



**Differential Autism**  
**Diagnosis**  
The Role of SLP in Evaluating  
Social Communication Differences

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### Disclosures

Both presenters are salaried employees of Oregon Health & Science University. Dr. Dolata holds a joint appointment with Pacific University. No relevant financial relationships to disclose.

Dr. Dolata is a member of the OSHA executive board, but is not presenting today in that capacity.



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### Introductions

- Over 20 years of combined experience on team-based Autism Diagnostic Clinics
- University teaching
  - OSHU, Pacific University, Portland State University
- Ongoing research on ASD identification and language outcomes in ASD



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## Goals

- Describe features of ASD
    - Diagnostic criteria & testable characteristics
  - Identify common differential diagnostic categories
- Describe the role of SLP
- Assessment & intervention



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## Agenda: 3 Basic Parts

1. Review diagnostic criteria
2. Differential social characteristics of young children
3. Diagnosis in older children and co-morbid conditions



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## The Role of the SLP in Diagnosis

- Social communication affects:
  - Nonverbal and verbal behavior
  - Reciprocal interactions
  - Conversational back and forth



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## The Role of the SLP in Diagnosis

- SLPs are well-suited to
  - Describe social communication abilities
  - Identify signs of ASD
  - Collaborate with professionals during diagnostic process



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## Best Practice in ASD Diagnosis

- Parental interview
- Use of gold-standard diagnostic measures
- Adherence to criteria from the diagnostic manual
- Team collaboration to review:
  - Cognition
  - Language
  - Social skills
  - Mental health
  - Behavior



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## Why is differential diagnosis important?

- Clinic
  - Appropriate supports
- Research
  - Homogenous samples, leading to meaningful intervention research



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## Terminology

- Differential diagnosis
  - The process of differentiating between two or more conditions that share symptomatology
- Co-morbidity
  - The presence of two or more simultaneous conditions



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## Terminology

- Overlapping symptoms
  - Symptoms that commonly occur within multiple distinct disorders
    - e.g., irritability, decreased concentration, impaired sleep = both anxiety and depression
- Diagnostic overshadowing
  - Occurs when one disorder is considered primary and is seen to account for or explain all other symptoms
    - e.g., intellectual disability



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## Autism Spectrum Disorders

- Behaviorally defined neurodevelopmental disorder
- Impacts social, language, cognitive, play, and adaptive functioning
- Affects 1-2% of US Children

Leaf & McEachin, 1999;  
Xu, Strathearn, Liu, & Bao, 2018



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## Autism: Prevalence

- Most recent CDC data: 1:59 children in US (2018 report)
- 4 times more likely in boys
- Diagnosis occurs across ethnic and socioeconomic lines
  - Similar stats for Europe and Asia
  - Health disparities exist for medically underserved populations
    - Some Black and Latinx families experience delayed access to evaluation, diagnosis, and intervention



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## Autism: Diagnostic Criteria

- Found in *Diagnostic & Statistical Manual of Mental Disorders (DSM-5)*
- Revision published in 2013 (5<sup>th</sup> Edition) *redefined* ASD

DSM-5, 2013



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## Major changes to Dx of ASD

- Elimination of subcategories of ASD:
  - Autistic Disorder, Asperger Syndrome, Pervasive Developmental Disorder, Childhood Disintegrative Disorder, Rett Syndrome



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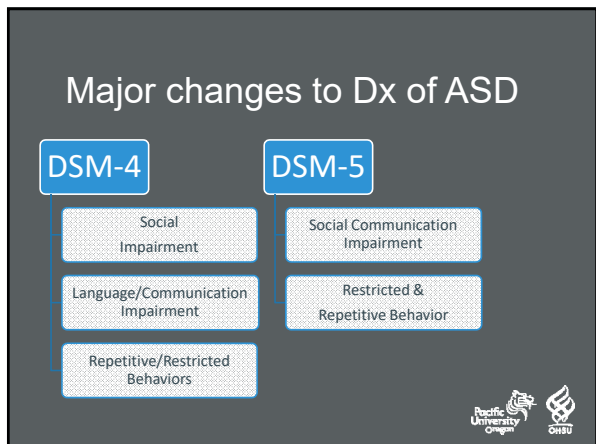
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- ### Major changes to Dx of ASD
- Added "modifiers" to the ASD diagnosis
    - Severity level: 1-3
    - With/without cognitive impairment
    - With/without language impairment
    - With co-occurring medical condition
- Pacific University Oregon OHSU

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- ### Major changes to Dx of ASD
- Social Pragmatic Communication Disorder
    - New diagnosis
    - Allows for diagnoses when RRBs are not present
- Pacific University Oregon OHSU

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## Current Basic criteria #1

- Past or present in the Social Impairment category:
  - Deficits in social reciprocity
  - Deficits in nonverbal communicative behaviors used for social interaction
  - Deficits in maintaining and understanding relationships

DSM-5, 2013



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## Current Basic criteria #2

- Past or present in the RRB category:
  - 2 types of repetitive patterns of behavior
    - Stereotyped or repetitive motor movements
    - Insistence on sameness or inflexible routines
    - Highly restricted, fixated interests
    - Hyper- or hypo-reactivity to sensory input
    - Unusual interest in sensory aspects of environment

DSM-5, 2013



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## ASD: Beyond the DSM-5

- Language regression
- Prosodic differences
  - Singsong or robotic intonation
  - Idiosyncratic jargon
- Behavioral outbursts / Self-injury
- Idiopathic toe-walking



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## ASD: Characteristics

- Spectrum Disorder
  - Heterogeneous
    - “If you’ve met one person with autism, you’ve met one person with autism.” - Stephen Shore



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## ASD: Characteristics

- Difficulty with Social Interaction
  - Social motivation, initiation
  - Theory of mind
  - Shared enjoyment
  - Maintenance
  - Peer relationships
  - Reciprocity



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## ASD: Characteristics

- Form, Content, & Use?

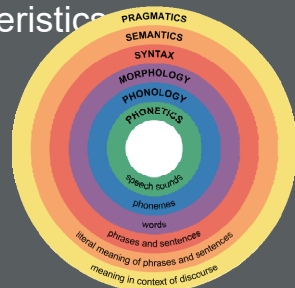


Image: Lumen Learning



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## ASD: Language Profile

- Use
  - Conversational skills
    - Initiation, maintenance
    - Repair
    - Appropriateness
  - Reciprocity
  - Paralinguistics & Nonlinguistics
  - Theory of Mind, Presupposition



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## ASD: Language Profile

- Content
  - affected by atypical vocabulary, difficulty with homonyms, meaning from context, sarcasm, humor, word play
  - Line blurs quickly between content and use



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## ASD: Language Profile

- Morphology and Syntax (i.e., "grammar")
  - Children with ASD
    - Normal grammar
    - OK vocab, grammatical deficits
    - Globally low linguistic abilities

Witke, Mastergeorge, Ozonoff, Rogers, & Naigles, 2017



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<b>A. Social Communication:</b>  Expressive Deficits (Vocal affect, prosody, syntax deficits)  Receptive Deficits (responding to name, following directions)  Challenges with Reciprocity (initiation/response, turn-taking, one-sided interactions)  Impaired use and interpretation of nonverbal communication (eye contact, facial expressions, gesture use, proxemics)  Social skills difficulties (making and keeping friends, social play, reading emotions and intentions)	<b>B. Restricted/Repetitive Behaviors:</b>  Echolalia/Stereotyped language  Repetitive motor movements  Rigid or routinized behaviors (insistence on specific routines, difficulties with transitions)  Tantrums/meltdowns/explosive behaviors  Hyper focus on preferred topics and activities  Sensory differences
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## Autism Diagnosis

- Is Autism on the rise?
  - Changes in criteria
    - DSM-3 (1987)
      - Differentiated from childhood schizophrenia
    - DSM-4 (1994)
      - Expanded to include Asperger's and PDD
    - DSM-5 (2013)
      - Ended ADHD exclusion, added sensory



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## Autism Diagnosis

- Is Autism on the rise?
  - Changes in visibility
    - More access to services, more children in services
  - Shifts from other diagnoses
    - Language disorder
    - Intellectual disability
    - ADHD



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## Autism Diagnosis

- Co-morbidities
  - ~10% of kids with ASD also have genetic or chromosomal disorders
    - e.g., Down Syndrome, Fragile X, tuberous sclerosis
  - 31% with Intellectual Disability, 25% Borderline
  - 37-85% with ADHD
  - 50-70% with depression and/or anxiety

ADDM, 2018; Gadow et al, 2008;  
Lee and Dusley, 2006; Moseley et al., 2011



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## Autism: Assessment

- Who can make an Autism Diagnosis?
- Diagnosis or Eligibility?
- Different agencies, different requirements
  - School districts- educational eligibility
  - State of Oregon- DD services
  - Federal requirements – SSI
  - Medical providers - insurance



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## Autism: Assessment

- Single discipline
- Multidisciplinary
- Interdisciplinary
- Transdisciplinary



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## Assessment: Team

- Interdisciplinary teams
  - Developmental pediatrics
  - Psychology
  - Psychiatry
  - Speech-Language Pathology
  - Occupational Therapy
  - Audiology
  - Special Educators
  - Parents
  - Teachers



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## Assessment: Components

- Record review
  - Medical
  - Educational
  - Prior assessments
  - Family concerns, reasons for referral
- Family interview
- Observation
- Static Assessment



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## Autism: Assessment

- Static Assessments: Single Disciplines
- Gold Standard Autism Evaluation:
  - Autism Diagnostic Observation Schedule (ADOS)
  - Autism Diagnostic Interview (ADI)



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## ADOS-2

- Play and conversation based
  - 5 modules (toddler → adulthood)
  - 4 are language-based
  - Two are age-based
- Provides opportunities to demonstrate social skills
- Quality assessment, behaviors most sensitive to ASD go into scoring algorithm




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### Module 1

#### Social Affect

- Gesture Use
- Eye contact
- Directed Facial Expressions
- Directing vocalizations to others
- Initiation of joint attention
  - + Showing + Pointing
- Quality of Social Overtures
- Verbal/Nonverbal Coordination
- Response to Joint Attention

#### RRB

- Vocal Intonation
- Stereotyped/Idiosyncratic language
- Unusual sensory interests
- Hand/finger mannerisms
- Repetitive Interest/Stereotyped bx

### Module 3

#### Social Affect

- Gesture Use
- Eye contact
- Directed Facial Expressions
- Quality of Social Overtures
- Quality of Social Response
- Reciprocity
- Conversational Turntaking
- Verbal Organization (rept event)
- Shared Enjoyment
- Rapport

#### RRB

- Stereotyped/Idiosyncratic language
- Unusual sensory interests
- Hand/finger mannerisms
- Excessive Interest/Stereotyped bx

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## Part 2: ASD in Toddlers

- Primary differential conditions to consider
  - Hearing impairment
  - Complex social history
  - “Late talker”
  - Language disorder
  - Global developmental delay




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## Early Language Delay

- Relationship to Global Developmental Delay
- Video: clip from Hanen and Clip from ADOS
- Autism Navigator Clip



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## Language Disorder: Communication Profile

- Syntax and Morphology
  - Younger Children:
    - Shorter MLU
    - Simple syntactic structures
  - Morphosyntactic challenges
    - Verb inflections
    - Possessives
    - Copula/Auxiliary
    - Closed-class words: prepositions, pronouns



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## Early Language Delay

- Characteristics of late talkers that might seem like ASD:
  - May have reduced vocabulary, verbal initiation
  - May echo others or use jargon
    - These are normal language-learning skills that are sometimes "overused" in ASD



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## Early Language Delay

- Primary considerations:
  - **Joint attention**, shared enjoyment
  - Receptive language
  - Communicative intention
  - Nonverbal communication
  - Gestures, variety
  - Play skills
  - Imitation



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## Why are these skills important?

- Joint attention as the foundation, pre-requisite
  - Imitation
  - Showing
  - Pointing
  - Shared enjoyment



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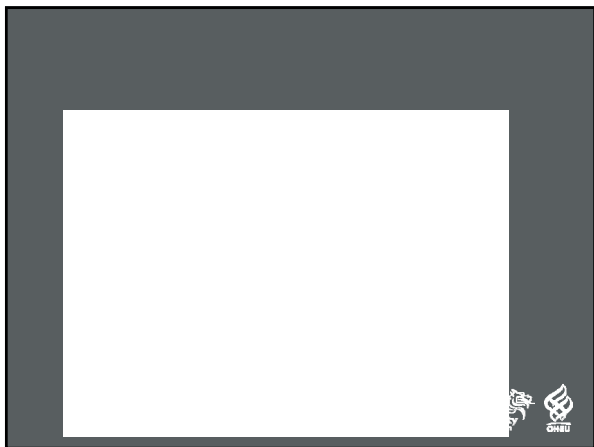
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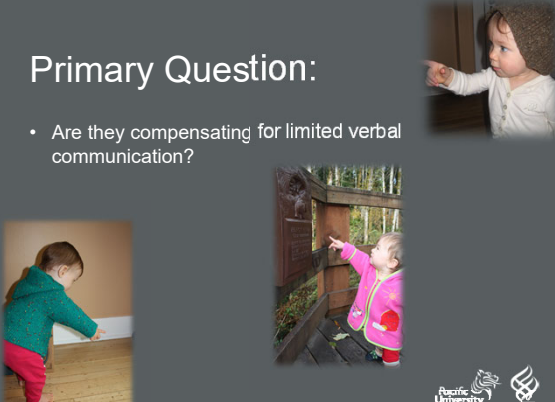
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### Primary Question:

- Are they compensating for limited verbal communication?



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### Predictors of future language skills

- Frequency, range, and complexity of babbling
- Frequency and range of communicative initiations
- Level of comprehension
- Frequency and range of symbolic play

Also red flags when reduced!



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### Red flags for ASD in toddlers

- A child who does not demonstrate intent or desire to communicate
  - intentionally typically develops ~ 9m
- 12m who is not using gestures
- 12-16m who does not respond to name consistently
- 15m who does not point
- Atypical communicative methods
  - Body proximity, hand guiding



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## But be careful with red flags!

- Most kids do the things that kids with ASD do (e.g., hand guiding, lining up cars, spinning, etc.), but:
  - they just don't get stuck on them,
  - have larger repertoire for communication, play, etc.,
  - Involve others more readily in their play



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## More terminology

- Jargon
  - Strings of babble, might have repetitive prosody
- Prosody
  - Rhythm, melody, stress, intonation
- Echolalia
  - Immediate repetition of others or self
- Scripting
  - Repeating direct quotes from people or characters
- Perseverative or repetitive speech
  - Repetitions of word, phrase, topic with tendency to get stuck



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## Global Developmental Delay

- Differential becomes more difficult with increasing severity of delay
- Consider similarities to the "late talker"
- What are differences, how might cognition affect social communication?



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### ASD or Developmental Delay?

- ASD**
  - Receptive and Play skills lower than expected given expressive language skills
- ASD+DD**
  - Less interested in interaction
  - Less likely to use regulated gaze
  - Less able to engage in back and forth turns
  - Less apt to initiate
- DD**
  - Receptive language > Expressive language
  - Natural skills > tested skills
  - More likely to have pretend play
  - More likely to use gestures

Paul, Chawarska, & Volkmar, 2008; Weismer, Lord, & Esler, 2010



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### ADOS-2 Module 1 Video Clip

- Watch for:
  - Repetitive speech
  - Echolalia
  - Repetitive interests
  - Stereotyped movements



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### Language Disorders



- Clinical labels
  - Expressive Language Disorder
  - Receptive Language Disorder
  - Mixed Receptive Expressive Language Disorder
  - Language Impairment
  - Specific Language Impairment
  - Developmental Language Disorder
  - Speech and Language Delay
- Can impact any linguistic domain



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## Specific Language Impairment

- Team approach necessary due to exclusion criteria
  - Verbal performance 1.25 SD below mean
  - Performance (NV) IQ WNL
  - Normal hearing
  - No oral structural/ oral motor deficits
  - No emotional or behavioral problems
  - No neurological problems
  - Social abilities WNL



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## Language Disorder: Communication Profile

- Syntax and Morphology for older children
  - Challenges with language requires for academics
  - Syntactically less complex utterances
- Literacy
  - Kids with language impairment at higher risk for literacy difficulty
    - Which can cyclically affect later language learning

Schuele, 2004



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## Language Disorder: Communication Profile

- Semantics
  - Decreased size & diversity of lexicon
    - Difficulty with relational word meanings
    - Over-reliance on all-purpose verbs
  - Slower rate of acquisition
    - Same developmental sequence
    - Fast-mapping occurs more slowly
  - Word retrieval difficulties



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## Language Disorder: Communication Profile

- Effect on pragmatics
  - Topic initiation
  - Turn-taking
  - Entering peer conversations, keeping up
  - Repair strategies
  - Narrative construction



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## Language Disorder: Differential

- Primary Question:
  - Are social skills impaired beyond what would be expected given language and chronological age expectations?
  - Consider:
    - play and peer interactions
    - nonverbal communication



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## Part 3: Adolescents & Increasingly Complex Differentials

- Let's consider:
  - Intellectual Disability
  - Social Pragmatic Communication Disorder
  - Syndromes
  - ADHD
  - Tourette's Disorder
  - Mood/Thought Disorders



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## Intellectual Disability

"Intellectual disability is a disability characterized by significant limitations both in intellectual functioning and in adaptive behavior, which covers many everyday social and practice skills. This disability originates before the age of 18."

American Association on Intellectual and Developmental Disabilities



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## ID: Functional effect on skills

- Social
  - Interpersonal skills, social responsibility, naiveté, social problem solving, rule following, avoidance of victimization
- Practical
  - Activities of daily living, occupational skills, healthcare, travel, schedules, safety, money, phone

American Association on Intellectual & Developmental Disabilities



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## ID: Prevalence

- Most common developmental disorder
- 1-3 % of the population
- Mild: 3 times more common than severe
- More common in males

WHO, 2001; Center for Disease Control



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## ID: Severity

- Classifications by Approximate IQ Ranges
  - Mild: 50-69
  - Moderate: 36-49
  - Severe: 20-35
  - Profound: Below <20

Boat & Wu, 2015



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## ID: Etiology

- Organic
  - Syndromic
    - e.g., Down Syndrome, Fragile X
  - Prenatal
    - e.g., Substance abuse, physical injury
  - Perinatal
    - e.g., hypoxia
- Familial
  - Parent(s) with ID
  - Parents without ID but inheritance in absence of syndrome
  - Extreme environmental deprivation



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## ID: Effect on Language

- Expressive Language
  - Semantics
    - Abstraction
  - Syntax
    - Cognition seems to predict syntactic development



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## ID: Effect on Language

- Receptive Language
  - Speed of information processing
  - Linguistic competence
    - Many children with ID have Receptive < Cognitive
  - Contextual understanding
    - Can benefit from routine and context cues



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## ID: Effect on Language

- Social communication
  - Communicative functions
    - Slow to acquire full range
      - Mild-mod ID with full repertoire by adulthood
    - Primarily responsive
      - particularly with more severe ID
  - Conversations
    - Repair, reciprocity, topic maintenance



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## ID: Differential Considerations

- Primary Question:
  - “Are delays in social communication more severe than would be expected for developmental level?”



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## Social Pragmatic Communication Disorder (SPCD)

- New diagnosis in 2013
- Criteria:
  - Persistent difficulties in social use of V and NV communication with deficits in **ALL** of the following:
    1. Using communication socially
    2. Changing communication for context / listener
    3. Following rules for conversation and storytelling
    4. Understanding what is not explicitly stated



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## SPCD Differentials

- Absence of RRB
- Meets all criteria
- Plus, symptoms not better explained by...anything else
  - ASD, GDD, ID, ADHD, mental health, etc.



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## Associated Syndromes

- Down Syndrome
- Rett Syndrome
- Fragile X
- Tuberous Sclerosis
  
- Also consider common co-morbid diagnoses



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## Differential Considerations

- Clinically & Personally
  - Will the symptoms resolve?
  - Would particular treatment approach be beneficial?



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## Attention Deficit Hyperactivity Disorder

- Disorder of executive functioning
  - Attentional control
  - Cognitive inhibition
  - Inhibitor control
  - Working memory
  - Cognitive flexibility



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## ADHD: Diagnosis

- Interferes with functioning or development
- Manifests across environments
- Presents prior to age 12

DSM-5, 2013



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## ADHD: Prevalence & Prognosis

- Prevalence
  - ~7% of children in US
  - Worldwide adult prevalence: 3.4%
- Prognosis
  - ADHD improves with time
    - Brain maturation
    - Functional/ cognitive coping

Thomas et al., 2015; Fayyad et al., 2007



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## ADHD: Common Comorbidities

- 2/3 of kids have at least one co-occurring condition
  - Common co-occurring diagnoses include:
    - Disruptive behavior disorders
      - ODD, Conduct
    - Mood disorders
    - Anxiety disorders
    - Tics & Tourette Syndrome
    - Learning Disabilities

Rief, 2005; AAPA, 2000



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## ADHD: Effect on Language

- Performance difference noted on standardized tests
  - Formulated sentences (CELF-R)
  - Sentence imitation (TOLD-P2)

Oram, Fine, Okamoto, & Tannock, 1999; Kim & Kaiser, 2000



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## ADHD: Communication Markers

- Clinical struggles
  - Expressive
    - Formulation, narrative construction, association vs. retrieval
  - Receptive
    - Sequencing and inhibition tasks, working memory



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## ADHD: Communication Markers

- Form
  - No specific syntactic markers; however
    - Organizational deficits may lead to grammatical inconsistencies
  - High risk of learning disabilities leading to higher level language dysfunction
    - Learning to read, reading to learn



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## ADHD: Communication Markers

- Content
  - Organizational deficits
    - Circumlocution, mazes, false starts
    - Poor declaration of referents
  - Semantic weaknesses
    - Filler words, non-specific vocab, word finding
  - Metalinguistic weaknesses
    - Inference, meaning from context



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## Video: Communication in ADHD



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## ADHD: Communication Markers

- Use
  - Inattention
    - Failure to read context
    - Failure to attend to or read conversational partner
  - Impulsivity
    - Proxemics
    - Interrupting, verbal outbursts
    - Conversational turn-taking, dominating
    - Oversharing



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## ADHD: Communication Markers

- Functionally, what does this affect?
  - Eye contact
  - Volume, rate modulation (“in your face”)
  - Proxemics
  - Topic maintenance
  - Reciprocity
  - Intense areas of interest
  - Explosive behaviors, transitions



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## ADHD Differentials from ASD

- Remember the validity codes (E-codes) on ADOS-2!
  - *Is the test measuring what it's supposed to?*
- Quality assessment
  - Eye contact (avoidance or inattention?)
  - Social insight (knowing vs. following rules)
  - Intense areas of interest (specificity vs. preference)



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## ADHD Differentials from ASD

- Consider social impact of co-morbid conditions as well



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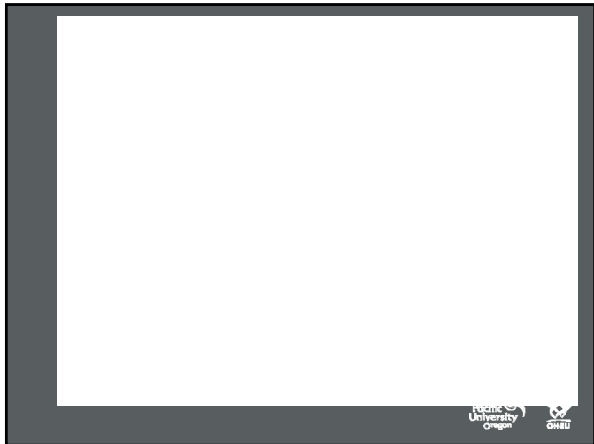
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### Tourette's/Tic Disorders:

- May affect up to 10% of children
- Trajectory (Mills & Hedderly, 2014):
  - Tic Disorders generally begin in childhood
  - Around 1% of children fulfill criteria for TS:
    - Begin as simple motor tics and progress to complex motor tics or vocal tics over 1-2 years
  - Maximum tic severity is usually 8-12 years
  - By age 18 tics usually wane, with no or mild tics remaining until adulthood



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### Tics & Tourette's Disorder

- Includes repetitive motor movements
  - Tics vs. RRBs?
    - Age of onset, quality
- Are social differences more like the kind with mood disorders or ADHD?
  - Consider co-morbidities (e.g., anxiety, mood)



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### Depression & Anxiety: Communication Markers

- Impaired/avoidant eye contact
- Low amplitude, absent gestures
- Low vocal intensity, volume
- Social avoidance
- May have rigid or compulsive behaviors



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## Depression & Anxiety Disorders: Diagnostic Considerations

- Co-morbidity: Is it:
  - ASD Plus \_\_\_\_\_, or
  - ASD or \_\_\_\_\_...
- 40% of kids with ASD also have Anxiety
- Important considerations: Adults with ASD
  - 3x more likely to have depression
  - 5x more likely to attempt suicide
- Self-report necessary for diagnosis

van Steensel et al., 2011; Croen, 2015



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## Depression & Anxiety Disorders: Diagnostic Considerations

- High rate of false positives on ADOS-2
  - Remember the E-codes/Validity codes?
- Consider presence/absence of RRB
- Because of high co-morbidity, may need to treat mood/anxiety prior to ASD assessment
- Quality assessment
  - What's driving the social differences?



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## Bipolar Disorder

- ~4% of US Adults at some point in lives
- NIHM Definition, characteristics
  - Dramatic shifts in mood, energy, activity
    - Affect ability to carry out daily tasks



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## Bipolar Disorder: Communication Markers

- Marked social impairments despite typical social development PRIOR to onset of bipolar disorder
- Difficulty with facial expression processing tasks
- Difficulty inferring others' emotional states

Gellar et al., 2000



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## Thought Disorder / Schizophrenia

- ~<1% of the adult population, exceedingly rare in children
- Characterized by
  - Thoughts that seem out of touch with reality
  - Disorganized speech or behavior
  - Decreased participation in daily activities
  - Difficulty with concentration and memory
  - Flat or inappropriate affect
  - Neologisms

Doherty, 1995; Nowak, 1997;  
Torrey, 1997



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## Thought Disorder Differentials

- False positives (E-codes!)
- Items that will come up in interview
  - Age of onset
  - Historical presentation
  - Absence of RRBs
- Quality assessment:
  - No interest in social relationships
  - Rejection vs. lack of understanding of social "rules"



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## Summary

- Review criteria
- Consider co-morbid possibilities
- Remember validity codes
- Collaborate with your teams



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Thank you!



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