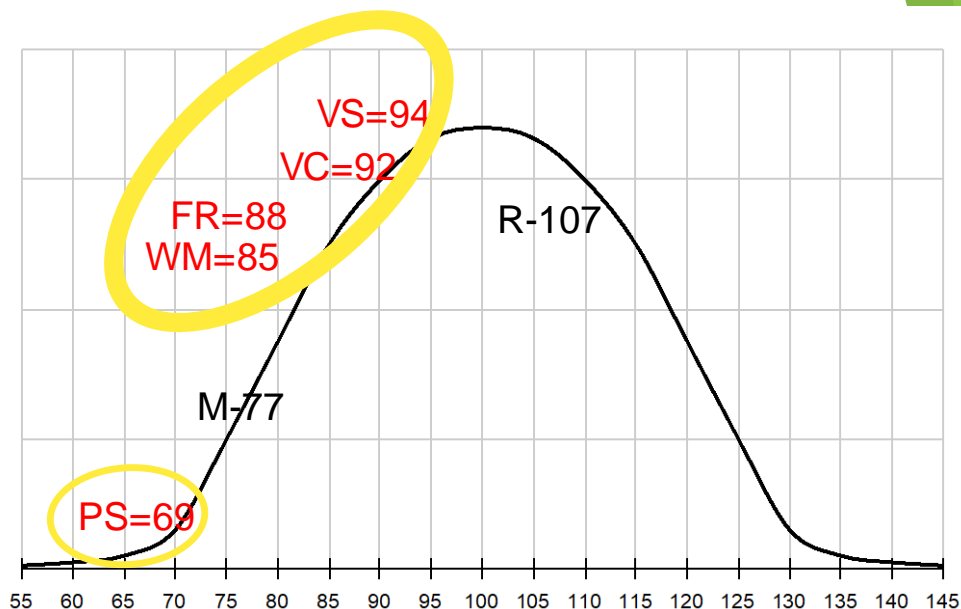
Processing Speed = 69

### Woodcock Johnson IV

Reading = 107

Math = 77

Written Language = 94



# Nat Speech and Language Evaluation

## Clinical Evaluation of Language Fundamentals 5 (CELF-5)

subtest-----scaled score-----

Word Structure-----11

Following Directions-----6

Sentence Comprehension -----9

Formulated Sentences-----7

Recalling sentences-----11

Understanding Spoken Paragraphs----7

Word classes-----8

## Social Language Development Test-Elementary

Making Inferences -----7

Interpersonal Negotiation-----6

Multiple Interpretations-----7

Supporting Peers-----10

Altercations with friends when he misunderstands

Inconsistent back and forth conversation: best on a topic of his interest

Demands brother be a certain character in play, and how the play should go

School increases services  
Math 3 x 30, Writing 3 x 30  
Social Language Pragmatics  
(group and 1:1)  
OT 2 x 30

**Nat at 8, end of 1<sup>st</sup> grade**

## **NVLD**

Visual spatial deficits

~~Discrepant vs. verbal~~

↓ Math calculation

↓ Fine motor

## **Both**

Deficits in

- Executive Function
- Pragmatics

## **ASD**

- Restricted, repetitive behaviors & interests
- Sensory differences
- ?Defined social deficits

# Specialist Consultation

## ▶ **ADOS-2, module 3**

- ▶ Answers questions without elaboration
- ▶ Inconsistent response to social overtures
- ▶ Reduced eye contact; avoided eye contact
- ▶ Facial tensing
- ▶ Flat affect
- ▶ Names friends, cannot define a friend
- ▶ Cannot explain the difference between a classmate and a friend

- ▶ **Parent SRS-2:** difficulties across social communication, cognition, awareness, and restricted interests and repetitive behaviors



**ASD (+Anxiety)  
(+Math LD)  
(+ Slow Proc.Speed)**



# Autism Spectrum Disorders

## DSM-IV (1994)

### Pervasive Developmental Disorders

1. Autistic Disorder
2. Pervasive Developmental Disorder, not otherwise specified
3. Asperger's Disorder (normal IQ, no language delay)
4. Rett's Disorder
5. Childhood Disintegrative Disorder

Exclusionary criteria: ADHD

# A word about Hans Aspergers

- Austrian pediatrician
- Pioneer in the study of autism
- Emphasized the intelligence of some with autism (credited with protecting them from Nazis)
- Also referred several to a clinic that was the center of child euthanasia
- Dr. Baron-Cohen recognizes that identifying subtypes could be helpful, that for some the term is part of their identity, but also the need to revise our language

Simon Baron-Cohen, PhD  
*Nature* **557**, 305-306 (2018)



# Autism Spectrum Disorders

## DSM-V (2013)

Pervasive Developmental Disorders

1. Autistic Disorder
2. Pervasive Developmental Disorder, not otherwise specified
3. Asperger's Disorder (normal IQ, no language delay)
4. Rett's Disorder (genetic test now!)
5. Childhood Disintegrative Disorder (usually medical dx)



# Autism Spectrum Disorder

DSM-V (2013)

Autism Spectrum Disorder

with cognitive impairment  
with language impairment

Severity levels

Removed the exclusionary criteria of ADHD



# DSM-5 Autism Spectrum Disorder

## 299.00 (F84.0)

- A. Persistent deficits across multiple contexts:
1. Deficits in social emotional reciprocity (approach, conversation, sharing interests/emotions/affect)
  2. Deficits in nonverbal communication (poorly integrated eye contact, body language, expression, gesture)
  3. Deficits in developing/ understanding/ maintaining relationships, sharing imaginative play



## DSM-5 Autism Spectrum Disorder 299.00 (F84.0)

- B. At least 2 restricted, repetitive behaviors/interests
1. Stereotyped, repetitive speech, motor movement, object use
  2. Adherence to routines, ritualized verbal/nonverbal behaviors, resist change
  3. Restricted, fixated interests of abnormal intensity/focus
  4. Hyper/Hypo reactivity to sensory input or unusual interest in sensory aspects of environment



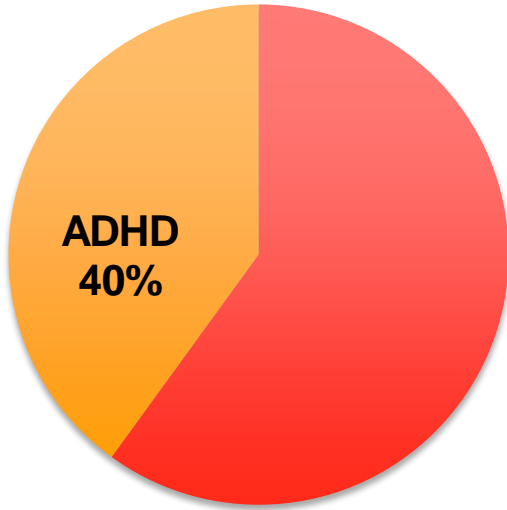


# Severity Ratings

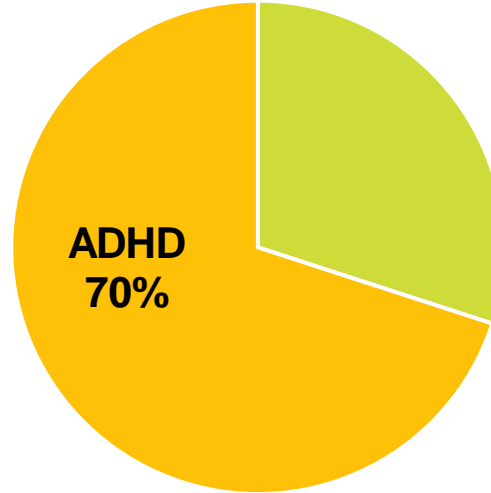
Severity Level	Social Communication	Restricted Interests and Repetitive Behaviors
3: Requiring Very Substantial Support	Severe deficits cause severe impairments; limited initiation and response	Markedly interfere with function, marked distress when routines interrupted
2: Requiring Substantial Support	Marked deficits; limited initiation and reduced response	Obvious to casual observer, interfere with function; distress if interrupted
1: Requiring Support	Difficulty initiating, atypical or unsuccessful response	Significantly impair function; resists interruption

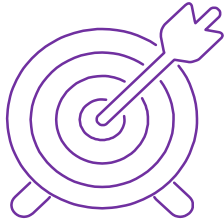
# Overlapping ADHD

**Youth with ASD**



**Youth with NVLD**





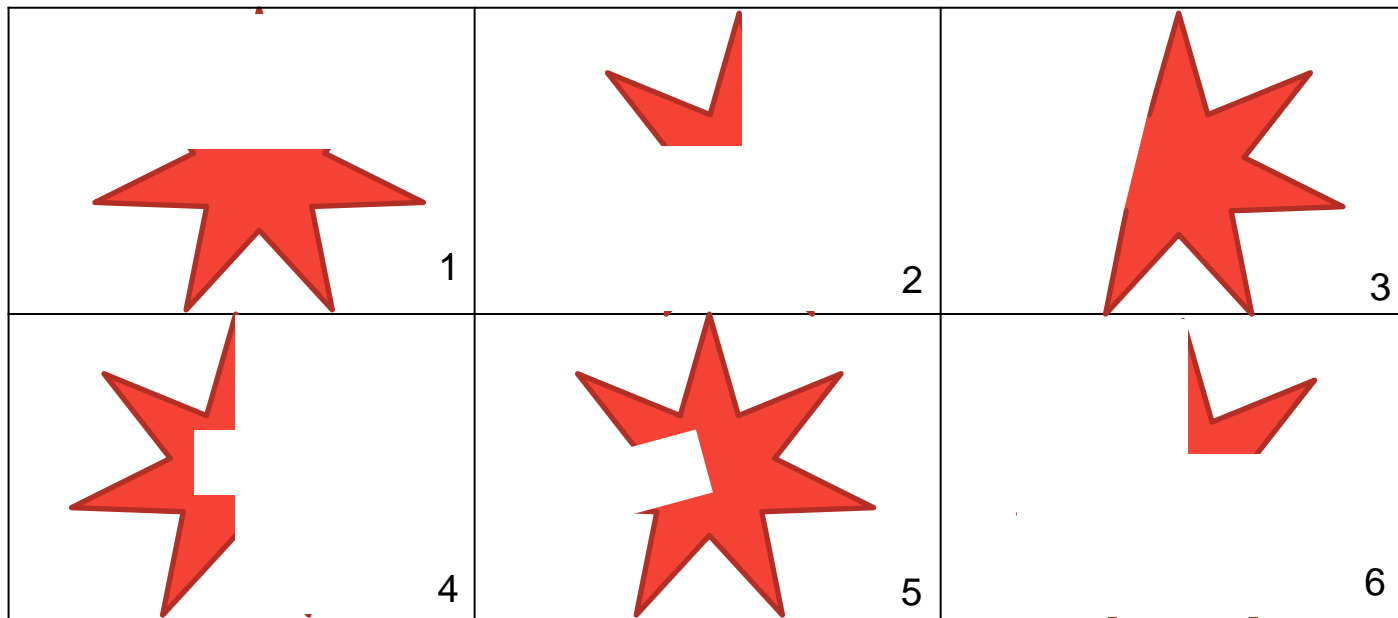
## Take Home Messages

- ▶ Recognize changing terms, developing children, and overlapping symptoms create complexity
- ▶ **Raise the question of ASD when appropriate to help parents prepare and consider the possibility**
- ▶ One step at a time!

## References

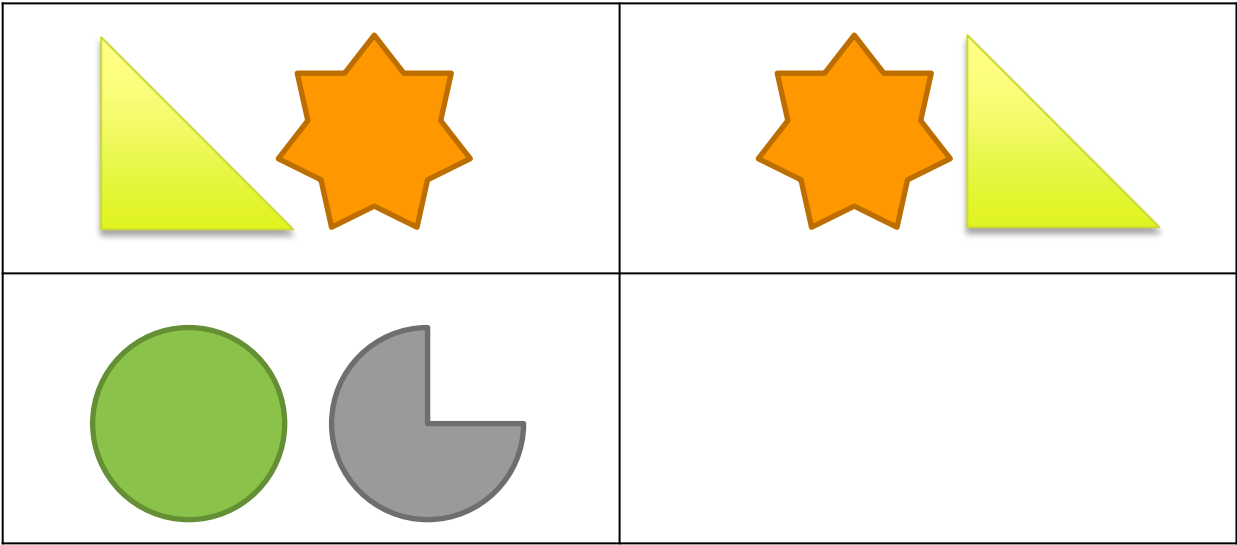
1. Mammarella IC, Cornoldi C. Nonverbal learning disability (developmental visuospatial disorder). *Handb Clin Neurol*. 2020;174:83-91.
2. Margolis AE, et al. Estimated Prevalence of Nonverbal Learning Disability Among North American Children and Adolescents. *JAMA Netw Open*. 2020 Apr 1;3(4):e202551.
3. Antshel KM, Russo N. Autism Spectrum Disorders and ADHD: Overlapping Phenomenology, Diagnostic Issues, and Treatment Considerations. *Curr Psychiatry Rep*. 2019 Mar 22;21(5):34
4. Langer N, Benjamin C, Becker BLC, Gaab N. Comorbidity of reading disabilities and ADHD: Structural and functional brain characteristics. *Hum Brain Mapp*. 2019 Jun 15;40(9):2677-2698.

## Visual Spatial: Visual Puzzles

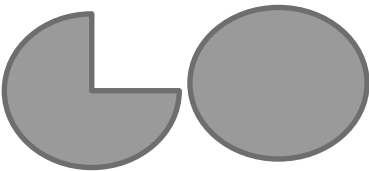


1,2,6

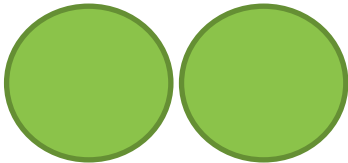
# Fluid Reasoning: Matrix Reasoning



1



2



3



4