



# Evidence-Based Assessment for Autism Spectrum Disorders

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Superheroes social skills training, Rethink Autism internet interventions, parent training, EBP classroom training, functional behavior assessment: An autism spectrum disorder, evidence based practice (EBP) training track for school psychologists

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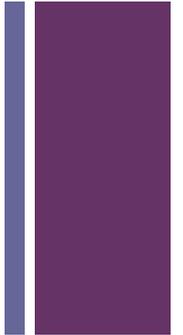
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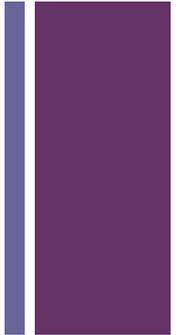
# Evidence-Based Assessment



- Best Practice requires the use of Evidence-Based measures
- Evidence-based measures are both reliable and valid
- Diagnostic Validity
  - Sensitivity: A scale's ability to correctly identify an individual as having a disorder (Avoiding false positives or type 1 error)
  - Specificity: A scale's ability to accurately discriminate those that do not have a disorder (Avoiding false negatives or type 2 error)
- Clinician is responsible for understanding the measures he/she utilizes
  - Relevance of measure for the individual
  - Normed dates
  - Standardization sample



# Importance of Early & Accurate Diagnosis



■ Accurate Early Diagnosis  Early Intervention

- For those with Autism Spectrum Disorders, Early Intervention, **using evidence-based practices**, is fundamental in improving the trajectory for an individual.
- Reliable diagnoses of ASD can be made as young as 20-24 months; however, Wiggins et al. (2006) found a mean age of diagnosis of 5 years in a sample of 108 children with ASDs
- Critical Period for Early Intervention:
  - Before the age of 7

# + Diagnostic Criteria

Diagnostic & Statistical Manual of Mental Disorders,  
Fifth Edition (DSM-5)

American Psychiatric Association (2013)

## ■ Autism Spectrum Disorder

- A. Persistent deficits in social communication and social interaction across multiple contexts, as manifested by the following, currently or by history (examples are illustrative, not exhaustive):
  - 1. Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions or affect; to failure to initiate or respond to social interactions.
  - 2. Deficits in nonverbal communicative behaviors used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication.
  - 3. Deficits in developing, maintaining, and understanding relationship, ranging, for example, from difficulties adjusting behavior to suit various social contexts; to difficulties in sharing, imaginative play or in making friends; to absence of interests in peers.
- *Specify* current severity: Based on social communication impairments and restricted, repetitive patterns of behavior.

# + Diagnostic Criteria

## Diagnostic & Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)

### American Psychiatric Association (2013)

- B. Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history (examples are illustrative, not exhaustive):
  - 1. Stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypes, lining up toys or flipping objects, echolalia, idiosyncratic phrases).
  - 2. Insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior (e.g., extreme distress at small changes, difficulties with transitions, rigid thinking patterns, greeting rituals, need to take same route or eat same food every day).
  - 3. Highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interests).
  - 4. Hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment (e.g., apparent indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement).
- *Specify* current severity: Based on social communication impairments and restricted, repetitive patterns of behavior.

# + Diagnostic Criteria

Diagnostic & Statistical Manual of Mental Disorders,  
Fifth Edition (DSM-5)

American Psychiatric Association (2013)

- C. Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities, or may be masked by learned strategies in later life).
- D. Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning
- E. These disturbances are not better explained by intellectual disability or global developmental delay. The disorders frequently co-occur; to make comorbid diagnoses of ASD and intellectual disability, social communication should be below that expected for general developmental level.

# + Diagnostic Criteria

Diagnostic & Statistical Manual of Mental Disorders,  
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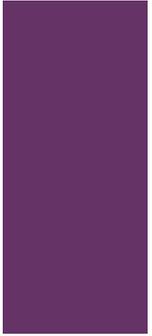
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- Severity Level Specification
  - Based on social communication impairments and restricted, repetitive patterns of behavior
    - Level 3: “Requiring very substantial support”
    - Level 2: “Requiring substantial support”
    - Level 1: “Requiring support”
- Additional Specifications:
  - With or without accompanying intellectual impairment
  - With or without accompanying language impairment
  - Associated with a known medical or genetic condition or environmental factor
  - With catatonia (psychomotor features)
- Specifications guide interventions to better fit severity level and particular difficulties



# Screening & Diagnosis of Autism

## Level One: Routine Developmental Surveillance



- American Academy of Pediatrics (AAP; 2011) recommends that all children be screened for developmental delays and disabilities during regular well-child doctor visits
  - 9 months, 18 months, and 24 or 30 months of age
- In addition, all children should be screened for autism spectrum disorder specifically during regular well-child visits at 18 and 24 months.
- The American Academy of Neurology (2000) recommends a flexible, continual developmental surveillance process at each pediatric well-child visit from infancy through childhood.
- Appropriate developmental screening questionnaires to be used include: **BRIGANCE Early Childhood Screens III** (Brigance, 2013), **Ages and Stages Questionnaire- Third Edition (ASQ-3;** Squires & Bricker, 2009), **Child Developmental Inventory** (CDI; Ireton, 1992), and **the Parents' Evaluations of Developmental Status** (PEDS; Glascoe & Robertshaw, 2007).
- Developmental milestones of particular concern
  - Failing to babble at 12 months
  - Use single words by 16 months
  - Use two word spontaneous phrases by 24 months
  - Display any loss of language or social skills at any age
  - Siblings of children with ASD should be more closely monitored



# Screening & Diagnosis of Autism

## Level One: Routine Developmental Surveillance



- Modified Checklist for Autism in Toddlers (M-CHAT; Robins, Fein, Barton & Green 2001; Robins & Dumont-Mathieu) at 18 months
  - Denver Criteria for the CHAT (Scambler et al., 2006)
- Autism Spectrum Screening Questionnaire (ASSQ; Ehlers, Gillberg, & Wing, 1999)
- Early Screening of Autistic Traits Questionnaire (ESAT;
- Red Flag Behaviors:  
Absence or limited frequency of...
  - Responding to name
  - Following a point or a gaze
  - Pointing for reasons other than making requests
  - Engaging in pretend play
- Much better at catching classic autism as opposed to high functioning

# + Diagnosis

## Level Two: Diagnosis & Evaluation of Autism

- Core Assessment Domains for Best Practice
  - Record Review
  - Developmental and medical history
  - Medical screening and/or evaluation
  - Parent/caregiver interview
  - Parent/teacher ratings of social competence
  - Direct child observation
  - Cognitive assessment
  - Academic assessment
  - Adaptive behavioral assessment
  - Communication and language assessment





# Assessment Considerations

For Best Practice, each ASD assessment should include:

- Two main sources of information
  - Description of course of development and current behavior patterns (provided by caregivers)
  - Direct observation of behavior
  
- Involvement of a multidisciplinary team of members to inform specialty areas of relevance:
  - Speech & Language Pathologists
  - Occupational Therapists
  - Physical Therapists
  - Behavior Specialists
  - Psychiatrists
  - Special Education Teachers





# Gold Standard Measures

## Standardized Parent Interview

- Autism Diagnostic Interview, Revised (ADI-R; Rutter, Lecouteur, & Lord, 1994)
  - The most reliable standardized measure to obtain an early developmental history of an individual suspected of having an autism spectrum disorder.
  - Most widely used diagnostic instrument in autism research
  - Identifies symptoms linked to the DSM-IV-TR & ICD-10 criteria
  - Comprises 93 questions summed into 3 functional domains
    - Language/communication; Reciprocal Social Interactions; & Restricted, Repetitive & Stereotyped Behaviors & Interests
    - Diagnostic & Current Behavior Algorithms
      - Diagnostic focuses on developmental history at ages 4-5 years
      - Current Behavior focuses on symptoms at time of testing for treatment and planning





# Gold Standard Measures

## Standardized Parent Interview



- ADI-R
  - One cutoff score for Autism Spectrum Disorder
  - Should not be used on individuals with a mental age below 20
  - Specificity in identifying autism over intellectual disability
  
- Drawback:
  - Long administration time (2 hours)
  - Lengthy training



# Gold Standard Measures

## Standardized Direct Observation

Autism Diagnostic Observation Schedule, Second Edition (ADOS-2; Lord, Rutter, DiLavore, Risi, Gotham, & Bishop, 2012 )

- Most sophisticated and psychometrically sound direct observation tool for ASD
- Originally created in 1989 to standardize behavioral observations
- Revised in 1994 with increased use in clinical settings
  - Distinguished spectrum vs non-spectrum individuals with 92% accuracy or better (Lord et al., 2000).
- Compliments the ADI-R to create a “Gold Standard” in assessment
  - Together the two measures account for a parent/caregiver interview and a standardized observation of behavior.

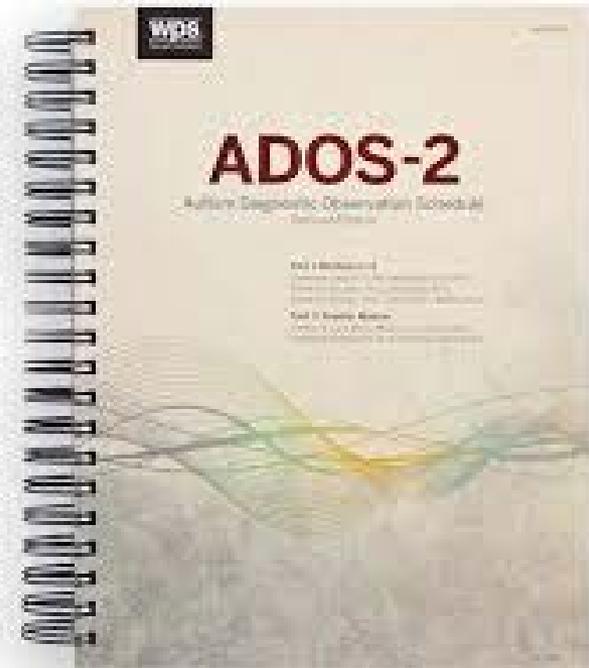




# + Gold Standard Measures

## ADOS-2

- Five points of interest for coding behavior
  - Social Interaction
  - Communication
    - Verbal & Nonverbal
  - Play and imaginative use of materials
  - Stereotyped/restricted behaviors
  - Other abnormal behaviors/affect





# Gold Standard Measures

## ADOS-2



- The observation is performed through one of 5 Modules
  - Modules 1, 2, 3, 4, and a Toddler Module
  - Module is chosen based on the language ability of the client
  
- Toddler Module: 12 to 30 months of age; Nonverbal, single words, or inconsistent simple phrases
- Module 1: Older than 31 months of age; Nonverbal/single words; Moving around/playing
- Module 2: Moving around/playing and verbally fluent and under 36 months; or, any age with phrase speech
- Module 3: Age 3 to early adolescence; toy play is still appropriate; verbally fluent
- Module 4: Older adolescents or adults; verbally fluent; tasks are largely interview format

# + Gold Standard Measure

## ADOS-2

### ■ Module Selection

- Language ability is pertinent as the language demands of the tasks should not hinder the individual's ability more than typical
- When in doubt, choose the less-demanding module
- Incorrect module selection invalidates assessment
  - If the wrong module has been selected, the evaluator should switch to the correct module during the assessment



# Gold Standard Measures

## ADOS-2

### ■ Scoring

- Follow guidelines for hierarchical presses to elicit behaviors
  - 2-3 clear examples of the behavior is “good”
  - Administrator should be aware of how hard he/she is working to provoke the desired behaviors
    - Guidelines:
      - 0- Behavior shows no abnormality
      - 1- Behavior is mildly abnormal or slightly unusual
      - 2- Behavior is definitely abnormal or unusual
      - 3- Behavior is markedly abnormal as to interfere with the interview or very limited
      - 7- Abnormality not specified in coding
      - 8- Behavior did not occur and is not applicable
      - 9- Rating is applicable, but insufficient evidence





# Gold Standard Measures

## ADOS-2



- ADOS-2 (2012) revisions
  - Algorithms for Modules 1-3
    - Create more consistency across modules for easier comparison throughout an individual's development
  - Addition of a toddler module- provides ranges of concern
    - Allow the assessment of younger children
  - Improve accuracy and effectiveness of diagnostic algorithms
    - Previously, the ADOS over-identified children with language impairments and under-identified nonverbal individuals.
    - ADOS-2 has greater specificity for populations with significant cognitive/developmental impairment

# + Gold Standard Measures

## ADOS-2

- Drawbacks
  - Expensive
  - Intensive training (inter-rater reliability)
  - Time-consuming to learn, administer, and score
  - Over-identifies ASD in children with significant intellectual disability in early childhood
  - Repetitive and stereotyped behaviors are often not exhibited during the observation

# + Symptom Screening Questionnaires

## Rating Scales & Checklists

- Rating scales and checklists may also be used to inform the assessment of the presence and severity of specific symptoms that are characteristic of autism spectrum disorders.
  - Create “functional profiles”
- These scales should not be used as universal screening measures and should only be used to further investigate diagnostic hypotheses of ASD.
- Commonly used scales include:
  - **Social Responsiveness Scale, Second Edition**  
(SRS-2; Constantino & Gruber, 2012)
  - **Social Communication Questionnaire**  
(SCQ; Rutter, Bailey, & Lord, 2003)
  - **Childhood Autism Rating Scale, Second Edition**  
(CARS2; Schopler, Van Bourgondien, Wellman, & Love, 2010)
  - **Gilliam Autism Rating Scale, Second Edition**  
(GARS-2; Gilliam, 2006)
  - **Autism Behavior Checklist**  
(ABC; Krug, Arick, & Almond, et al., 1978, 1980)
  - **Autism Spectrum Rating Scales**  
(ASRS; Goldstein & Naglieri, 2010)



# + Symptom Screening Questionnaires

## Rating Scales & Checklists

Social Responsiveness Scale, Second Edition (SRS-2; Constantino & Gruber, 2012)

- 65 items that are rated in regard to the past 6 months
  - Child: 15-20 minutes to complete by a parent or teacher
  - Adult: 15-20 minutes to complete by an informant; self-report
- Measures social behavior across 5 domains: social awareness, social information processing, capacity for reciprocal social responses, social anxiety/avoidance, and characteristic autistic preoccupations/traits.
- Did not clearly distinguish autism from PDD-NOS or Asperger's
- Strong correlations with ADI-R: mother ratings- .65-.74 (Constantino et al., 2003)

# + Symptom Screening Questionnaires

## Rating Scales & Checklists

### Social Communication Questionnaire (SCQ; Rutter, Bailey, & Lord, 2003)

- Designed to assess for qualitative impairments in reciprocal social interaction and communication, as well as restricted, repetitive, and stereotyped behavior.
  - 40-item rating scale completed by parent or other primary care giver (must be familiar with developmental history).
  - Lifetime Version and Current Version
    - Lifetime version assesses period between the individual's 4<sup>th</sup> and 5<sup>th</sup> birthdays
    - Current version assesses current functioning
  - Item content is directly related to the diagnostic algorithm items of the ADI-R
    - Pearson correlations for ADI-R domains (Bishop & Norbury, 2002):
      - Reciprocal Social Interaction- .92, Language/Communication - .73, Restricted, Repetitive, & Stereotyped Behaviors and Interests- .89.

# + Symptom Screening Questionnaires

## Rating Scales & Checklists

Childhood Autism Rating Scale, Second Edition  
(CARS2; Schopler, Van Bourgondien, Wellman, & Love, 2010)

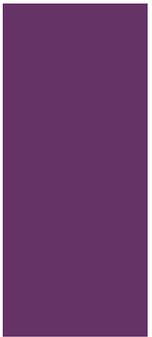
- Designed to identify symptoms associated with ASD
  - CARS2-HF developed specifically to identify those with high functioning autism- those 6 and older with an IQ above 80 and fluent communication.
  - 15-item behavior rating scale- structured observation instrument
  - Developed to help identify children with autism and to evaluate varying degrees of the disorder and to differentiate between other developmental disorders.
    - Especially moderate to severe intellectual disability
    - Ratings are based on a clinician's observations or parent report
    - Based on pre-DSM-IV-TR criteria of autism
    - Cons
      - Over-identifies autism
      - Poor discrimination between ID and ASD

# + Symptom Screening Questionnaires

## Rating Scales & Checklists

Gilliam Autism Rating Scale, Second Edition (GARS-2; Gilliam, 2006)

- Designed to differentiate between those with ASD and those with other severe behavioral disorders, as well as those who are typically developing
  - 42-item likert scale measure to be completed by the parent and the teacher, takes 5-10 minutes
  - Parent interview asks for developmental milestones in the child's first 3 years
- Appropriate for individuals ages 3-22 years



# + Symptom Screening Questionnaires

## Rating Scales and Checklists

- GARS-2
- Norm-referenced, reflecting the conceptualization of autism as outlined in the DSM-IV-TR
  - Subscales broken into stereotyped behaviors, communication, and social interaction to measure the diagnostic features of the DSM-IV-TR
  - Composite Autism Index indicates severity
    - Composite is calculated to omit verbal communication if need be
- GARS-2 includes a chapter applying test items to applied behavior analysis and research
- Criticism: Remains limited and should be interpreted with caution
  - Only 9% of the standardized sample were ages 16-22, decreasing validity for this age group
  - Standardization sample includes “individuals with autism,” however, no further information is provided
    - The manual mentions recruitment through an online organization for Asperger’s disorder, perhaps including both DSM-IV-TR autistic disorder and autism spectrum disorder in the same norm.

# + Symptom Screening Questionnaires

## Rating Scales & Checklists

### Autism Behavior Checklist

(ABC; Krug, Arick, & Almond, et al., 1978, 1980)

- 57 clinician rated items
- Sub-categorized into 5 groups
  - Sensory, relating, body and object use, language, and social interaction and self-help.
- 67 and higher indicate a high level of autism, scores under 53 indicate a low possibility
- Questionable ability to adequately distinguish ASD from other developmental disabilities

# + Symptom Screening Questionnaires

## Rating Scales & Checklists

### Autism Spectrum Rating Scales (Goldstein & Naglieri, 2010)

(ASRS;

- Designed to measure behaviors of children and youth ages 2-18
- Rating forms for parents and teacher (having known child at least 4 weeks) take approximately 20 minutes to complete
- 70 behavior items are rated for the past month
- Scores reported as T-scores
  - Total score, ASRS score, DSM-IV-TR score, & Treatment score
- Norm-referenced and based on DSM-IV-TR criteria
- Three Scales
  - Self-Regulation, Social/Communication, Stereotypical Behaviors
- Accurately discriminate from members of the general population and those with other clinical diagnoses (Simek & Wahlberg, 2010).
  - ASD vs general population effect size-  $d = 1.54$
  - ASD vs other clinical diagnoses-  $d = 1.36$



# Comprehensive Evaluation

## Supplemental Measures



- It is important to note that these measures are not used in the diagnosis of autism, however, they provide a more comprehensive picture of the individual's functioning once autism is identified.
- Useful since autism is known for uneven development
- Wide variety and severity of delays across individuals.



# Comprehensive Evaluation

## Supplemental Assessments



### ■ Cognitive Assessment

- Associated with severity of autistic symptoms
  - Can be used to assess whether child's social & communication delays are greater than expected based on cognitive functioning.
  - Often uneven intellectual profile
    - Due to discrepancy between scores, the overall IQ composite may not meaningfully explain true cognitive ability
    - Scores should be interpreted separately to identify cognitive strengths and weaknesses
    - Approximately 10% exhibit splinter skills (National Research Council, 2001)
      - DSM-5 recommends the use of untimed, nonverbal tests to assess for potential strengths in those with limited language
- No single cognitive pattern is indicative of an ASD diagnosis



# Comprehensive Evaluation

## Supplemental Assessments



### ■ Cognitive Assessment

- Predictor of long-term educational attainment, communication skills, and independent living skills.
- Measures:
  - **Stanford-Binet Intelligence Scales, Fifth Edition** (SB5; Roid, 2003)
    - Separates verbal and nonverbal domains; broken down into 5 factor scores; ASD included in standardization sample; lower basal.
  - Wechsler Intelligence Scales:
    - **Wechsler Intelligence Scales for Children, Fourth Edition** (WISC-IV; Wechsler 2003); **Wechsler Adult Intelligence Scale, Fourth Edition** (WAIS-IV; Wechsler, 2008); **Wechsler Preschool & Primary Scale of Intelligence, Fourth Edition** (WPPSI-IV; Wechsler, 2012)
      - Provides nonverbal and verbal reasoning, tasks to observe motor ability (processing speed); however, possibly more verbally loaded.
  - **Leiter International Performance Scale-Third Edition** (Leiter-3; Roid, Miller, Pomplun, & Koch, 2013)
    - Nonverbal; presence of teaching trials are a strength for this population



# Comprehensive Evaluation

## Supplemental Assessments



### ■ Academic Assessment

- Academic measures are necessary for educational decision making and planning as this is where the child will most likely receive the most services and individual help.
- Results can provide a profile of academic strengths and weaknesses
  - Possible identification of splinter skills, e.g., hyperlexia, above average memory, or calculation skills.
  - Examples of academic measures are:
    - **Woodcock Johnson Tests of Achievement** (WJ-III; Woodcock, McGrew, & Mather, 2001, 2007), **Wechsler Individual Achievement Test, Second Edition** (WIAT-II; Wechsler, 2005), and **Kaufman Test of Educational Achievement, Second Edition** (KTEA-II; Kaufman & Kaufman, 2004).



# Comprehensive Evaluation

## Supplemental Assessments



### ■ Adaptive Behavior Assessment

- Ability to display age-appropriate behaviors necessary to function safely and appropriately in daily life is an essential piece of the autism trajectory.
  - Highly important predictor of long-term outcome as well as ability to live independently.
  - Functioning in this domain is not always consistent with intellectual functioning as exhibited on a cognitive measure
  - Important to note any discrepancies the individual may demonstrate between cognitive level and adaptive scores in the areas of social skills and daily living
- Measures of adaptive behavior that are appropriate for an autism assessment include:
  - **Vineland Adaptive Behavior Scales, Second Edition** (Vineland-II; Sparrow, Cicchetti, & Balla, 2005), **Developmental Profile, Third Edition** (DP-3; Alpern, 2007), and the **Adaptive Behavior Assessment System, Second Edition** (ABAS-II; Harrison & Oakland, 2003).



# Comprehensive Evaluation

## Supplemental Assessments



- **Communication & Language Assessment**
  - Functional language by age 5 is one of the best established prognostic factors
  - DSM-5 Specifier
    - With accompanying language impairment: No intelligible speech (nonverbal), single words only, or phrase speech
    - Without accompanying language impairment: Speaks in full sentences or has fluent speech



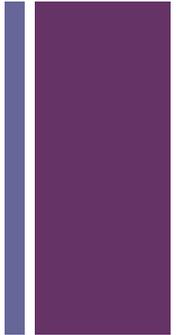
# Comprehensive Evaluation

## Supplemental Assessments



- **Communication & Language Assessment**
  - Obtain information in both verbal and nonverbal communication
    - Social communicative functions of language
    - Nonverbal skills that regulate interactions
    - Look for uneven skills: High functioning individuals may exhibit strengths in formal language
  - Examples of measures:
    - **Peabody Picture Vocabulary Test, Fourth Edition** (PPVT-4; Dunn & Dunn, 2007), **Expressive One-Word Picture Vocabulary Test, Fourth Edition** (EOWPVT-4; Brownell, 2010), and **Clinical Evaluation of Language Fundamentals, Fourth Edition** (CELF-4; Semel, Wiig, & Secord, 2003).
    - **Comprehensive Assessment of Spoken Language** (CASL; Carrow-Woolfolk, 1999), **Test of Pragmatic Language, Second Edition** (TOPL-2; Phelps-Terasaki & Phelps-Gunn, 2007), **Pragmatic Language Skills Inventory** (PLSI; Gilliam & Miller, 2006), **Test of Language Competence-Expanded** (TLC-Expanded; Wiig & Secord, 1989), **Children's Communication Checklist, Second Edition** (CCC-2; Bishop, 2006).

# + Future Efforts



- Continued need to create and research evidence-based assessment measures
  - Rating scales should aim to better match best practice measures in the field (ADI-R & ADOS-2)
  - Best practice measures should address differences in gender and ethnic background
  - Emphasis on reliably discriminating ASD from other developmental delays and intellectual disability
  - Efforts to identify individuals with ASD without cognitive impairment and language delay at younger ages