ASSESSMENT OF LANGUAGE IN ASD

Megan Brendal, MS, CCC-SLP

Patterns of Language in ASD

- **Variability** within timing and patterns of language acquisition
- Individuals may speak later in life and develop speech at a slower rate

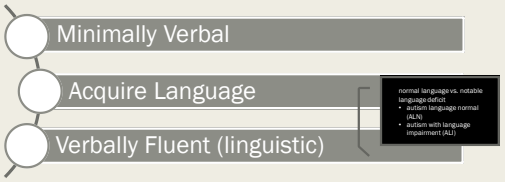
Therefore…

- First step is to estimate expressive and receptive language levels
- Constructs to focus on
- Determine need for possible accommodations and effects on interpretation of findings
  - *Need AAC?*
  - *Cognitive Requirements?*
  - *Motor Skills?*
  - *Assessments available?*
    - Standardized (observational, parent report) & Informal

Language in ASD: Developmental

- Phase 1: Preverbal Communication
- Phase 2: First Words/Single Words
- Phase 3: Word Combinations
- Phase 4: Sentences
- Phase 5: Complex Language

Language in ASD



Determining Language Levels

Pre-intentional Communication

- Individual's interactions are more reflective of general state
  - *E.g. comfort, hunger, sleep*
- Individual not yet communicating to intentionally change/affect another's behaviors
- Communicative *'acts'* are interpreted by caregiver
  - *Based on body movement, sounds, facial expressions*

**Observed in typically-developing children 0-8 months

Phase 1: Preverbal Communication

- Individuals use verbal and/or nonverbal means intentionally for communicative purposes
- Not yet symbol users
- May use verbal and/or nonverbal means to communicate for following reasons:
  - *Behavior regulation*
  - *Social interaction*
  - *Joint attention*

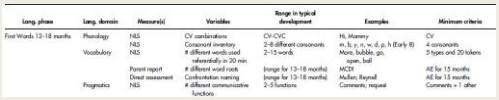
**Observed in typically-developing children between 6-12 months

Phase 2: First/Single Words

- Use single word(s) spontaneously to communicate
  - *Via verbalizations, manual signs, AAC*
  - *Words may include approximations and 'chunky' phrases*
- Use words to communicate:
  - *In various settings*
  - *With varied communicative partners*
  - *To serve several functions, including:*
    - Behavior regulation: to request or protest an action, item, or make choice
    - Social Interaction: to request attention, show affection, greet
    - Initiate Joint Attention: to direct attention or seek information

**Observed in typically-developing children between 12-18 months

First/Single Words: Benchmarks



Lang. phase	Lang. domain	Measure(s)	Variables	Range in typical development	Examples	Minimum criteria
First Words 12–18 months	Phonology	NAS	CV combinations	CV-CVC	Hi, Mommy	CV
		NAS	Consonant inventory	2–8 different consonants	m, b, y, n, w, d, p, h (Early 8)	4 consonants
	Vocabulary	NAS	# different words used referentially in 20 min	2–15 words	More, bubble, go, open, ball	5 types and 20 tokens
		Parent report	# different word roots	(range for 13–18 months)	MCDI	AE for 15 months
		Direct assessment	Confrontation naming	(range for 13–18 months)	Mullen; Reynell	AE for 15 months
	Pragmatics	NAS	# different communicative functions	2–5 functions	Comments; request	Comments > 1 other

Defining Spoken Language Benchmarks and Selecting Measures of Expressive Language Development for Young Children With Autism Spectrum Disorders

Tager-Flusberg et al, 2009

First/Single Words: Benchmarks

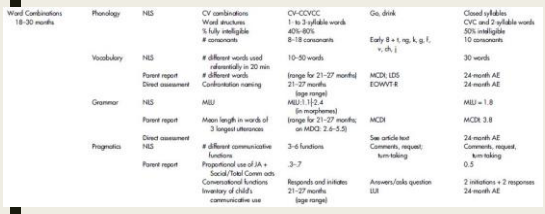
- Single Word Communicators may also be defined via benchmarks (Tager-Flusberg et al, 2009):
- Phonology
  - *Individual demonstrates CV-CVC combination*
  - ***OR*** *uses 2-8 different consonants*
- Vocabulary
  - *Uses 2-15 different words/word approximations within 20 minute natural language sample*
  - ***OR*** *demonstrates 13-18 month age equivalent on Parent Report/direct assessment measure*
- Pragmatics
  - *Use 2-5 communicative functions throughout natural language sample*

Phase 3: Word Combinations

- Individuals in this phase may have a rapidly increasing vocabulary containing:
  - *2-3 word combinations*
  - *nouns, verbs, adjectives*
  - *Word combinations that refer to objects, people, events, environment for various functions*

**Observed in typically-developing children between 18-30 months

Word Combinations: Benchmarks



Word Combinations 18–30 months	Phonology	NLS	CV combinations Word structures % fully intelligible # consonants	CV-CCVCC 1- to 3-syllable words 40%–80% 8–18 consonants	Go, drink Early 8 + t, ng, k, g, f, v, th, j	Closed syllables CVC and 2-syllable words 50% intelligible 10 consonants
	Vocabulary	NLS Parent report Direct assessment	# different words used referentially in 20 min # different words Confrontation naming	10–50 words (range for 21–27 months) 21–27 months (age range)	 MCDI; LDS EOWVT-R	30 words 24-month AE 24-month AE
	Grammar	NLS Parent report Direct assessment	MLU Mean length in words of 3 longest utterances	MLU 1.1–2.4 (in morphemes) (range for 21–27 months; on MDO: 2.6–5.5)	 MCDI See article text	MLU = 1.8 MCDI: 3.8 24-month AE
	Pragmatics	NLS Parent report	# different communicative functions Proportional use of JA + Social/Total Comm acts Conversational functions Inventory of child's communicative use	3–6 functions .3–.7 Responds and initiates 21–27 months (age range)	Comments, request; turn-taking Answers/asks question LUI	Comments, request, turn-taking 0.5 2 initiations + 2 responses 24-month AE

Word Combinations: Benchmarks

- Phonology
  - *Use CV-CCVCC combinations*
  - ***OR** 1-3 syllable words*
  - ***OR** have 40-80% intelligibility*
  - ***OR** use 8-18 consonants*
- Lexicon
  - *Use 10-50 different words within 20 minute natural language sample*
  - ***OR** receives 24 month age+ range via parent report and/or direct assessments*
- Grammar
  - *Uses Mean Length of Utterance (MLU) of 1.8+*
  - ***OR** MCDI 3.8*
- Pragmatics
  - *Uses 3-6 different communicative functions*
  - ***OR** demonstrates 2 initiations and 2 responses in conversation*
  - ***OR** receives 24 month AE on parent report*

Phase 3: Sentences

- Individuals combine words:
  - *Into clausal structures or sentences with some morphological markers*
    - E.g. plural –s, prepositions, verb endings
  - *Communicate with familiar and unfamiliar people*
  - *Communicate about present <u>and</u> non-present objects, people, events, environment*

**Observed in typically-developing children 30-48 months

Sentences: Benchmarks

- Phonology:
  - *Criterion of 75% intelligibility in a natural language sample*
  - ***OR** a 36-month level/age equivalent on a direct assessment measure*
- Vocabulary:
  - *Criterion for number of different words used on the natural language sample*
  - ***OR** the age-equivalent criterion on a direct assessment measure*
- Grammar:
  - *Criterion for a 36-month age-equivalent on a direct assessment measure*
  - ***OR** the mean length utterance on a natural language sample*
    - **Natural language sample must meet minimum of 100 spontaneous (nonimitated, non echoed) utterances
- Pragmatics
  - *Criterion based on elicited narrative*
  - ***OR** criterion for conversation natural language sample*
  - ***OR** 36-month age equivalent on parent report **OR** direct assessment measure*

Sentences: Benchmarks

Lang. phase	Lang. domain	Measure(s)	Variables	Range in typical development	Examples	Minimum criteria
Sentences 30–48 months	Phonology	NLS NLS	% fully intelligible Consonant inventory	70%–100% 16–24 different CS; 75% correct	 sh, th, s, z, l, sh	75% intelligible
	Vocabulary	Direct assessment NLS Direct assessment	AE score # different word roots AE score	 70–136 in 65 utterances (range for 30–48 months)	GFTA-2 SALT norms	36-month AE 92 in 65 utterances 36-month AE
	Grammar	NLS Direct assessment	MLU in morphemes AE score	2.7–4.0 MLU		MLU = 3.0 36-month AE
	Pragmatics	Elicited NLS	Discourse functions	Narration	TEOL SPELT-3 Preterse, talk about past/future	1 narrative
		NLS	Conversational topic related turn-taking			2 full turns on same topic following adult utterance
		Parent report	Inventory of child's communicative use	30–48 months (age range)	LUI	36-month AE
		Direct assessment	Communicative functions	30–48 months (age range)	CASL	36-month AE on Pragmatics subtest

Phase 5: Complex Language

- Individuals:
  - *Use complex language (e.g. relative clauses)*
  - *Communicate about abstract ideas (including hypotheticals)*
  - *Communicate with familiar and unfamiliar partners in various settings*

**Observed in typically-developing children 48+ months

Once estimated language levels are determined, what are the developmentally appropriate constructs to be assessed?

Pre-intentional Communication: Constructs

- Vocalizations
  - *Vegetative sounds*
    - Burping, coughing, gurgles
  - *Crying, cooing, laughing*
  - *Vowel-like sounds, closed consonants*
  - *Babbling (?)*
- Responsivity
  - *Smile Response*
  - *Startle/orients to sounds*
- Social
  - *Eye gaze*
    - Follows objects, attends to faces
  - *Turn-taking abilities (starts ~ 3 months)*
- Motor Skills
  - *Head and trunk control*
  - *Ability to hold objects*

Pre-intentional Communication: Measures

- Standardized
  - *Observational:*
    - Mullen Scales of Early Learning
      - *Birth to 6 years*
  - *Parent Report:*
    - Vineland Adaptive Behavior Scales-Parent/Caregiver Interview-3rd Edition
      - *Birth to 99 years*
    - Ages & Stages Questionnaire-3rd Edition
      - *1 month to 5 years; 6 months*
- Informal:
  - *Communication Matrix*
    - Observing caregiver-child interaction

Pre-intentional Communication

■EXAMPLE

Preverbal Communication: Constructs

- Motor Skills
  - *Gross motor, fine motor, speech-motor*
  - *Typically developing? Atypical patterns?*
- Comprehension
  - *Demonstrates recognition of words*
    - E.g. visually attending to item
  - *Demonstrates understanding of words*
    - Types of words (e.g. names/people, no/yes)
  - *Demonstrate understanding of simple commands*
  - *Consistency of responses*

Preverbal Communication: Constructs

- Responsivity
  - *To social smile*
  - *To name*
  - *To social stimuli*
    - *Instructions*
    - *Redirection*
    - *Tasks*
  - *To Joint Attention*
- Nonverbal Cognitive Ability
  - *Problem Solving, memory, reasoning*
    - E.g. matching objects/pictures, sorting items, matching pictures, visuospatial orientation
  - *Is nonverbal cognitive ability similar to verbal cognitive abilities?*
    - Global developmental delay? Or language delay?

Preverbal Communication: Constructs

- Object use/play
  - *Levels:*
    - Sensorimotor/exploratory (~2-12 months)
      - *E.g. mouthing, banging, licking, rubbing*
    - Nonfunctional (~6-12 months)
      - *Relating objects to another (e.g. stacking, nesting, pushing)*
    - Functional (~10-18 months)
      - *using objects as intended (e.g. stirring a spoon, drinking from a cup, holding a doll)*
  - *Symbol use in play?*

Preverbal Communication: Constructs

- Vocalizations
  - *Phonemic Inventory*
    - Consonants may include /m, b, p, y, w, d/
      - *Typically developing? Atypical pattern?*
  - *Babbling*
    - Reduplicative, variegated, jargon
    - Syllable structure (CV? CVC?)
    - Frequency of vocalizations

Preverbal Communication: Constructs

- Presence of integrated behaviors
  - *Verbal + nonverbal **AND/OR** nonverbal + nonverbal*
- Presence of communicative acts
  - *Communicative purposes*
    - Behavioral Regulation
    - Social Interaction
    - Joint Attention

Preverbal Communication: Measures

Standardized Observational Assessments

- Global measures
  - *Mullen Scales of Early Learning*
    - Birth to 68 months
  - *Bayley Scales of Infant and Toddler Development*
    - 1-42 months
  - *Batelle Developmental Inventory-2nd Edition*
    - Birth to 7 years
- Language Specific
  - *Communication and Symbolic Behavior Scales*
    - Infants: 6-24 months or children up to 72m with atypical development
  - *Preschool Language Scales-5th Edition*
    - Birth to 7 years; 11 months

CSBS DP Infant-Toddler Checklist

Social	• Emotion & Eye Gaze • Communication • Gestures
Speech	• Sounds • Words
Symbolic	• Understanding • Object Use

Preverbal Communication: Measures

Standardized Parent Report

- Macarthur Bates Communication Development Inventory
  - *Word & Gestures (8-18 months)*
- Receptive Expressive Emergent Language Test- 3rd Edition
  - *Birth to 36 months; birth to PreK*
- Vineland Adaptive Behavior Scales-3rd Edition

Preverbal Communication: Measures

- Informal

Informal Measurements

- *Parent-child or child-clinician interaction*
  - ~20-30 minutes
- *Developmental Assessment of Play (Casby, 2003)*
- *Communication Matrix (Rowland, 2004)*

Preverbal Communication

■EXAMPLE

First/Single Words: Constructs

- Determine primary modalities of communication
  - *Manual signs, AAC, verbalizations, combinations?*
- Motor Skills
  - *Gross motor, fine motor, speech-motor*
    - Ability to imitate or use verbalizations to determine speech-motor skills?
- Nonverbal cognitive development
  - *May include problem solving, memory, reasoning*
    - E.g. matching objects/shapes/pictures, sorting/categorizing

First Words/Minimally Verbal: Constructs

- Comprehension
  - *Demonstrates understanding of words*
    - Types of words (nouns, verbs, descriptors)
  - *Demonstrates understanding of commands*
    - 1 step, 2 step, if-then
  - *On par with cognitive development? Expressive language? Global delay? Isolated language delay?*

First Words/Minimally Verbal: Constructs

- Listener Responsiveness
  - *To verbal social stimuli*
    - E.g. instructions, redirection, name
  - *To Joint Attention*
  - ***Consistency of responses*
- Imitation ability

First Words/Minimally Verbal: Constructs

- Gestures
  - *Manual signs?*
  - *Deictic, conventional, representational*
  - *Type, range, frequency*
  - *Purposes*
- Eye Gaze
  - *3 point gaze, initiation of joint attention*
- Facial Expression
- Shared Enjoyment

First Words/Minimally Verbal: Constructs

- Vocalizations
  - *Phonemic Inventory*
    - Consonants may include /m, b, p, y, w, d/
      - *Typically developing? Atypical pattern?*
      - *Rate, range, frequency*
    - Vowel use
      - *Appropriate?*

First Words/Minimally Verbal: Constructs

- Phonological Awareness
  - *Syllable structure (i.e. consonant-vowel combinations)*
- Phonological Processes
  - *Typically developing? Persisting?*
- Prosody
- Morpheme use
  - *Browns Morphemes*
  - *Typically developing? Delayed ?Atypical patterns?*

First Words/Minimally Verbal: Constructs

- Vocabulary
  - *Number of words used*
  - *Number of words with different word roots*
  - *Types of words (names, nouns, verbs, descriptors)*
  - *Confrontational naming abilities*
  - *Errors?*
    - E.g. overgeneralizations

First Words/Minimally Verbal: Constructs

- Integrated behaviors
  - *e.g. EC+VOC, EC+GES, EC+FE*
- Communicative purposes
  - *Behavioral Regulation, Social Interaction, Joint Attention*
- Initiation of interactions
  - *Spontaneous? Prompted?*

First Words/Minimally Verbal: Constructs

- Play
  - *Level of play*
    - Sensorimotor/exploratory, nonfunctional, functional, emerging imaginary
  - *Object Use*
    - Using symbols within play?
    - Play schemes/Sequencing?

First Words/Minimally Verbal:

REVIEW ARTICLE

Assessing the Minimally Verbal School-Aged Child With Autism Spectrum Disorder

Connie Kasari, Nancy Brady, Catherine Lord, and Helen Tager-Flusberg

Table 1. Language Measures

Assessment name	Variables assessed	Age range	Assessment context	Citation	Rating
Language Use Inventory	Pragmatic language	18–47 months	Parent report	O'Neill [2007]	◐
Peabody Picture Vocabulary Test—IV	Receptive vocabulary	2; 6–90 years	Standardized	Dunn and Dunn [2006]	●
The MacArthur-Bates Communicative Development Inventories (CDI)	Receptive and expressive language	8–37 months*	Standardized parent report	Fenson et al. [2006]	◐
Preschool Language Scales-5	Auditory comprehension	Birth–7; 11	Standardized	Zimmerman et al. [2011]	◐
Reynell Developmental Language Scales-III	Verbal comprehension	1–6 years	Standardized	Edwards et al. [1999]	◐
Sequenced Inventory of Communicative Development—Revised	Expressive language Receptive language Sound and speech discrimination Awareness and understanding	4–48 months	Standardized	Hedrick et al. [1984]	◐
Test of Early Language Development—3	Receptive language	2; 0–7; 11 years	Standardized	Hresko et al. [1999]	◐
Language Samples	Expressive language gestures	All ages	Observation Natural contexts and Structured probes	Tostanova Smith [2010] Rojas and Iglesias [2010] Romski et al. [2010] Kaiser and Roberts [2010]	●
Vineland Adaptive Behavior Scales-II	Receptive language Expressive language Written language	0–90 years	Parent report Teacher report	Sparrow, Cicchetti, and Balla [2005]	◐

*This measure is not validated on school-aged children, but was included because the raw scores have frequently been used in research and clinical practice with older children.

● = Well suited for use with minimally verbal children

◐ = Use with some caution

○ = Unlikely to yield meaningful results

First Words/Minimally Verbal: Mea

Table 4. Nonverbal Cognitive Abilities

Assessment name	Variables assessed	Age range	Assessment context	Citation	Rating
Differential Ability Scales-II	Nonverbal reasoning Visual-perceptual Spatial visualization Memory Pattern detection Processing	2; 6–17; 11 years	Standardized	Elliott [2007]	◖
Leiter International Performance Scale-R*	Visualization Reasoning Memory Attention	2–21 years	Standardized	Roid and Miller, [1997] Roid et al.	●
Mullen Scales of Early Learning	Fine motor Nonverbal reasoning	0–5; 11 years	Standardized	Mullen [1995]	◖
Psycho-Educational Profile–3	Fine motor Gross motor Visuo-Motor Imitation	6 months to 7; 0 years (developmental age)	Standardized Parent report	Schopler, Reichler, Lansing, and Marcus [2005]	◖
Ravens Progressive Matrices	Reasoning Problem solving	5–80 years	Standardized	Raven, Raven, and Court [1998]	◖
Snijders Oomen Nonverbal	Abstract/concrete reasoning Spatial reasoning Visual perception	2; 6–16; 11 years	Standardized	Tellegen and Laros [1993]	◖

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○ = Unlikely to yield meaningful results.
*Note: Leiter-3 now published; 3–75 years

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Mullen Scales of Early Learning

Birth-68 months of age

Subscales:
- Gross Motor
- Visual Reception
- Fine Motor
- Receptive Language
- Expressive Language

Standard Scoring
- Mean = 50
- SD = 10

First Words/Minimally Verbal: M

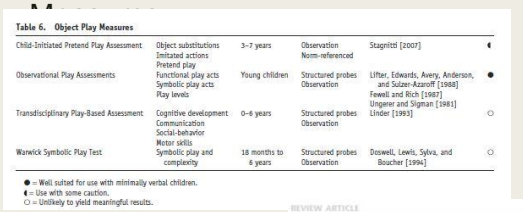

Table 6. Object Play Measures

Child-Initiated Pretend Play Assessment	Object substitutions Imitated actions Pretend play	3–7 years	Observation Norm-referenced	Stagnitti [2007]	◖
Observational Play Assessments	Functional play acts Symbolic play acts Play levels	Young children	Structured probes Observation	Lifter, Edwards, Avery, Anderson, and Sulzer-Azaroff [1988] Fewell and Rich [1987] Ungerer and Sigman [1981]	●
Transdisciplinary Play-Based Assessment	Cognitive development Communication Social-behavior Motor skills	0–6 years	Structured probes Observation	Linder [1993]	○
Warwick Symbolic Play Test	Symbolic play and complexity	18 months to 6 years	Structured probes Observation	Doswell, Lewis, Sylva, and Boucher [1994]	○

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First Words/Minimally Verbal

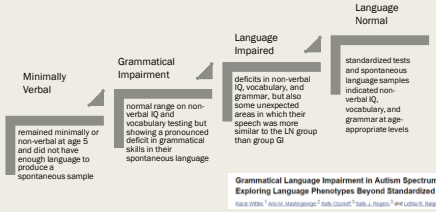
■EXAMPLE

Language in ASD

- Minimally Verbal
- Acquire Language
- Verbally Fluent (linguistic)

normal language vs. notable language deficit
- autism language normal (ALN)
- autism with language impairment (ALI)

Language in ASD: Subgroups



Grammatical Language Impairment in Autism Spectrum Disorder: Exploring Language Phenotypes Beyond Standardized Testing

Kacie Wittke,[1] Ann M. Mastergeorge,[2] Sally Ozonoff,[3] Sally J. Rogers,[3] and Letitia R. Naigles[4,*]

Acquired Language & Verbally Fluent

- Includes individuals who have:
  - *Grammatical impairments*
  - *Language Impairments*
  - *Normal Language*
- And includes those who use:
  - *Word combinations*
  - *Sentences*
  - *Complex language*

Autism Language Impaired (ALI)

- Two groups:
  - *Grammatical Impairment (GI):*
    - Scores on nonverbal IQ and vocabulary testing are WNL but show a pronounced deficit in use of grammatical skills within their spontaneous language
  - *Language Impairment (LI):*
    - Deficits in nonverbal IQ, vocabulary, and grammar as measured by scores with areas in speech more similar to typically-developing "normal" language (vs GI group)

Autism Language Impaired: Grammatical Impairments

- When compared to typically-developing children, children with ALI:
  - *Produce significantly fewer markers of past tense –ed and 3rd person –s (Roberts et al, 2004)*
  - *May use significantly less complex language, including fewer WH-questions (Eigsti et al, 2007)*
  - *Errors in pronoun use (e.g. reversals)*

Autism Language Impaired: Language Impairments

- Demonstrate shorter MLUs
- Produce fewer grammatical morphemes
- Present with smaller lexicons
- More likely to use jargon, echolalia
- Lower non-verbal IQ scores
- **Frequency of grammatical errors (i.e. nouns, verbs, pronoun errors) and use of correct Brown's morphemes have been found to be comparable to ALN

Wittke et al, 2017

Autism Language Normal (ALN)

- Individuals with ASD whose language scores and non-verbal cognitive abilities are *similar* to that of TD-age peers
- At 5 years of age, individuals may present more similarly to that of typically developing peers:
  - *Few grammatical morpheme errors for nouns, verbs, pronouns*
  - *Accuracy within Browns 14 morphemes may suggest mastery*
  - *Lexical abilities present intact*

Wittke et al, 2017

Natural Language Sample

- Collection(s) of language used in natural contexts
- May be collected during child-clinician or child-caregiver interaction or during pragmatic-based assessments (e.g. Autism Diagnostic Observation Schedule, Communication and Symbolic Behavior Scales→ assessments that involve social presses)
- Must provide adequate time and opportunities for language (~30 min or may be compilation of interactions with child)
- Samples may then be transcribed and coded at phonetic and lexical levels; can use computer software (e.g. SALT, CHILDES, Lingquest)

***Natural Lang Samples provide good measurements of expressive language (phonological repertoire, lexical and grammatical knowledge, and pragmatic/communicative skills)*

Natural Language Sample

- Context:
  - *Play, Conversation, Narrative, Semi-structured (e.g. ADOS)*
- Setting:
  - *Home, school, research lab, clinic*
    - Live data collection or recorded
- Conversational partner:
  - *Researcher/examiner, parent*
- Length may be determined by:
  - *1) minimum number of utterances needed*
  - *2) **OR** minimum amount of time required for reliable/valid measure*

Barakova & Tager-Flusberg, 2018

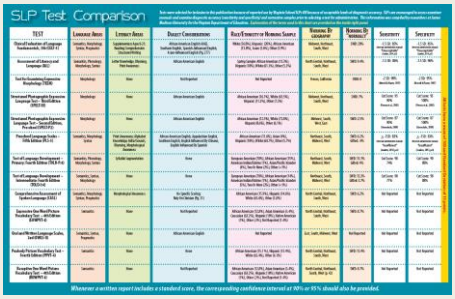
Standardized Assessments vs Informal

- Currently limited number of assessments that evaluate language in less-structured environments
  - *Resulting in difficulties interpreting treatment outcomes*
- Within structured language tests, spontaneous language not always into account
  - *May be elicited by a task, material, or question (e.g. "what is he doing," "what are these")*
- Some children with ASD may score WNL or in higher ranges on standardized verbal IQ assessments, which include assessments of language skills, while still demonstrating significant deficits in odd use of language
  - *Stereotyped phrases, verbal rituals, pedantic speech* (Kjelgaard and Tager-Flusberg 2001; Tager-Flusberg, 2003; Ghaziuddin et al., 1992; Gotham et al. 2007; Mayes et al. 1992; Paul et al, 2009.
- Standardized vs Informal assessments may result in varied outcomes
  - *Example: young children with ASD have been found to score higher on standardized lang test of vocab and verbal knowledge versus parent reports focused on ability to use language on daily basis in natural setting (Luyster et al, 2008)*

Standardized with Informal

- Spontaneous language assessment are crucial in evaluating SLI as a complement to standardized, more structured measures (ASHA, 2008)
- Some children with ASD may score WNL or in higher ranges on standardized verbal IQ assessments, which include assessments of language skills, while still demonstrating significant deficits in odd use of language
  - *Stereotyped phrases, verbal rituals, pedantic speech*

  (*Kjelgaard and Tager-Flusberg 2001; Tager-Flusberg, 2003) Ghaziuddin et al.; 1992; Gotham et al. 2007; Mayes et al. 1993; Paul et al, 2009.)*



http://www.doe.virginia.gov/special_ed/disabilities/speech_language_impairment/slp-comprehensive-assessment-card.pdf

Evidence Based Treatment Approaches for Aphasia and Concomitant Disorders

Fall 2018
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UNIVERSITY of WASHINGTON

Disclosures:

Financial: I received an honorarium for this presentation.
Non-financial: I am a member of the ANCDS Standards and Education Board and a member of the WSLHA Clinical Practice Committee.

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Learner Objectives

- Learner will summarize current best practices for aphasia treatment.
- Learner will list at least three research-based treatment protocols for aphasia.
- Learner will identify three co-exisiting disorders and the impact each would have for aphasia treatment.

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Today's Agenda:

8:30-9:00 Discuss Your Settings, Introductions
9:00-10:15 Current research and language models
10:15-10:30 Break
10:30-12:00 Word and Sentence level treatment options
12:00-1:00 Lunch
1:00-2:00 Sentence and Discourse treatment options
2:15-2:45 Break
2:45-3:45 Hands on Practice
(Outcome measures, assessments, adaptation if time)
3:45-4:00 Discussion, Questions, and Paperwork

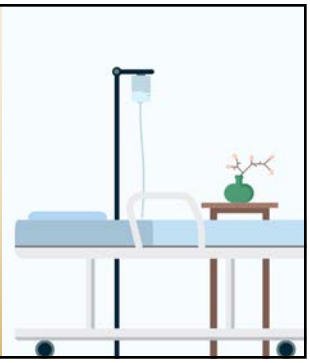
Our Demographics

Where do we work?

How long?

Caseload Mix?

Session length?



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Models of Language Exercise

A word about terminology....

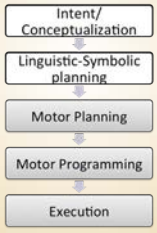
Modular	Distributed
Auditory comprehension Receptive	Activation of acoustic representations and lexical/ semantics
Verbal expression Verbal production Expressive	Activation of lexical/semantics and articulatory motor
Reading	Activation of orthography and ..... *Articulatory programming (reading aloud)* *Semantics (reading comprehension*

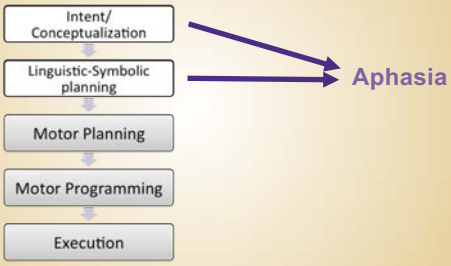
Theoretical Framework...

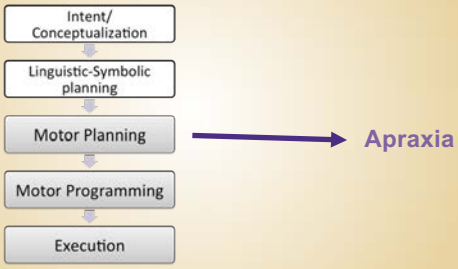
- Explains and differentiates acquired communication impairments resulting at each level of the speech production system
- Detailed description and separation of the processes involved in the organization and execution of speech
- Includes four phases of speech production:
  - (1) linguistic-symbolic planning
  - (2) motor planning
  - (3) motor programming
  - (4) execution

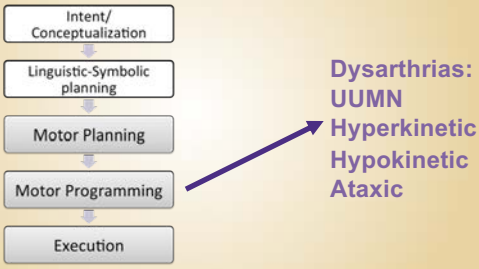
A Theoretical Framework for the Characterization of Pathological Speech Sensorimotor Control

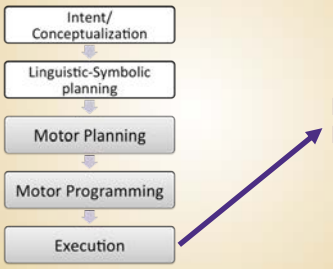
A very simplified view:



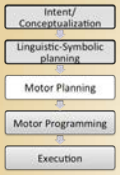








More Info About Models of Language



Apraxia

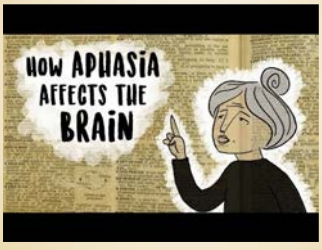
- motor planning disorder of speech production
- results from inefficiencies in the translation of intact phonologic representations to a code readable by the motor system (McNeil, Robin, & Schmidt, 1997, 2009)
- typically caused by left hemisphere CVA and often co-occurs with aphasia and/or dysarthria (Duffy, 2005; 2013)

Characteristics	AOS	PP
Prosody		
Overall Rate:	Slow rate	Near normal rate
	Inability to increase rate while maintaining phonemic integrity	Ability to increase rate and maintain phonemic integrity*
Microsegmental Rate:	Prolonged movement transitions*	Normal movement transitions*
	Prolonged inter-word intervals*	Normal average inter-word intervals (in error free utterances)
	Long vowel durations (in multi-syllabic words or sentences)*	Normal vowel durations in all productions*
	Increased movement durations for individual speech gestures*	Average movement durations*
Stress assignment	Errors on stressed syllables	No clear relationship between syllabic stress and error frequency
Phoneme Characteristics	Phoneme distortions	Undistorted perseverative, anticipatory, and phoneme exchange or phoneme cluster errors
	Distorted sound substitutions	Absence of distorted sound substitutions
Self-Corrections	Successive self initiated trials to repair an error leads no closer to the target	Successive self initiated trials to repair an error leads closer to the target
Non-speech Characteristics	Difficulty tracking predictable movements with speech articulators	Intact ability to track predictable movements with speech articulators
	Intact ability to track unpredictable movements with speech articulators	Intact ability to track unpredictable movements with speech articulators

Simplified from McNeil et al., 2009 ** Some variability observed within and across patients*

Models of Language Breakout Topic time

Aphasia Model



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GOAL SETTING IDEAS

Sometimes progress is difficult to measure. The use of scales, such as ASHA NOMs, questionnaires, or Goal Attainment Scaling(GAS) can help measure change.

Consider life participation outcomes for your client.

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Scaling Response

- Goal attainment scaling(GAS)
  - An attempt to construct scale which are tailored to specific individuals, yet can yield results on a common ratio scale across all people
  - If intervention worked as intended subject should score 0
  - A higher mean score for all indicate goals were set too low
  - not all subjects need have same goals

Critique
- Ability to tailor the scale to specific goals of the individual
- Each subject has his own scale, different number of goals and vary criteria for each one
- Extremely labour intensive

GAS is useful when
- The objective is to evaluate intervention as a whole, goals for each person are different and adequate resources for training goal setters and raters are present.

			Verbal rating		Numerical conversion	
At Baseline	With respect to this goal do they have?		Some function	❑	-1	
			No function (as bad as they could be)	❑		-2
At Outcome: Was the goal achieved?	Yes		A lot more	❑	+2	+2
			A little more	❑	+1	+1
			As expected	❑	**0**	**0**
	No		Partially achieved	❑	-1	-1
			No change	❑	-1	-2
			Got worse	❑	-2	

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Self-anchored rating scales

- Set a value for communication right now
- Describe a long term goal
- Describe a short term goal
- Work with the client and partners toward
- Small change

(Fox, 2012)

Treatment Motivation

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Treatment Approaches

Word/Sentence Level Treatments

VNeST

- Dr. Lisa Edmonds, Columbia University
  - Verb Network Strengthening Treatment (VNeST)
  - Verbs carry loads of information
    - Associated nouns
    - Syntactic structures
- Dr. Edmonds giving a talk on VNeST at Moss Rehab: https://www.youtube.com/watch?v=Ayx6Q174jmo

Verb Network Strengthening Treatment(VNeST)

A semantically based treatment that targets lexical retrieval of meaningful words in sentences

The nouns that are related to verbs in proposed networks are called thematic roles

Research has shown that verbs and their related thematic roles are neurally co-activated so that the agents and patients facilitate the activation of the verbs and vice versa

VNeST requires participants to produce diverse scenarios related to trained verbs which may spread activation to untrained verbs and networks.

VNeST

- Transitive
- Imageable
- Semantic pairs
- Feasible for treatment
- Salient/relevant for participant

VNeST Tutorial, Sig 2

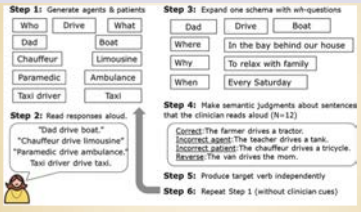
A tutorial with assessment, stimuli, and instructions for administering VNeST

https://sig2perspectives.pubs.asha.org/article.aspx?articleid=1913558

ASHAWIRE

From: **Tutorial for Verb Network Strengthening Treatment (VNeST): Detailed Description of the Treatment Protocol with Corresponding Theoretical Rationale**

Perspect Neurophysiol Neurogenic Speech Lang Disord. 2014;24(3):78-88. doi:10.1044/nnsld24.3.78



Legend:

Treatment Steps for Verb Network Strengthening Treatment (VNeST).
The person with aphasia completes each step with clinician cues, as needed.

Date of download: 9/21/2018
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Phonomotor Treatment for Aphasia

- Principal Researcher: Dr. Diane Kendall – University of Washington
- Based on 2 assumptions:
  - Speech sounds (phonology) are the underlying building blocks for language processing
  - Interactive distributed networks support language

Kendall, Oelke, Brookshire & Nadeau (2015). The influence of phonomotor treatment on word retrieval abilities in 26 individuals with chronic aphasia: An open trial. JSLHR, 58, 798-812.

Phonomotor Treatment for Aphasia

- Nearly everyone with aphasia has impaired phonology
- (when appropriately tested)
- If you can strengthen phonology, positive effects will feed upstream to other areas of language function.

Phonomotor Treatment for Aphasia

- How do you strengthen phonology?
  - Work mostly with the sound system – leave meaning out of it (especially early on)!
  - Multi-modality training
    - Acoustic
    - Visual
    - Tactile-kinesthetic
    - Orthographic (writing)
  - Progressively more complex
  - Critical role for Socratic questioning

Phonomotor Treatment for Aphasia

- VA RR&D Merit Review Grant (2013-2017)
  - N =80 PWA
  - Portland and Seattle
  - N= 40 semantic feature analysis
  - N=40 phonomotor treatment
  - Intensive treatment – 10 hrs/week x 6 weeks
  - Primary outcome: generalization to untrained stimuli at 3 months post-treatment

(modified) Response Elaboration Training (M-RET)

RET is intended to work towards changes in production of language content: number of nouns, verbs, and short phrases etc.

Some studies look at syntax structure changes too.

M-RET is a modification of response elaboration training (RET ; Kearns, 1985) for persons with aphasia (PWA) with co-occurring AOS.

RET was developed to promote verbal language productivity through elaboration of patient-initiated utterances (Kearns, 1985).

Wambaugh et al. modified RET for use with persons with AOS who had difficulties with initiating utterances; the modifications included provision o f response options, use of integral stimulation when needed, and repeated practice opportunities.

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Semantic Feature Analysis (SFA)

SFA is used to improve word-retrieval abilities in clients with aphasia.

This is done via spoken production of a target, most usually prompted through a picture stimulus, alongside structured elicitation of a series of semantic features that are associated with the target.

This combination of elicitation of a target and semantic features is hypothesised to strengthen (or reactivate) the semantic network around the target and thereby facilitating improved word retrieval on subsequent attempts.

As the client is also encouraged to verbally produce the target, phonological representations of the target are also accessed and may therefore also improve the activation pathways between semantic and phonological representations.

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Semantic Feature Analysis (SFA)

Client characteristics:

SFA may be suitable for clients with impairments at the level of semantics and also in accessing phonological word forms from semantics.

Some applications may also be relevant for clients with difficulties exclusively at the level of phonological representations although other approaches may be more applicable (e.g. Phonological Components Analysis).

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From: **Semantic Feature Analysis: The Evidence for Treating Lexical Impairments in Aphasia**

Perspect Neurophysiol Neurogenic Speech Lang Disord. 2001;11(2):23-28. doi:10.1044/nnsld11.2.23

Legend:
Semantic feature analysis chart. See text for a description of how the chart is used.

Date of download: 9/26/2018

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SFA steps

Step 1) Place a picture of an object in the center of a graphic organizer, like the one below.

Step 2) The person with aphasia tries to name the item in the picture. Regardless of the response, move to the next step.

Step 3) Ask each of the questions around the picture, writing in the correct answers as they're discussed.

- Category: What type of thing is it?
- Function: What is it used for?
- Action: What does it do?
- Location: Where do you find it?
- Association: What does it go with? or What does it make you think of?
- Properties: What does it look like? (color, shape, size) What does it feel/taste/sound like?

If the person with aphasia names the item at any point, that's great! But keep going with the rest of the questions.

Step 4) The person with aphasia tries to name the picture again. If they can't say it on their own, have them repeat after you.

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SFA variations

Researchers have studied a variety of adaptations to expand SFA that you can try in your treatment:

- Use the word in a sentence after naming all the features.
- Discuss the semantic features in a small group or with group feedback.
- Describe the picture to a partner who cannot see it (barrier task). They must guess what the picture is based on the semantic features.
- Elaborate on the answers, making complete or longer sentences.
- Think about each feature, one by one, instead of answering aloud. Then name the picture.
- Choose words for SFA based on word-finding errors identified in a picture description task, story retell, or procedural discourse sample.
- Select the features from multiple choice options, or answer yes/no questions about each feature.

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Phonological Components Analysis (PCA)

PCA is a word-finding treatment that helps the person with aphasia learn to analyze the sounds in words. It is based on the same principles as Semantic Feature Analysis (SFA), a naming treatment that targets the meaning of words, and uses a similar graphic organizer to ask questions about each word.

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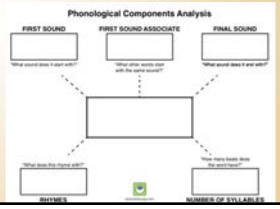
Phonological Components Analysis (PCA)

How To Do Phonological Components Analysis

Step 1) Place a picture of an object in the center of a graphic organizer



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Phonological Components Analysis (PCA)

How To Do Phonological Components Analysis.

Step 2) The person with aphasia tries to name the item in the picture. Regardless of the accuracy of the response, move to the next step.

Step 3) Ask each of the questions around the picture, writing in the correct answers as they're discussed. If the person can't answer on their own, you can provide written and verbal choices, or fill in the answer for them.

- First sound: "What sound does it start with?"
- First sound associate: "What other word starts with the same sound?"
- Final sound: "What sound does it end with?"
- Rhymes: "What does this rhyme with?"
- Number of syllables: "How many beats does the word have?"

Step 4) The person with aphasia tries to name the picture again. If they can't say it on their own, have them repeat after you.

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Copy and Recall Treatment (CART)

1. Client is presented with a picture. Clinician provides a spoken prompt to elicit writing (e.g. 'Coffee, Can you write the word coffee?')
1. If client is able to successfully write the target, then clinician should provide reinforcing feedback and move onto the next target
1. If client is unable to successfully write the target, then the clinician should provide a written model of the target for the client to copy at least three times.

Adapted from Beeson, Rising & Volk (2003)

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Copy and Recall Treatment (CART)

4. Remove client's previous written responses (i.e. those given in step 3) and once again present the picture and ask the client to write the target word.

5. If client is successful, then clinician should offer feedback before moving to next item

6 If client is unsuccessful, go back to step 3.

7. If client is repeatedly unsuccessful on a particular item, move to next item before frustration develops

Adapted from Beeson, Rising & Volk (2003)

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Copy and Recall Treatment (CART)

Beeson et al (2003) Example of CART attempts

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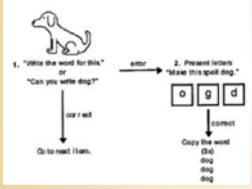
Anagram & Copy Treatment (ACT)



Beeson (1999) ACT protocol

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ACT

1. Client is presented with a picture. Clinician provides a spoken prompt to elicit writing (e.g. 'Can you write ***money***?).

1. If client is able to successfully write the target, then clinician should provide reinforcing feedback and move onto the next target.

1. If client is unable to successfully write the target, then the clinic should present the component letters in a random order (e.g. through letters cards, Scrabble tiles) and the client should be encouraged to use these letters to assist with writing of the target word.

Adapted from Beeson, Hirsch & Rewega (2002)

ACT

4. If client is successful, then they should be encouraged to copy the completed word three more times.

5. If client is unsuccessful, then the clinician should arrange the letters in the correct order while providing feedback.

6. Client should then be encouraged to write the target word and then copy this three times.

7. Remove client's previous written responses (i.e. those given in step 4 or 6) and once again present the picture and ask the client to write the target word.

Adapted from Beeson, Hirsch & Rewega (2002)

CART/ACT modifications

step-downs

- Some clients may find writing is facilitated if they are asked to mentally imagine what the word looks like.
- Some clients may appear phased when asked to write the whole word. Clinician may attempt to facilitate production of the word by first explicitly encouraging writing of the first letter. This may also be facilitated with a phonological cue.

CART/ACT modifications

Step-ups

- If a client is successful in copying and recall (i.e. writing the target when previous attempts have been removed), the delay between copy and recall can be increased, possibly with a short conversation or intervening trials.
- If a client is successful solving the anagrams in ACT, then additional letters may be included with the array to act as distractors. The distractibility of the additional letters may be manipulated in relation to visual similarity to other letters (e.g. if a client has impairment in early visual processing of letters), or in relation to phonological similarity (e.g. if writing is sometimes mediated via phonology i.e. sounding out the letters, or if there are additional phonological level impairments.

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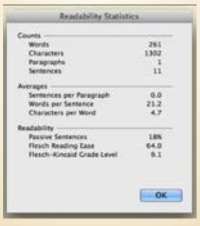
Alexia and Agraphia Treaments

Multiple Oral Reading(MOR)

https://www.unicationtherapyforadults.wordpress.com/2014/03/08/multiple-oral-reading-mor/



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Beeson-Phonological treatment

http://www.aphasia.arizona.edu/Aphasia_Research_Project/For_Professionals.html

Treatment for Spelling

Beeson-Cascading Lexical Retrieval Treatment

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Treatment Ideas for Aphasia and AOS

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Combined Aphasia and Apraxia of Speech Treatment (CAAST)

The CAAST protocol uses elements of sound production treatment (SPT; Wambaugh, Kalinyak-Fliszar, West, & Doyle, 1998) to treat AOS and modified response elaboration training (M-RET; Wambaugh & Martinez, 2000) to treat nonfluent aphasia.

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Combined Aphasia and Apraxia of Speech Treatment (CAAST) Description of SPT:

Treatment was applied in the form of a response contingent hierarchy. Specifically, the steps of the hierarchy were applied only as needed (i.e., in the event of a preceding incorrect response). The treatment hierarchy is shown in Appendix C and includes the following techniques: modelling-repetition, minimal contrast practice, graphemic cueing, integral stimulation, articulatory placement cueing, repeated practice, and verbal feedback.

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Combined Aphasia and Apraxia of Speech Treatment (CAAST) Description of SPT:

In the first two treatment phases (treatment of Sets 1 and 2 separately), application of the treatment hierarchy to each of the 24 treatment words constituted one treatment trial. Three to four treatment trials were completed in each treatment session when three sounds were under treatment. In the final phase of treatment, when all six sounds received treatment, a trial consisted of application of treatment to each of the 48 treatment words and two trials were completed each session.

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Treatment Approaches

Sentence/Discourse Level Treatments

Speech Entrainment

In Fridriksson's study, 13 patients completed three separate behavioral tasks that were used to understand the effects of speech entrainment on speech production. During the "speech entrainment-audio visual" portion of the study, participants attempted to mimic a speaker in real-time whose mouth was made visible on the 3.5-inch screen of an iPod Touch and whose speech was heard via headphones.

The "speech entrainment-audio only" condition involved real-time mimicking speech presented via headphones with the screen of the iPod blank. During a spontaneous speech condition, patients spoke about a given topic without external aid.

Speech Entrainment

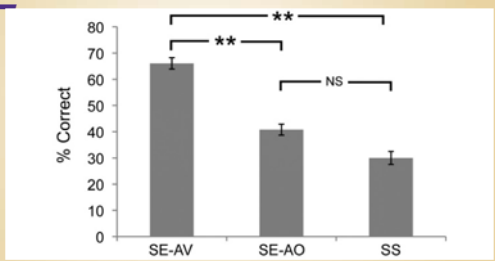
Each patient also completed a three-week training phase where they practiced speech every day with the aid of speech entrainment. Overall, the training resulted in improved spontaneous speech production, something that is relatively rare in this population. Ultimately the patients were able to produce a short script about their stroke to tell to other people.

Neuroimaging results from the patient subjects have also given Fridriksson and his research team a greater understanding of the mechanism involved in speech entrainment.

(Fridrikksson, 2012)

Speech Entrainment

Fridrikksson, 2012)



Script Training

Script training in aphasia is a treatment approach that focuses on improving communication in everyday activities. It typically involves the repeated practice of words, phrases, and sentences embedded within a monologue or dialogue that is individualized to the person with aphasia. Script practice can be accomplished in various ways, including listening to the script, repeating the target utterances, reading them aloud, producing them from memory, or performing a combination of these activities. Based on the Instance Theory of Automatization (Logan, 1988), the premise of this approach is that words or phrases within a script can be successfully mastered with repetitive, cue-based massed drilling. They become "islands of relatively fluent automatic speech" that are then produced in real-life discourse (Youmans, Youmans, & Hanrahan, 2010).

Script Training Example (with levels)

Grocery Script
Pat: Want to go grocery shopping?

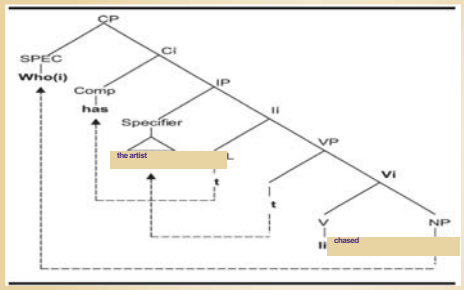
- → 1 Sure, And let 's go soon
- → 2 Sure, And we better go soon.
- → 3 Sure, We better, because we're running low on food.
- → 4 Sure, And we shouldn't wait too long, because we're running out of food.
- → 5 We definitely should, NAME. And we shouldn't wait too long because we're running out of groceries.

Treatment of Underlying Forms (TUF)

- Dr. Cynthia Thompson, Northwestern University
  - Treating more complex syntactic constructions → improvement in simpler constructions, but not the other way around (CATE effect)

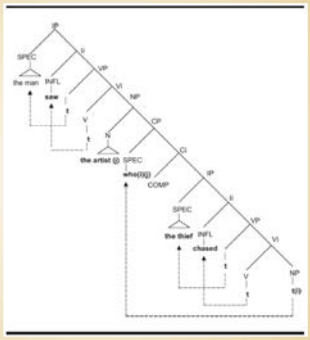
Treatment of Underlying Forms (TUF)

- WH- constructions ("Who did the waiter watch?")
- Object clefts ("It was the guest who the waiter watched")
- Object relative clauses ("The man saw the guest who the waiter watched")
- **All involve wh-movement from a shared canonical form

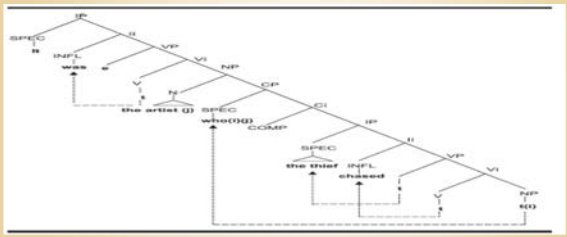


Wh- construction

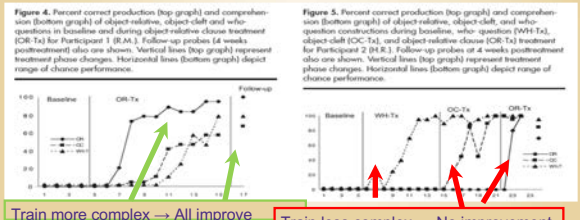
Object relative clause



Object cleft clause



Thompson et al., 2003



Train more complex → All improve

Train less complex → No improvement until trained

Aphasia Bank- Picture Description, Core Lexicon Analysis

Stimulus picture: Picture Description – Broken Window

Richardson & Dalton, *Aphasiology,*2015
92 controls (stratified into 4 age groups) from AphasiaBank database
Core lexicon – lemmas produced by ≥50% of all controls

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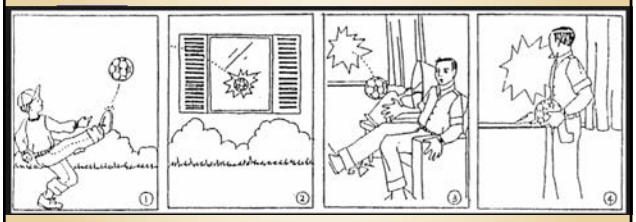
Broken Window Sequence



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Cinderella story

Using the Cinderella story, you can analyze:

- Main Concepts
- Story Grammar
- Coherence
- Core Lexicon

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Aphasia Bank- Story Grammar scoring

Components and Descriptions (Roth & Spekman, 1986)

1. Setting – habitual or static states of characters and locations
   - major setting
   - minor setting
2. Initiating Events – the immediate cause for a response on the part of the protagonist
   - natural occurrence
   - action
   - internal event
   - verbalization
3. Response – the psychological state of the character after the initiating event or a verbal response to the situation
   - affective response
   - goal
   - cognition

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Aphasia Bank- Story Grammar scoring

Components and Descriptions (Roth & Spekman, 1986)

4. Plan – statements that specify a character's strategy for obtaining the goal
5. Attempt – the character's overt action(s) to obtain the goal.
6. Direct Consequence – the character's success or failure at attaining the goal(s); any changes in the sequence of events resulting from the character's actions
   - natural occurrence
   - action
   - end state
7. Reaction – the way the character feels or reports feeling about the outcome; the character's thoughts regarding success or failure
   - affect
   - cognition
   - action

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Facilitating Authentic Conversation-

Principles of Conversation

- Conversation is a free exchange of turns between two or more individuals on any topic of mutual interest to the participants, and while each participant has the opportunity to take a turn, there should not be an obligation to do so.
- Conversation is often unbalanced; since it is largely structured by the current speaker, there may be large differences in time-at-talk or the length of turns-at-talk.
- While a conversation is generally initiated about a topic of interest, the extension of that topic or the shift to another topic is dependent on a number of contextual factors. One cannot expect to maintain a topic over extended turns unless that topic is of particular interest to the involved participants.
- Finally, conversation generally is accomplished in an orderly manner so that any responses and/or changes within the conversation are relevant to the topical and structural organisation of the preceding talk.

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Facilitating Authentic Conversation-

Table 1. Conversational shaping strategies to create a therapeutic effect during conversation.

Strategy	Description
Conversational contingencies	Employed to inhibit behaviours by allowing and highlighting the natural consequences of problematic behaviours in conversation.
Calibrate the use of corrections	Employed to inhibit behaviours by employing implicit correction and mediation to model more effective strategies in conversation.
Positive conversational reactions	Employed to facilitate behaviours by providing positive and/or heightened demonstrations of alignment during conversation.
Providing bracket critiques	Typically employed to facilitate behaviours by providing feedback on specific techniques or strategies before re-establishing the flow of conversation.

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Consider which treatment options make sense for your client and your setting.

Evidence-based **aphasia resources** for the busy clinician (so ALL of you!)

Resources

Supported Communication – http://www.aphasia.ca/home-page/health-care-professionals

Kagan, A. (1998). Supported conversation for adults with aphasia: Methods and resources for training conversation partners. ***Aphasiology*, 12**(9), 816-830.

SPPARC – https://www.speechmark.net/spparc-supporting-partners-people-aphasia-relationships-conversation

Kagan, A., Wallinson, R., & Bryan, K. (2001). *SPPARC: Supporting Partners of People with Aphasia in Relationships and Conversations*. (Bicester, UK: Winslow Press).

Conversation Coaching

Kagan, A., Holland, A., & Reweega, M. (2002). Conversational coaching: Treatment outcomes and future directions. Aphasiology, 16(4), 345-361.

Profile of Partner Candidacy for Conversation Training

Turner, S. & Whitworth, A. (2006b). Clinicians' perceptions of candidacy for conversation partner training in aphasia: How do we select candidates for therapy and do we get it right? ***Aphasiology*, 20**(7), 616-643.

Caregiver Support

UW Caregiver Hub – UWCaregiverHub.com

ANCDS

Academy of Neurologic Communication Disorders and Sciences

www.ancds.org

ANCDS: Overview

- Supports clinicians who serve individuals with neurologic communication disorders by providing education, training, and certification opportunities
- Membership (annual fee). Can become ANCDS Board Certified
- Clinical resources are free to non-members
- Holds annual meeting and webinars with continuing education opportunities
- Podcasts (no CEUs)

ANCDS: Evidence-Based Guidelines

- Evidenced-based Treatment Guidelines for:
  - Apraxia of Speech
  - Aphasia
  - Progressive Neurogenic Communication Disorders
  - Dysarthria
  - Traumatic Brain Injury

ANCDS: Evidence Tables

- ➢ Evidence tables citing published studies and their major findings/impressions
- ➢ Recommended standardized tests, with information on rationale for use and strengths/limitations
- ➢ Well-ordered, easily accessible guidelines, though not searchable

ASHA Practice Portal: Overview

Wide variety of neurogenic clinical topics with information on:

• Incidence/Prevalence	• SLP Roles and Responsibilities
• Signs/Symptoms	• Assessment
• Causes	• Treatment
• Other Resources	

American Speech-Language-Hearing Association

ASHA Practice Portal: Evidence Maps

- Easily digestible summaries of current assessment/treatment evidence
- Organized by "external scientific evidence," "clinical expertise," and "client perspectives"
- Searchable based on publication date or practice area (e.g. screening, assessment, treatment, etc.)

ASHA Practice Portal: Evidence Maps

- Recommendations are rated by Evidence Level
  - Level A: multiple randomized controlled trials or meta-analysis
  - Level B: one randomized controlled trial or multiple non-randomized controlled studies.
  - Level C: consensus expert opinion or case studies.

The University of Arizona

Aphasia Treatment Evidence Tables

http://aphasiatx.arizona.edu

U of A: Aphasia Treatment Tables

- Detailed compendium of published research on aphasia treatment
- Sponsored by ANCDS
- Organized by treatment type:
  - Overall Language Performance Studies
  - Lexical Retrieval Studies
  - Syntax Studies
  - Speech Production/Fluency
  - Written Language/Reading
  - Alternative Communication Studies

U of A: Aphasia Treatment Tables

- Each table lists treatment category, study design, level of evidence, and treatment description
  - Keys for codes are on home page
- Very succinct

speechBITE: Overview

- Free, searchable EBP database
- Developed by group of researchers in Australia
- Assesses ***methodological quality***, not treatment effectiveness/strength of evidence of listed studies
- Includes group-comparison studies and single-case designs
- Single-case designs are frequently not included in level of evidence hierarchies even though they comprise the majority of SLP research (Munro et al., 2013)

speechBITE: Searching

- See Video Tutorial for search recommendations
  - Searching speechBITE (tab at top of page) → Video Tutorial (right-hand menu)
- Search Strategies are helpful for refining your search
  - Searching speechBITE (tab at top of page) → Search Strategies (right-hand menu)
- For refresher on various levels of evidence, see FAQs
  - FAQs (tab at top of page) → Research Designs on speechBITE (first section) → "In what order does speechBITE list studies?"

Type	Study Design	on speechBITE
Level 1	Systematic review of randomised controlled trials	All systematic reviews are listed first in search results. Systematic reviews are not rated.
Level 11	Randomised controlled trials	Randomised controlled trials are listed second in the search results. Randomised controlled trials are rated on the PEDro-P scale for methodological quality.
Level 111-1	Pseudo-randomised controlled trials (i.e. using alternate allocation or some other non-random method)	Indexed as non-randomised controlled trials and listed third on speechBITE. Non-randomised controlled trials are rated on the PEDro-P scale for methodological quality.
Level 111-2	A comparative study with concurrent controls: non-randomised experimental trial, cohort study, case-control study or interrupted time series	Indexed as non-randomised controlled trials and listed third on speechBITE. Non-randomised controlled trials are rated on the PEDro-P scale for methodological quality.
Level 111-3	A comparative study without concurrent controls: historical control study, two or more single arm study, interrupted time series without a parallel control group	Indexed as non-randomised controlled trials and listed third on speechBITE. Non-randomised controlled trials are rated on the PEDro-P scale for methodological quality.
Level 4	Case series with either post-test or pre-test/post-test outcomes	Case series with both pre-test/post-test outcomes are listed fourth on speechBITE. Case series are not rated for quality on speechBITE.

UW Aphasia Lab

- University of Washington's Aphasia Research Laboratory's webpage contains section for lab research publications organized by specific areas of aphasia (e.g., anomia, alexia)
- Also contains links for clinicians and students interested in phonomotor treatment

https://sphsc.washington.edu/research-labs/aphasia-research-lab/about-aphasia

Patient/Caregiver Sites

- **Crossing the Void**: website created by stroke survivor Carol Cline Schultz
  - http://www.crossingthevoid.com/
- **National Aphasia Association:** aphasia-friendly site for survivors and carers
  - http://www.aphasia.org/
- **UW Caregiver Hub**: resources for families in the Greater Puget Sound area and beyond who are navigating life after stroke or brain injury
  - https://canvas.uw.edu/courses/1085620/pages/home

Questions?

AUTISM SPECTRUM DISORDER: EVIDENCE-BASED ASSESSMENT AND TREATMENT RECOMMENDATIONS FOR SLPS

LAURIE SWINEFORD, PHD, CCC-SLP
MEGAN BRENDAL, M.S., CCC-SLP
OCTOBER 13, 2018

OUTLINE

- Current DX for ASD
- Role of SLP in Screening and DX
- Characterizing Language in ASD
- Assessment of Language
- Goal Writing
- Treatment Planning

CURRENT DX CRITERIA FOR ASD

DSM-IV TO DSM-5: PRIMARY CHANGES

DSM-IV	DSM-5
• Previously we used the term Pervasive Developmental Disorders (PDD)	• What was formerly PDD is now termed Autism Spectrum Disorder (ASD)
• Separate categories under the overall PDD heading – Autism, Asperger's, PDD-NOS	• Single diagnosis – ASD – But includes better ways to capture level of language, adaptive skills, IQ, etc. (specifiers and severity)
• 3 Core diagnostic domains	• 2 Core diagnostic domains

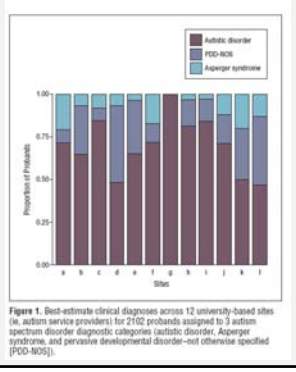
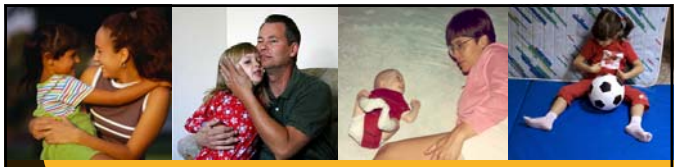


Figure 1. Best-estimate clinical diagnoses across 12 university-based sites (ie, autism service providers) for 2102 probands assigned to 3 autism spectrum disorder diagnostic categories (autistic disorder, Asperger syndrome, and pervasive developmental disorder–not otherwise specified [PDD-NOS]).

DIAGNOSING ASD

- Both presence of abnormal behaviors and the absence of normal behaviors required to make a diagnosis of ASD
- AKA: "positive" behaviors and "negative" behaviors

- Age, developmental level (e.g., IQ, mental age), expressive language level, sex, culture, and context (e.g., different settings or social circumstances) can significantly affect how behaviors manifest



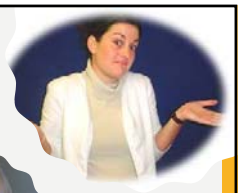
PERSISTENT DEFICITS IN SOCIAL COMMUNICATION AND SOCIAL INTERACTION

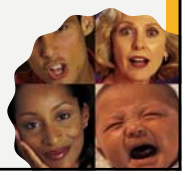
PERSISTENT DEFICITS IN SOCIAL COMMUNICATION AND SOCIAL INTERACTION

1. Deficits in social-emotional reciprocity, ranging from abnormal social approach to failure of normal back-and-forth conversation; reduced sharing of interests, emotions, or affect, failure to initiate or respond to social interactions

PERSISTENT DEFICITS IN SOCIAL COMMUNICATION AND SOCIAL INTERACTION

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.





PERSISTENT DEFICITS IN SOCIAL COMMUNICATION AND SOCIAL INTERACTION

3. Deficits in developing, maintaining, and understanding relationships, 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 interest in peers

RESTRICTED, REPETITIVE PATTERNS OF BEHAVIOR, INTERESTS, OR ACTIVITIES

RESTRICTED, REPETITIVE PATTERNS OF BEHAVIOR, INTERESTS, OR ACTIVITIES

(1) Stereotyped or repetitive motor movements, use of objects, or **speech**

(2) Insistence on sameness, inflexible adherence to routines, or ritualized patterns or verbal nonverbal behavior

RESTRICTED, REPETITIVE PATTERNS OF BEHAVIOR, INTERESTS, OR ACTIVITIES

(3) Highly restricted, fixated interests that are abnormal in intensity or focus

- Interests that are typical for peers, but abnormal in intensity
- Interests that are abnormal in focus and intensity

RESTRICTED, REPETITIVE PATTERNS OF BEHAVIOR, INTERESTS, OR ACTIVITIES

- (4) Hyper- or hypo-reactivity to sensory input or unusual interests in sensory aspects of the environment

DSM-5 DIAGNOSTIC CRITERIA

Persistent deficits in **social communication and social interaction** across multiple contexts, as manifested by the following, currently or by history:

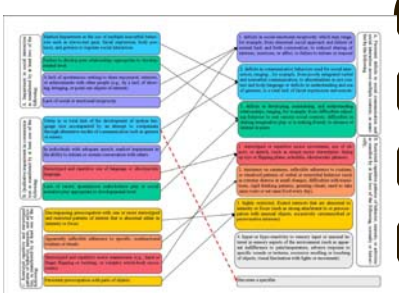
1. Deficits in **social-emotional reciprocity**
2. Deficits in **nonverbal communicative** behaviors used for social interaction
3. Deficits in **developing, maintaining, and understanding relationships**

***Need to meet ALL 3**

Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following,

1. **Stereotyped or repetitive motor movements, use of objects, or speech**
2. **Insistence on sameness**, inflexible adherence to routines, or ritualized patterns or verbal nonverbal behavior
3. Highly **restricted, fixated interests** that are abnormal in intensity or focus
4. Hyper- or hypo-reactivity to **sensory input** or unusual interests in sensory aspects of the environment

****Need to meet 2 of the 4**



Changes include:

1. Delay in language moves from a specific criteria to a specifier

2. Addition of sensory input as a specific criteria

3. Odd language moved to RRB

DSM-5 DIAGNOSTIC CRITERIA

A. Persistent deficits in social communication and social interaction (3)

B. Restricted, repetitive patterns of behavior, interests, or activities (2)

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. Disturbances are not better explained by intellectual disability or global dev't delay

OTHER DSM CHANGES

- **Inclusion of Specifiers**
  - Associated with Known Medical or Genetic Condition or Environmental Factor (e.g. Fragile X, VCFS)
  - **LANGUAGE SKILLS!!!!!!!**
  - Cognitive abilities
  - Associated with other behavioral/psychiatric disorders
  - Severity of symptoms in the two domains

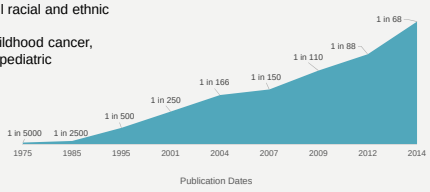
Dimensional Ratings for ASD in DSM -5	Social Communication & Interaction	Fixated Interests and Repetitive Behaviors
Requires very substantial support LEVEL 3	Minimal social communication	Marked interference in daily life
Requires substantial support LEVEL 2	Marked deficits with limited initiations and reduced or atypical responses	Obvious to the casual observer and occur across contexts
Requires support LEVEL 1	Even with support, noticeable impairments	Significant interference in at least one context
Subclinical symptoms (NOT ASD!)	Some symptoms in this or both domains; no significant impairment	Unusual or excessive but no interference
Normal variation (NOT ASD!)	Maybe awkward or isolated but within normal limits (WNL)	WNL for developmental level and no interference

	DSM-5 Symptoms	Toddler		Preschool		Child		Adult	
		NV	V	NV	V	NV	V	NV	V
Social Communication & Interaction	Social Emotional Reciprocity	✓	✓	✓	✓	✓	✓	✓	✓
	Nonverbal Communication	✓ Joint attention	✓ Joint attention	✓	✓	✓	✓	✓	✓
	Relationships	Parent-child?	Parent-child?	Interest in children, imitation	imaginative play	friendships	friendships	✓	✓
Restricted & Repetitive Behavior	Stereotyped/Repetitive Speech, motor movements or use of objects	Motor/ object	✓	motor/object	x	motor/object	x	motor/object	✓
	Adherence to Routines	?	?	?	✓	✓	✓	✓	✓
	Restricted Interests	?	?	✓	✓	?	✓	✓	✓
	Sensory Reactivity or Interests	✓	✓	✓	✓	✓	✓	✓	✓

ASD Prevalence

- No medical test or cure
- Costs a family $60,000 a year
- Reported to occur in all racial and ethnic groups
- More common than childhood cancer, juvenile diabetes, and pediatric AIDS combined

1 in 68 children
(1 in 42 boys & 1 in 189 girls)



Increase in prevalence due to truly rising rates? Better identification? Misclassification?

PREVALENCE IMPACT ON SLPS

- Recent surveys conducted by ASHA indicated (2016, 2017)
  - approximately 90% of school-based SLPs served children with ASD
  - children with ASD accounted for approximately 20% of the pediatric caseloads of SLPs in outpatient clinics and offices

ASHA ROLES AND RESPONSIBILITIES

- providing information to individuals and groups known to be at risk for ASD, to their family members, and to individuals working with those at risk;
- educating other professionals on the needs of persons with ASD and the role of SLPs in diagnosing and managing ASD;
- screening individuals who present with language and communication difficulties and determining the need for further assessment and/or referral for other services;
- conducting a culturally and linguistically relevant comprehensive assessment of language and communication, including social communication skills;
- assessing for the need for and requirements for using augmentative and alternative communication (AAC) devices as a mode of communication;
- diagnosing the presence or absence of ASD (typically as part of a diagnostic team or in other multidisciplinary collaborations);
- referring to other professionals to rule out other conditions, determine etiology, and facilitate access to comprehensive services;
- making decisions about the management of ASD;
- participating as a member of the school planning team (e.g., whose members include teachers, special educators, counselors, psychologists) to determine appropriate educational services;
- developing treatment plans for speech and language services, including social language goals and goals for literacy development and for assisting the student with self-regulatory and social interactive functions to allow him/her to participate in the mainstream curriculum to as great an extent as possible;
- providing training in the use of AAC devices to persons with ASD, their families and caregivers, and educators;
- counseling persons with ASD and their families regarding communication-related issues and providing education aimed at preventing further complications related to ASD;
- consulting and collaborating with other professionals, family members, caregivers, and others to facilitate program development and to provide supervision, evaluation, and/or expert testimony, as appropriate;
- partnering with families in assessment and intervention with individuals with ASD;
- remaining informed of research in the area of ASD and helping advance the knowledge base related to the nature and treatment of ASD;
- advocating for individuals with ASD and their families at the local, state, and national levels;
- serving as an integral member of an interdisciplinary team working with individuals with ASD and their families/caregivers and, when appropriate, considering transition planning;
- providing quality control and risk management.

one of the earliest and most frequently noted features of ASD reported by parents of toddlers with ASD is a delay in or lack of spoken communication

WHY IS EARLY IDENTIFICATION IMPORTANT?

- To optimize child outcome:
  - early diagnosis leads to specialized early intervention which leads to improved social, language, cognitive skills
  - intervention begun before 3 years of age has a larger impact than intervention begun after age five
- To educate and empower families:
  - alleviate parental uncertainty, provide access to resources, information, and support; provide strategies for promoting child's development; provide opportunities for networking and advocacy; clarify genetic implications for family
- To understand causes and improve treatments:
  - identify core features; define etiological subtypes; delineate developmental pathways and sequences; develop tailored treatments
- Ultimately, we want to intervene **before the full syndrome/disorder is manifest**, trying to alter the trajectory of the child's development

Shonkoff & Phillips, 2000

WHERE ARE WE WITH EARLY IDENTIFICATION?

- Evidence suggests that ASD has genetic causes BUT we still have to rely on observing behavior for screening and diagnosis
- Remarkable progress has been made in understanding the behavioral phenotype of ASD in very young children

DESPITE THESE ADVANCES

- A significant time lag between symptom onset (between 12-18 months of age) and average age of diagnosis (between 4 and 6 years of age) still exists

WHAT CAN WE DO TO IMPROVE EARLY IDENTIFICATION?

Recommendations or practice guidelines from:

- American Academy of Pediatrics
- American Academy of Neurology
- Centers for Disease Control
- Department of Health and Human Services

RECOMMENDATIONS/PRACTICE GUIDELINES

- Practice guidelines and recommendations from ALL organizations recommend:
- Developmental screening: a brief assessment designed to identify children who should receive more comprehensive evaluation
- Where can screening be completed?
  - Healthcare, community, school settings

RECOMMENDATIONS FOR DEVELOPMENTAL SCREENING

AAP, 2007

Administer ASD-specific screening tool:

- At any point when concerns about ASD are raised by parent or as a result of clinician observations
- At 18 and 24 month well checks for EVERYONE!

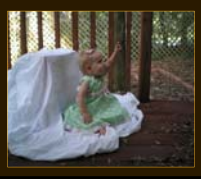
SPECIFIC PRACTICE PARAMETER RECOMMENDATIONS

- Clinical signs (indications for further evaluation) that can help identify children at risk for delay and/or ASD.
  - No babbling by 12 months
  - No gesturing (waving, pointing) by 12 months
  - No single words by 16 months
  - No spontaneous two-word phrases by 24 months
  - Loss of language or social skills at any age

American Academy of Neurology

Full PowerPoint on Practice Parameters for Screening and Diagnosis of Autism can be found:

https://www.aan.com/Guidelines/Home/GetGuidelineContent/126



SPECIFIC PRACTICE PARAMETER RECOMMENDATIONS: CENTERS FOR DISEASE CONTROL AND PREVENTION

Learn the Signs. Act Early.

Free materials online:

- Milestone Checklists for age 2 months-5 years (English & Spanish)
- Flyers
- Tip Sheets

https://www.cdc.gov/ncbddd/actearly/freematerials.html

EARLY IDENTIFICATION: SCREENING VS. DIAGNOSTIC PROCESSES

Screening
- Requires minimal training
- Employs measures that are relatively easy to administer and score
- Indicates **risk** for disorder based on a cutoff score

We can all play a role in screening for ASD!

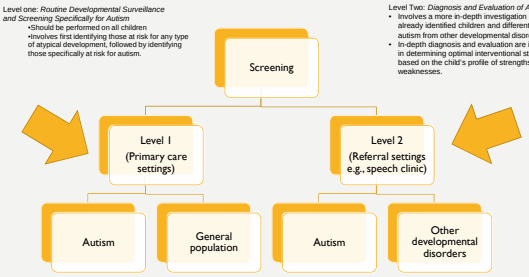
Diagnosis
- Requires advanced clinical training and specialized experience
- Involves integration of information and evaluation of behavioral symptoms in the context of developmental history, family factors, and cognitive level

Stone, 2009

LEVELS OF SCREENING

Level one: Routine Developmental Surveillance and Screening Specifically for Autism
- Should be performed on all children
- Involves first identifying those at risk for any type of atypical development, followed by identifying those specifically at risk for autism.

Level Two: *Diagnosis and Evaluation of Autism*
- Involves a more in-depth investigation of already identified children and differentiates autism from other developmental disorders.
- In-depth diagnosis and evaluation are important in determining optimal interventional strategies based on the child's profile of strengths and weaknesses.



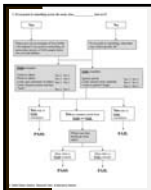
WHAT TOOL CAN WE USED FOR ASD-SPECIFIC SCREENING?

- **Modified Checklist for Autism in Toddlers, Revised with Foll**
- most widely used and studied tool
- appropriate for children 16–30 months of age
- has 20 yes/no questions
- requires minimal training
- takes approximately 5 minutes to complete

- Two options:
  - Free version that you can print from website:
    - https://www.m-chat.org/print.php
  - Free for parents to fill out right online:
    - https://www.m-chat.org/mchat.php

How do you administer M-CHAT-R/F?

1. Parents complete the M-CHAT-R/F.
2. You score the M-CHAT-R
   - For all items EXCEPT 2, 5, and 12, the response "NO" indicates ASD risk
   - For items 2, 5, and 12, the response "YES" indicates ASD risk
3. You decide what to do based on these guidelines:
   - **LOW-RISK**: Total Score is 0-2; if child is younger than 24 months, screen again after second birthday. No further action required unless surveillance indicates risk for ASD.
   - **MEDIUM-RISK**: Total Score is 3-7; Administer the Follow-Up (second stage of M-CHAT-R/F; on following slide) to get additional information about at-risk responses.
   - **HIGH-RISK**: Total Score is 8-20; It is acceptable to bypass the Follow-Up and refer immediately for diagnostic evaluation and eligibility evaluation for early intervention.



- If the child scored in MEDIUM RISK RANGE:

1. Conduct follow-up interview questions ONLY for items that they parent reported risk for (a "no" on all items except 2, 5, and 12 or a "yes" on items 2, 5, and 12)
2. Each page of the interview corresponds to one item from the M-CHAT-R. Follow the flowchart format, asking questions until a PASS or FAIL is scored. Please note that parents may report "maybe" in response to questions during the interview. When a parent reports "maybe," ask whether most often the answer is "yes" or "no" and continue the interview according to that response.
3. Score the responses to each item on the M-CHAT-R/F Scoring Sheet (which contains the same items as the M-CHAT-R, but Yes/No has been replaced by Pass/Fail). The interview is considered to be a **screen positive if the child fails any two items on the Follow-Up**.
4. If a child screens positive on the M-CHAT-R/F, it is **strongly recommended that the child is referred for early intervention and diagnostic testing as soon as possible**.
   - If the healthcare provider or parent has concerns about ASDs, children should be referred for evaluation regardless of the score on the M-CHAT-R or M-CHAT-R/F.

https://www.m-chat.org/_references/M-CHATInterview.pdf

M-CHAT-R/F PSYCHOMETRICS

- The M-CHAT-R is designed to detect as many cases of ASD (maximize sensitivity) as possible resulting in a high false positive rate
- The use of the follow-up interview will decrease the number of false positives

  Sensitivity: the ability of a test to correctly identify those with the disorder (true positive rate)

  Specificity: the ability of the test to correctly identify those without the disease (true negative rate)

- New research suggests that it is important to continue to monitor children who screen negative (low-risk) on the M-CHAT-R/F as sensitivity values were low in universal screening project

RECOMMENDATIONS FOR SCREENING

- Despite the AAP guidelines for surveillance and screening for ASD, **approximately 17.7%** following the specific AAP guidelines.
- Perceived barriers:
  - lack of time and resources
  - limited awareness of ASD-specific screening tools
  - concerns regarding the quality of screening tools
  - the referral process for follow-up assessment
  - early intervention
    - including long waitlists
    - the effectiveness of interventions.

- USPSTF released a recommendation statement concluding that there is insufficient evidence to support routine screening for ASD
- To fully assess the benefits and harms of screening for ASD one must consider two important areas of research:
  - the evidence related to the validity and accuracy of our screening tools and
  - the effectiveness of our interventions for children who screen positive
- The literature reviewed to develop the USPSTF recommendation found adequate evidence for ***both of the above issues***,
  - and yet, the USPSTF disappointingly determined insufficient evidence to support universal screening.

EARLY IDENTIFICATION: RESPONSE FROM ASHA

As the number of children in the United States affected by autism has currently risen to one in every 68 children, **now is not the time to risk any scaling back of screening**

We need to be **more vigilant, not less**. This is especially true given what we know about the often profound, lifelong impact of ASD on children and their families, the transformative benefits of early intervention, the relative ease of screening in pediatricians' offices, the effectiveness of current screening tests, and the lack of evidence that any harm comes from such screenings.

Although we agree that more research is needed in this area, **the possibility that some may interpret this statement as a call to limit screening-which may result in missed opportunities for early diagnosis of ASD during a critical developmental window for children who can benefit from early intervention-is a significant concern**.

AUTISM NAVIGATOR

- http://www.autismnavigator.com/asd-video-glossary/

EARLY DIAGNOSIS: HOW EARLY IS "EARLY"?

ASD still most often first diagnosed over age 3

1990s: Can we diagnose autism in 2-year-olds?

2000s: Can we diagnose autism under 2 years?

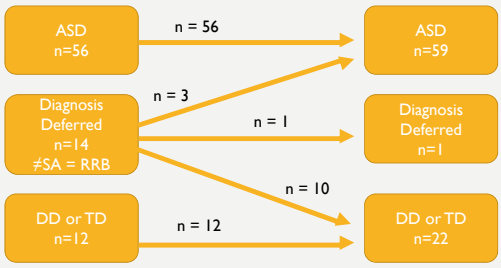
- ✓ Autism can be reliably diagnosed as young as 2 years by experienced clinicians
- ✓ Diagnostic stability is good in children over 2
- ✓ More variability with children with early diagnoses of PDD-NOS (and siblings)

STABILITY AND CHANGE IN DIAGNOSIS

- Diagnostic stability in children diagnosed by age three range from 80-100%
  - Few estimates for younger children
  - Most findings from high-risk samples

STABILITY AND CHANGE IN DIAGNOSIS

- Two diagnostic evaluations (n=82)
  - Time 1: Mean age – 19.39 months
  - Time 2: Mean age – 36.89 months
- Possible diagnoses
  - Confirm ASD
  - Rule Out ASD (DD or TD)
  - Defer Diagnosis
- Measures
  - ADOS
  - Mullen Scales of Early Learning
  - Vineland Adaptive Behavior Scales
  - Home Observation
  - Parent report:
    - ESAC, RBS, SCQ



We only diagnosed 83% of sample - 17% deferred diagnosis at Time 1

STABILITY AND CHANGE IN DIAGNOSIS

- Stable diagnosis ≠ Stable symptom severity
- Stable diagnosis = Experienced clinicians, gold-standard + home visit, deferred diagnosis

HOW DO YOU DIAGNOSE ASD?

No single measure is considered "the" one for diagnosing

Various tools may be used
- But there is a "gold standard"

No single person/professional is considered "the" one for diagnosing

Often a psychologist, psychiatrist, physician (developmental pediatrician), but others (e.g., SLP) with adequate training may also diagnose

Team approach is best!

HOW DO YOU DIAGNOSE ASD?

- Comprehensive Diagnostic Evaluation (gold standard):
  - Developmental/Cognitive Assessment
  - Adaptive Behavior Measure
  - Developmental History
  - – and Direct Observation of symptoms

* Parent interview needed for history of early development, report on peer interactions, and report on repetitive behaviors

ROLE OF THE SPEECH-LANGUAGE PATHOLOGIST WITH RESPECT TO DIAGNOSIS

- Interdisciplinary collaboration in assessing and diagnosing ASD is important due to the complexity of the disorders, the varied aspects of functioning affected, and the need to distinguish ASD from other disorders or medical conditions.
- Ideally, the role of the SLP is as a key member of an interdisciplinary team whose members possess expertise in diagnosing ASD. In cases when there is no appropriate team available, an SLP, who has been trained in the clinical criteria for ASD and who is experienced in the diagnosis of developmental disorders, may be qualified to diagnose these disorders as an independent professional (Filipek et al., 1999).
- Some state laws or regulations **may restrict the scope of practice of licensees**, however, and prohibit the SLP from providing such diagnoses. SLPs should check with their state licensure boards and/or departments of education for specific requirements.

https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589935303&section=Roles_and_Responsibilities

https://www.doh.wa.gov/Portals/1/Documents/8340/HCACentersExcellenceASD.pdf

LANGUAGE IN ASD

WHY DO WE CARE??

- Most children are initially referred for concerns about communication and/or language
- Language abilities in ASD are as heterogeneous as the ASD phenotype itself
- Language milestones are HIGHLY related to long-term prognosis
- Intervention research with an emphasis of facilitating language acquisition with improvement in communication as one of the key targets in treatment
- Language benchmarks as indicative of later outcomes
  - "useful language" by age 5
    - differentiated later general adaptive and social outcomes
    - more social and required fewer residential support services

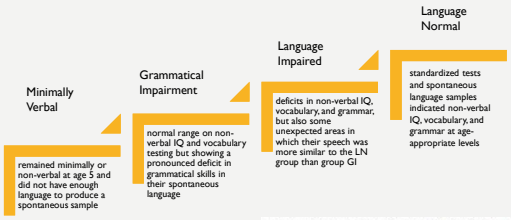
LANGUAGE IN ASD: CATEGORICAL

- Minimally Verbal
- Acquire Language
- Verbally Fluent (linguistic)

LANGUAGE IN ASD: DEVELOPMENTAL

- Phase 1: Preverbal Communication
- Phase 2: First Words
- Phase 3: Word Combinations
- Phase 4: Sentences
- Phase 5: Complex Language

LANGUAGE IN ASD: SUBGROUPS



Grammatical Language Impairment in Autism Spectrum Disorder: Exploring Language Phenotypes Beyond Standardized Testing

MINIMALLY VERBAL

- Exact number of words may vary across children, from no spoken words or phrases to perhaps 20 or 30
- The spoken words or phrases that a child uses will often be **restricted to limited contexts** and may only be used to **communicate one or two functions** (e.g. requests with familiar adults).
- **Rate** of spoken language is usually very low and may include **scripted phrases** that have been highly taught (e.g. *I want X*).
- In some cases, the minimally verbal child may also use echolalic or stereotyped language that does not appear to **be functionally communicative**

Minimally Verbal School-Aged Children with Autism Spectrum Disorder: The Neglected End of the Spectrum

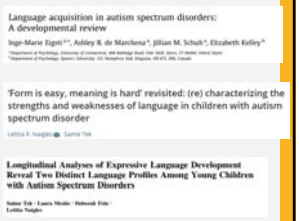
This definition of minimally verbal children does not address the question of: (a) receptive language skills or (b) alternative communication modes.

MINIMALLY VERBAL

- Data from existing longitudinal studies suggest that 30%–40% of children with ASD remain minimally verbal into adulthood
  - Improvement over last few decades
  - Related to EI?

FUNDAMENTAL DEFICIT IN LANGUAGE

- Vocabulary growth is easy – building lexical/semantic organization is hard
- Pragmatics yields consistent challenges
- Form is easy, meaning is hard
- Development of syntax and morphology seems easy


Language acquisition in autism spectrum disorders: A developmental review

'Form is easy, meaning is hard' revisited: (re) characterizing the strengths and weaknesses of language in children with autism spectrum disorder

Longitudinal Analyses of Expressive Language Development Reveal Two Distinct Language Profiles Among Young Children with Autism Spectrum Disorders

PREDICTORS?

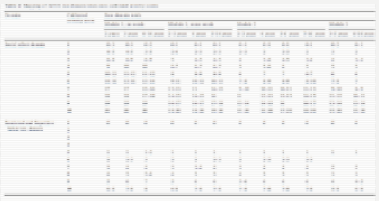
- Few studies have investigated factors that predict who remains nonverbal beyond the early preschool years.
  - very significant delays in developing oral motor skills during the first year of life
  - ability to imitate sounds and simple movements is one key predictor of expressive language
  - response to joint attention
  - early gesture use
  - autism symptom severity
  - **nonverbal cognitive abilities predict both expressive and receptive language**
- In some cases, the almost complete absence of any social motivation may be associated with no spoken language
  - about 25% begin to show more significant adverse consequences of having no means for communicating, with increased social withdrawal

IMPACT OF ASD SEVERITY ON LANGUAGE

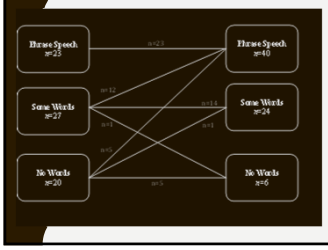
- Predictors can lead to targeted treatment
  - Early verbal, nonverbal cognitive, imitation, joint attention
- Autism Severity – CSS scores

Sample size	70
Age at Time 1	3.56±0.85 years
Time to follow-up	1.90±0.81 years
Age at Time 2	5.45±0.37 years

IMPACT OF ASD SEVERITY ON LANGUAGE



IMPACT OF ASD SEVERITY ON LANGUAGE



Predicting "Language Status"
Time 1 V and NV DQ and change ***
~~Time 1 ADOS domain CSS and change~~

Predicting Expressive Language AE
Time 1 V and NV DQ and change ***
ADOS SA-CSS and improvement ***
NVDQ washes out findings

DEVIANT LANGUAGE DEVELOPMENT

- Echolalia
  - Repetition, with same intonation, of words or phrases someone else has said
  - The term *immediate echolalia* applies to echoic utterances produced within two conversational turns of the original and resembling the original segmentally and/or suprasegmentally; the resemblance may be rigidly exact (pure) or selectively mitigated
  - The term *delayed echolalia* applies to echoic utterances (a) produced more than two conversational turns after the original and (b) either characterized by a higher level of linguistic complexity than the individual could generate independently or identified as a learned routine by familiar communication partners;
- Often serves communicative function
  - Turn-taking
  - Assertions
  - Affirmative answers
  - Request
  - Rehearsal to aid processing
  - Self-regulation
- One of most classic symptoms of autism
  - Not all children with ASD 'echo'
  - Not only seen in ASD

CHARACTERISTIC FEATURES OF LANGUAGE

- Odd/Stereotyped Language
  - Scripts/quotes
  - *Verbal rituals*
  - Odd phrasing
  - Idiosyncratic lexical terms or "neologisms"
- Verbal rituals for persons with autism can occur for a number of reasons, including:
  - Calming oneself in a difficult situation
  - Expressing anxiety in a difficult situation
  - Withdrawing from a particular situation
  - Expressing some emotion

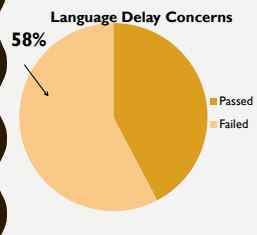
OVERLAP BETWEEN LD AND ASD?

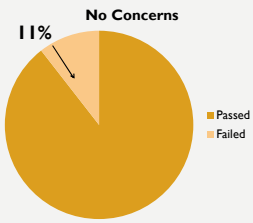
Initial Phone Screen: Do you have concerns about your child's language development?

Language Delay Concern	No Concerns
n=56	n=64
18.62 months (SD= 1.45)	18.55 months (SD=1.02)

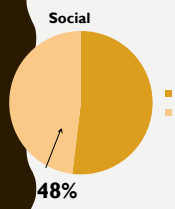
Social	• Emotion & Eye Gaze • Communication • Gestures
Speech	• Sounds • Words
Symbolic	• Understanding • Object Use

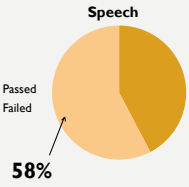
INFANT TODDLER CHECKLIST – TOTAL SCORE

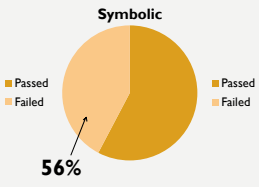


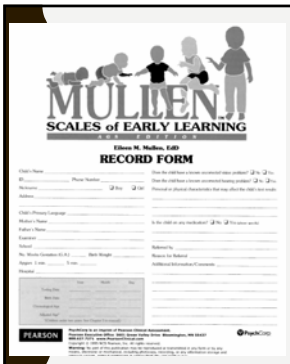


INFANT TODDLER CHECKLIST: LANGUAGE DELAY CONCERNS









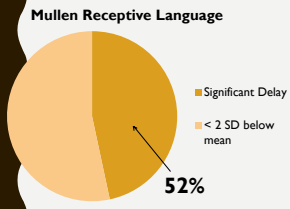
Mullen Scales of Early Learning

Birth-68 months of age

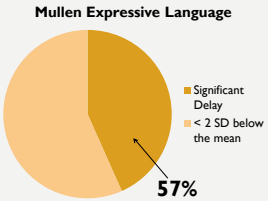
Subscales:
- Gross Motor
- Visual Reception
- Fine Motor
- Receptive Language
- Expressive Language

Standard Scoring
- Mean = 50
- SD = 10

MULLEN SCALES OF EARLY LEARNING: LD CONCERNS GROUP

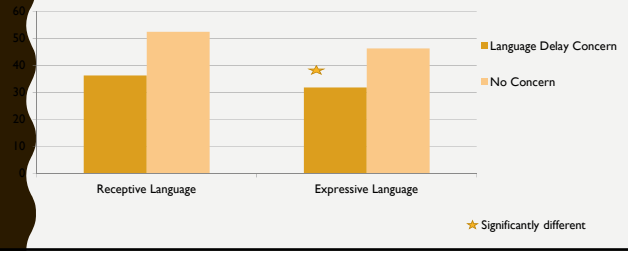


3% No concerns (n=2)

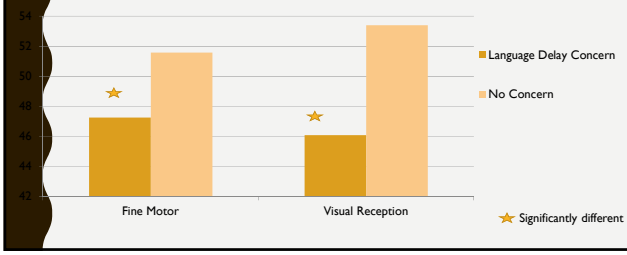


2% No concerns (n=1)

MULLEN SCALES OF EARLY LEARNING: MEAN STANDARD SCORES



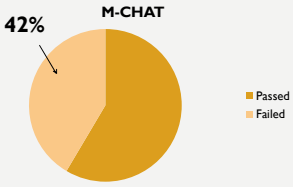
MULLEN SCALES OF EARLY LEARNING: MEAN STANDARD SCORES



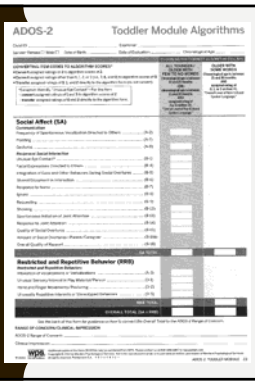
M-CHAT-R/F

- 16-30 months of age
- Scoring
  - Low-Risk (0-2)
  - Medium-Risk (3-7)
  - High-Risk (8-20)
- Follow-up Interview

M-CHAT: LANGUAGE DELAY CONCERNS



ASD Risk Level
- High: 21%
- Medium: 19%
- Low: 60%



ADOS-2 Toddler Module

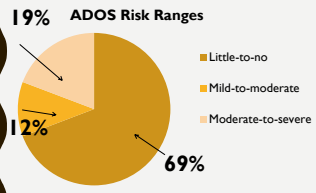
Algorithm:
- Social Affect (SA)
- Restricted and Repetitive Behaviors (RRB)
- SA+RRB

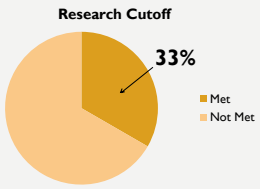
Ranges of Concern:
- Little-to-no
- Mild-to-moderate
- Moderate-to-severe

Research Cutoffs
- Met for ASD

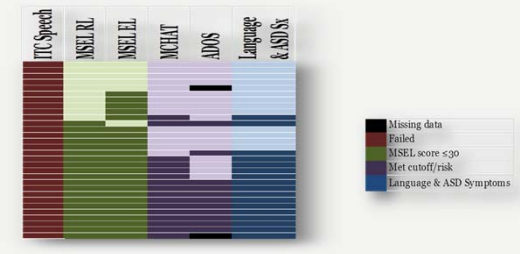
ADOS – T ALGORITHM SCORES

ADOS-T RISK AND CUTOFFS





OVERLAP OF LANGUAGE DELAYS AND ASD SYMPTOMS



RELATIONSHIP BETWEEN ASD & LANGUAGE

	ADOS SA	ADOS RRB	ADOS Total
Mullen RL	**-.596*** **	**-.407** **	**-.587** **
Mullen EL	**-.440*** **	**-.229**	**-.410** **

- Approximately half of children in LD concern group did have significant language delays
  - Parent Report: ITC
  - Standardized Test: MSEL
- One-to-one correspondence between measures not observed
  - 2/3 of ITC fail had significant delays on MSEL
- Very low rate of delays in no concern group

- ASD symptoms elevated in the language delay concern group
  - ~40% screen positive on M-CHAT-R
  - ~20% in highest risk range on ADOS-T
  - ~1/3 met ADOS-T research cut-off
- More severe language delays related to more autism symptomology

WHAT'S THE DIFFERENCE?

LANGUAGE DELAY

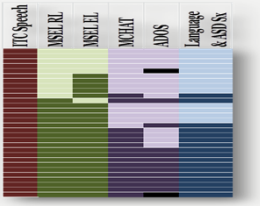
- Delayed, limited, lack of spoken language
- May have some social difficulties, but lower intensity/variety
- May show some repetitive behaviors, but not interfering with interactions and learning

ASD

- Delayed, limited, lack of spoken language WITHOUT compensation (especially gestures)
- Significant and impairing social deficits
- Significant and impairing repetitive behaviors

DISCUSSION

- Take home message:
- Overall group patterns, but lots of variability
- Difficulty of differential diagnosis



TIPS TO REMEMBER

1. ***You can communicate without language.*** You can communicate nonverbally through facial expression, gestures, and other behaviors.

2. ***You can use speech and language without communicating.*** You can talk to yourself without communicating to others. You can write information to yourself without communicating with others.

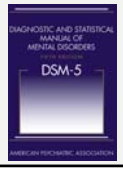
3. ***You can use language without speech.*** You can use written language and sign language.

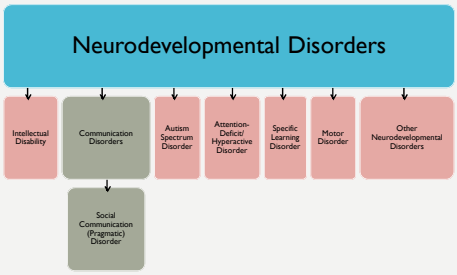
4. ***You can communicate without speech.*** You can communicate with others through written language, sign language, and nonverbal means, such as facial expression, gestures, and behavior.

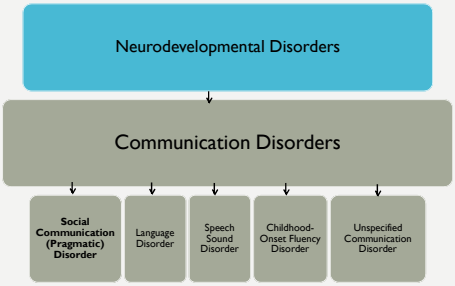
SOCIAL COMMUNICATION DISORDER

SOCIAL (PRAGMATIC) COMMUNICATION DISORDER

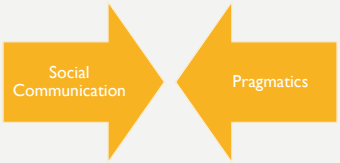
- A new diagnostic category
- Under Communication Disorders in the Neurodevelopmental Disorders section



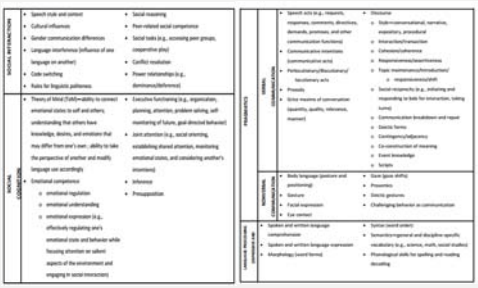




Social (Pragmatic) Communication Disorder



COMPONENTS OF SOCIAL COMMUNICATION



http://www.asha.org/uploadedFiles/ASHA/Practice_Portal/Clinical_Topics/Social_Communication_Disorders_in_School-Age_Children/Components-of-Social-Communication.pdf

DIAGNOSTIC CRITERIA

A. Persistent difficulties in the social use of verbal and nonverbal communication as manifested by **all** of the following:

1. Deficits in using communication for social purposes in a manner that is appropriate for the social context.
2. Impairment of the ability to change communication to match context or the needs of the listener
3. Difficulties following rules for conversation and storytelling
4. Difficulties understanding what is not explicitly stated and nonliteral or ambiguous language

DIAGNOSTIC CRITERIA

B. The deficits result in functional limitations in effective communication, social participation, social relationships, academic achievement, or occupational performance, individually or in combination.

C. The onset of symptoms is in the early developmental period (but deficits may not become fully manifest until social communication demands exceed limited capacities).

DIAGNOSTIC CRITERIA

D. The symptoms are not attributable to another medical or neurological condition or to low abilities in the domains of word structure and grammar, and are not better explained by ASD, intellectual disability (intellectual developmental disorder), global developmental delay, or another mental disorder.

DIAGNOSTIC CRITERIA

- Cannot co-occur with ASD
- Can co-occur with other Language Disorders
  - History of delay in reaching language milestones
  - Current abilities below peers
  - Most common associated feature of SCD
  - Shouldn't be explained by them

SO WHAT?

- Rule out a diagnosis of ASD
  - lack of these additional symptoms, currently or by history
- **Despite** relative strengths in word knowledge and grammar (structural language)
  - What does this mean?

SCD ≠ "MILD ASD"

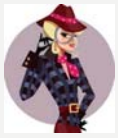
SCD
- Impairments in social communication
  - Mainly verbal
  - Includes nonverbal

ASD
- Impairments in social communication
  - AND SOCIAL INTERACTION & RECIPROCITY
- Presence of restricted interests, repetitive behaviors, insistence on sameness, or sensory

ROLE OF THE SLP

- How separable are pragmatic language problems are from reduced vocabulary and limited sentence structure
- Comprehensive assessment
  - grammatical, semantic, pragmatic aspects

THE ROLE OF THE SLP



- Identify social communication deficits
- Implement an assessment protocol that informs differential diagnosis of primary impairments:
  - **Structural language** disorder?
    - *Primary* deficits in syntax, phonological processing, and semantics (e.g., Tomblin et al., 2004)
  - **Pragmatic language** disorder (now called SCD)?
    - *Primary* deficits in conversation and prosocial skills (Bishop & Norbury, 2002; Norbury, 2013)
  - Deficits in **multiple aspects of language**

SCD: WHO IS AT RISK?

- Children and adolescents with:
  - *Specific Language Impairment (SLI)*
    - e.g., Fujiki, Brinton, & Todd, 1996
  - *Attention-Deficit/Hyperactivity Disorder + LI*
    - e.g., see review by Timler, 2014
  - *Specific Learning Disability*
  - *Siblings of Children with Autism Spectrum Disorder*
    - e.g., Miller, et al., 2014
  - *Fetal Alcohol Spectrum Disorder*
    - e.g., Coggins, et al., 2007
  - *Significant Histories of Abuse & Neglect*
    - e.g., Hwa-Froelich, 2014

NEXT STEPS – RESEARCH PERSPECTIVE

- Still a debate

Why no one needs a diagnosis of 'social communication disorder'

- Operationalized diagnostic criteria
- Move the field forward
  - better understand and document essential characteristics and validity of SCD

Social Communication Disorder: This Is Our Baby, SLPs!

ASSESSMENT OF LANGUAGE IN ASD

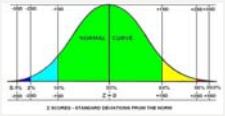
MEGAN BRENDAL, MS, CCC-SLP
LAUREN SWINEFORD, PHD, CCC-SLP

ASSESSMENT IN ASD: CHALLENGES

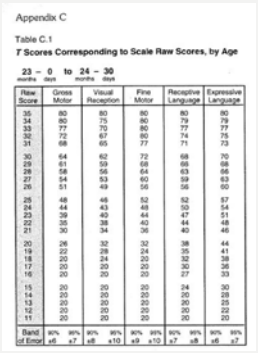
- Measures may focus more on *elicited* language in structured environments
  - E.g. labeling images, filling in blanks, or asking "What is this called" or "What is happening in this picture"
- Response to social stimuli
  - Individuals with ASD may have difficulty attending to instructions, task materials, redirection attempts
- Use of informal assessments (e.g. natural language samples) may be time consuming, requiring technical skills
- Although parent report has been found to be valid and reliable; parent reports have been found to over-report on presence of some skills
  - Specifically receptive language, as nonverbal cues/supports (e.g. pointing, 3-point gaze) may not be controlled for within natural environment

ASSESSMENT IN ASD: CHALLENGES

- Lack of uniform measures in assessing language skills in individuals with ASD
  - From young children to adults, especially for language in less structured and more natural environments (Tager-Flusberg et al. 2009; Kim, Junker, & Lord, 2014)
- Difficulties in identifying appropriate measures for individuals who are minimally verbal as they may not meet psychometric criteria for validity and reliability because:
  - Chronological age, developmental age, language use, sample population (Kasari, Brady, Lord, & Tager-Flusberg, 2013)
- Minimally verbal children with ASD also frequently demonstrate floor effects but show evidence of skills in non-testing contexts (Kasari, Brady, Lord, Tager-Flusberg, 2013)



ARE ALL THESE KIDS THE SAME?



Appendix C

Table C.1

T Scores Corresponding to Scale Raw Scores, by Age

23 – 0 to 24 – 30

Raw Score	Gross Motor	Visual Reception	Fine Motor	Receptive Language	Expressive Language
35	80	80	80	80	80
34	80	75	80	79	79
33	77	70	80	77	77
32	72	67	80	74	75
31	68	65	77	71	73
30	64	62	72	68	70
29	61	59	68	66	68
28	58	56	64	63	66
27	54	53	60	59	63
26	51	49	56	56	60
25	48	46	52	52	57
24	44	43	48	50	54
23	39	40	44	47	51
22	35	38	40	44	48
21	30	34	36	40	46
20	26	32	32	38	44
19	22	28	24	35	41
18	20	24	20	32	38
17	20	20	20	30	36
16	20	20	20	27	33
15	20	20	20	24	30
14	20	20	20	20	28
13	20	20	20	20	25
12	20	20	20	20	22
11	20	20	20	20	20
Band of Error	80% ±6	90% ±7	90% ±8	90% ±10	90% ±9	95% ±10	90% ±7	95% ±8	90% ±6	95% ±7

ASSESSING LANGUAGE WITHIN ASD

- First step is to determine language level:
  - Pre-intentional
  - Minimally verbal
  - Developmental Language Phases
    - First/Single Words
    - Word Combinations
    - Sentences
  - Complex/Fluent

PRE-INTENTIONAL COMMUNICATION

- **Does the individual <u>intentionally</u> communicate nonverbally and/or verbally?**
- Or is the individual's communication:
  - more reflective of a general state (e.g. comfort, hunger, sleep)
  - Interpreted primarily by the caregiver/parent based on the individuals body movement, sounds, facial expressions?

**Pre-intentional communication has been observed in typically-developing children 0-8 months

PRE-INTENTIONAL COMMUNICATION: CONSTRUCTS

- Vocalizations:
  - Vegetative sounds (burping, coughing, gurgles)
  - Crying, cooing, laughing
  - Vowel-like sounds, closed consonants
  - Presence of emerging babbling
- Responsivity
  - Smile response or response/orientation to sounds
- Eye gaze
  - Follows objects, attends to facing, turn-taking?
- Motor skills

PRE-INTENTIONAL COMMUNICATION: ASSESSMENT

Table 7. Intentional Communication Measures

Communication Complexity Scale	Joint attention and requesting gestures and language	12 months through adults	Structured Probes	Brady et al [2012]	●
Checklist of Communicative Competencies	Indirect assessment—joint attention not an explicit category.	Adolescents and Adults	Teacher report	Iacono, West, Bloomberg, and Johnson [2009]	○
Communication Matrix	Indirect information on communicative gestures and language	0–24 months	Teacher report	Rowland [2008]	●
Hobson and Hobson	Joint attention, eye contact	6–14 years	Observation	Hobson and Hobson [2007]	○
Inventory of Potential Communicative Acts	Behavior regulation, commenting, social interaction	Any age	Parent report Teacher report	Sigafoos et al. [2000]	◐
JAMES (items adapted from ESCS)	Joint attention and requesting gestures	5 years to adolescence	Structured probes Observation	Jahromi et al. [2009] Mundy et al. [2003]	●
Social Orienting Continuum and Response Scale	Joint attention initiating and responding	2–5 years	Observation	Mosconi et al. [2009]	○

ESCS Early Social Communication Scales; JAMES, Joint Attention Measure from the ESCS.

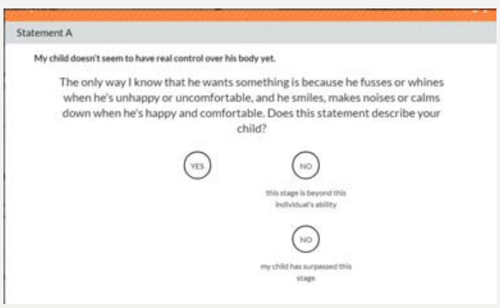
● = Well suited for use with minimally verbal children.
◐ = Use with some caution.
○ = Unlikely to yield meaningful results.

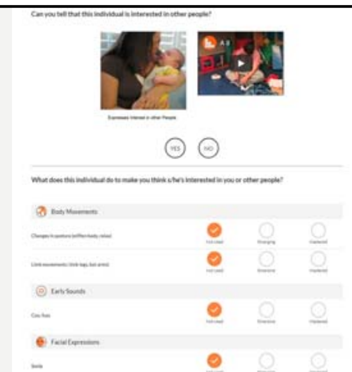
Assessing the Minimally Verbal School-Aged Child With Autism Spectrum Disorder

COMMUNICATION MATRIX (ROWLAND, 2008)

- Assessment instrument designed to evaluate expressive communication skills of individuals with a range of disabilities
- It covers seven levels of communication, from pre-intentional behavior to language
- FREE!

- https://communicationmatrix.org/





MINIMALLY VERBAL

MINIMALLY VERBAL

- Exact number of words may vary across children, from no spoken words/phrases to perhaps 20 or 30 words.
- The spoken words or phrases individual uses will often be **restricted to limited contexts** and may only be used to **communicate 1 or 2 functions** (e.g. requests with familiar adults).
- **Rate** of spoken language is usually very low and may include **scripted phrases** that have been highly taught (e.g. *I want X*).
- In some cases, the minimally verbal child may also use echolalic or stereotyped language that does not appear to **be functionally communication.**

*This definition of minimally verbal children does not address the question of: (a) receptive language skills or (b) alternative communication modes.

Minimally Verbal School-Aged Children with Autism Spectrum Disorder: The Neglected End of the Spectrum

MINIMALLY VERBAL: GENERAL ASSESSMENT

- Determine the goal of the assessment
  - Is the assessment to qualify for eligibility, to describe abilities/behaviors, or as outcome measure?
- Assessment environment
  - Inform caregiver of purpose and setting
  - Are the materials appropriate for chronological and developmental age?
  - What is the individual's primary mode of communication?
  - What reinforcements are needed? Are break times going to be necessary? Behavioral strategies that they respond best to?

MINIMALLY VERBAL: GENERAL ASSESSMENT

- Background information
  - Family history; previous medical and behavioral development
  - Prior interventions and their outcomes
  - Parent concerns/preferences
  - Vision and hearing testing
- Speech sound production
  - Oral mechanism examination
  - Abilities to produce various speech sounds
    - May be difficult within minimally verbal population as tasks may be difficult to follow (e.g. Puh-tuh-kuh or labeling picures)
    - Parent report may assist as alternative, asking questions such as if individual blows kisses or raspberries (e.g. Geye, Schweigert, & Goldsmith, 2008)
    - Recordings from multiple settings for speech sound inventory

MINIMALLY VERBAL: CORE DOMAINS

- **Social Behavior**
  - To understand and determine how individual is functioning in different contexts via teachers, caregivers, and familiar communicators
- **Repetitive and Restricted Behaviors**
  - Provides insight into extent in which they may impact participation/responsivity within assessment
- **Nonverbal Cognition**
  - Nonverbal cognition assists in prediction of language development (e.g Pickett, Pullara, O'Grady, & Gordon, 2009)
- **Language**
  - **Pre-linguistic skills**
    - Communicative functions
    - Gesture Use
    - Imitation
      - Ability to learn
    - Play
      - Predictive validity in early play has been found in multiple studies to social skills and communication abilities

MINIMALLY VERBAL: SOCIAL BEHAVIORAL

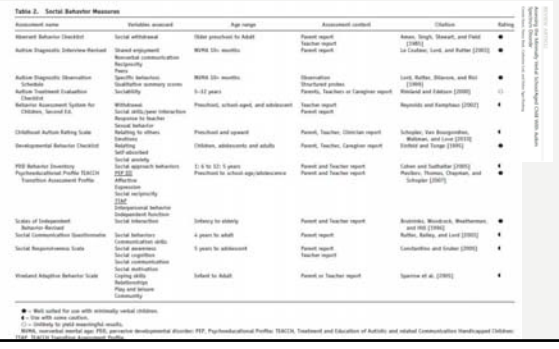


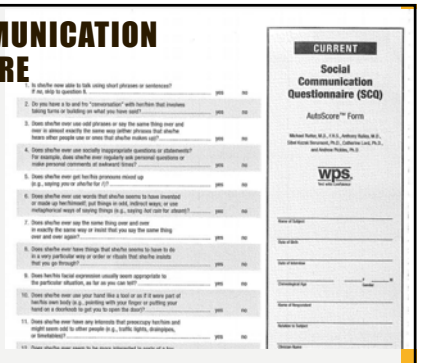
Table 2. Social Behavior Measures

Assessment name	Variables assessed	Age range	Assessment content	Citation	Rating
Aberrant Behavior Checklist	Social withdrawal	Older preschool to Adult	Parent report Teacher report	Aman, Singh, Stewart, and Field (1985) Le Couteur, Lord, and Rutter (2003)	●
Autism Diagnostic Interview-Revised	Shared enjoyment Nonverbal communication Reciprocity Peers	Mental age 10+ months	Parent report		●
Autism Diagnostic Observation Schedule	Specific behavior Qualitative summary scores	Mental age 10+ months	Observation Structured probes	Lord, Rutter, DiLavore, and Risi (1999)	●
Autism Treatment Evaluation Checklist	Sociability	5–12 years	Parents, Teachers or Caregiver report	Rimland and Edelson (2000)	○
Behavior Assessment System for Children, Second Ed.	Withdrawal Social skills/peer interaction Response to teacher	Preschool, school-aged, and adolescent	Teacher report Parent report	Reynolds and Kamphaus (2002)	◆
Childhood Autism Rating Scale	Relating to others Emotion Relating	Preschool and upward	Parent, Teacher, Clinician report	Schopler, Van Bourgondien, Wellman, and Love (2010)	◆
Developmental Behavior Checklist	Self-absorbed Social anxiety	Children, adolescents and adults	Parent, Teacher, Caregiver report	Einfeld and Tonge (1995)	●
PDD Behavior Inventory Psychoeducational Profile TEACCH PEP-3 Transition Assessment Profile	Social approach behaviors Affective Expressive Social reciprocity Play Interpersonal behavior	1; 6 to 12; 5 years Preschool to school age/adolescence	Parent and Teacher report Parent and Teacher report	Cohen and Sudhalter (1995) Marches, Thomas, Chapman, and Schopler (2007)	◆ ●
Scales of Independent Behavior-Revised	Social interaction	Infancy to elderly	Parent and Teacher report	Bruininks, Woodcock, Weatherman, and Hill (1996)	●
Social Communication Questionnaire	Social behaviors Communication skills	4 years to adult	Parent report	Rutter, Bailey, and Lord (2003)	◆
Social Responsiveness Scale	Social awareness Social cognition Social communication Social motivation	4 years to adolescent	Parent report Teacher report	Constantino and Gruber (2005)	◆
Vineland Adaptive Behavior Scale	Coping skills Relationships Play and leisure Community	Infant to Adult	Parent or Teacher report	Sparrow et al. (2005)	◆

● = Well suited for use with minimally verbal children.
◆ = Use with some caution.
○ = Unlikely to yield meaningful results.
BVMA, nonverbal mental age; PEP, pervasive developmental disorder; PEP, Psychoeducational Profile; TEACCH, Treatment and Education of Autistic and related Communication Handicapped Children; TAP, Transition Assessment Profile.

SOCIAL-COMMUNICATION QUESTIONNAIRE

- Rutter et al., 2003
- Parent Questionnaire
  - 40 yes/no questions
  - ~10 minutes to complete; 5 minutes to score
- Ages: 4 years with mental age 2 years and older
- Screening measure designed as questionnaire version of Autism Diagnostic Interview-Revised


CURRENT

Social Communication Questionnaire (SCQ)

AutoScore™ Form

WPS

MINIMALLY VERBAL: RRBS

Table 1. Repetitive Behaviors/Restricted Interests, Sensory Behavior, and Atypical Behaviors

Assessment name	Variables assessed	Age range	Assessment context	Citation	Rating
Aberrant Behavior Checklist	Irritability Social withdrawal Stereotypic behavior Hyperactivity Excessive speech	All ages	Parent report Teacher report	Aman et al. [1985]	●
Autism Diagnostic Interview-R	Restricted interests Routines and rituals Stereotyped and repetitive motor mannerisms Preoccupation with parts of object or nonfunctional elements	18 months+	Parent report	Lord et al. [1994]	●
Developmental Behavior Checklist	Disruptive/antisocial Self absorbed Communication disturbance Anxiety Social relating	4–18 years Adult form available	Parent or Teacher report	Einfeld and Tonge [2002]	●
Direct Observation of Repetitive Behaviors in Autism	Frequency of behaviors Duration of behaviors	All ages	Observation	Boyd et al. [2007]	◖
Repetitive Behavior Questionnaire	Repetitive language Sameness of behavior Repetitive movements	Not known	Parent or Teacher report	Turner [1995]	◖
Repetitive Behavior Scale-Revised	Stereotyped Self-injurious Compulsive Ritualistic Sameness Restricted	3 years to adult	Parent report	Bodfish et al. [1999] Bodfish [2003]	●
Sensory Profile Adolescent/Adult Profile	Sensory processing Sensory modulation Behavioral/emotional response to sensory stimuli	3–10 years 11+ years	Parent report	Dunn [1999] Brown and Dunn [2002]	◖
The Interest Scale	Specific interests Measures of functional impairment	6; 0–17; 11 years	Parent report	Bodfish [2003]	◖

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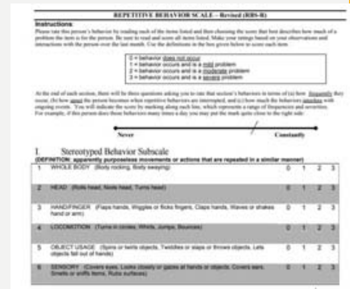
REPETITIVE BEHAVIOR SCALE-REVISED

- Lam & Aman (2007)
- Parent questionnaire for guardians of children 3 years-old to adulthood
- 44 items with 4-point scale
  - 0-Behavior does not occur, 1-Mild Problem, 2-Moderate Problem, 3-Severe Problem
- Consists of 6 scales:
  - Stereotyped Behavior
  - Self-Injurious Behavior
  - Compulsive Behavior
  - Routine Behavior
  - Sameness Behavior
  - Restricted behavior



AUTISM DIAGNOSTIC OBSERVATION SCHEDULE-2ND ED

Lord et al, 2012

- Semi-structured assessment of communication, social interaction, and play
- Ages: 12 months through adulthood
- Consists of five modules:
  - Toddler Module: Pre-verbal/Single Words (12-30 months of age)
  - Module 1: Pre-verbal/Single Words (>30 months of age)
  - Module 2: Phrase Speech
  - Module 3: Fluent Speech (Child/Adolescent)
  - Module 4: Fluent Speech (Adult)

MINIMALLY VERBAL: NONVERBAL COGNITION

- Domain may include:
  - Nonverbal reasoning, symbolic skills, memory, attention, processing speed, fine motor skills
- Nonverbal cognition assists in prediction of language development (e.g Pickett, Pullara, O'Grady, & Gordon, 2009)

When choosing assessment, consider:
  - Untimed assessments may provide better estimates of abilities
  - Visually based tests (perceptual, matrices reasoning) may elicit higher estimates of cognitive abilities vs other types (Dawson, Soulieres, Gernsbacher, & Mottron, 2007).

MINIMALLY VERBAL: NONVERBAL COGNITIVE DOMAIN

Table 4. Nonverbal Cognitive Abilities

Assessment name	Variables assessed	Age range	Assessment context	Citation	Rating
Differential Ability Scales-II	Nonverbal reasoning Visual-perceptual Spatial visualization Memory Pattern detection Processing	2; 6–17; 11 years	Standardized	Elliott [2007]	◖
Leiter International Performance Scale-R* *	Visualization Reasoning Memory Attention	2–21 years	Standardized	Roid and Miller, [1997] Roid et al.	●
Mullen Scales of Early Learning	Fine motor Nonverbal reasoning	0–5; 11 years	Standardized	Mullen [1995]	◖
Psycho-Educational Profile -3	Fine motor Gross motor Visual-Motor imitation	6 months to 7; 0 years (developmental age)	Standardized Parent report	Schopler, Reichler, Lansing, and Marcus [2005]	◖
Ravens Progressive Matrices*	Reasoning Problem solving	5–80 years	Standardized	Raven, Raven, and Court [1998]	◖
Snijders Oomen Nonverbal	Abstract/concrete reasoning Spatial reasoning Visual perception	2; 6–16; 11 years	Standardized	Tellagen and Laros [1993]	◖

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○ = Unlikely to yield meaningful results.
*Note: Leiter-3 now published: 3-75 years

LEITER INTERNATIONAL PERFORMANCE SCALE

- Individuals 3 years to 75+ years of age
- Admin 20-45 minutes
- Nonverbal measure of intelligence
  - Cognitive Scales:
    - Sequential order, Form completion, Classification and analogies, Figure ground, Matching/repeated patterns
  - Attention and Memory Scales:
    - Forward memory, Reverse memory, Attention sustained, Attention divided, Nonverbal stroop
- https://www.youtube.com/watch?v=SxhNF8hUfrk

MINIMALLY VERBAL: IMITATION

Table 5. Imitation Measures

Assessment name	Variables assessed	Age range	Assessment context	Citation	Rating
Imitation Assessments	Gestural imitation Imitation with objects Vocal/verbal imitation	Young children	Structured probes Observation	Rooyers, Oost, and Bothuyne [1998] Rogers et al. [2003] Stone et al. [1997]	●
Imitation Assessment	Imitation of upper and lower facial movements Non-meaningful hand/ finger movements	14–22 years	Structured probes Observation	Freitag et al. [2006]	◖

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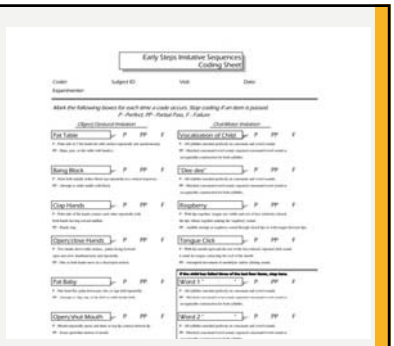
SEQUENCED IMITATION TASK (ROGERS, 2003)



MINIMALLY VERBAL: PLAY DOMAIN

Table 6. Object Play Measures

Child-Initiated Pretend Play Assessment	Object substitutions Imitated actions Pretend play	3–7 years	Observation Norm-referenced	Stagnitti [2007]	◖
Observational Play Assessments	Functional play acts Symbolic play acts Play levels	Young children	Structured probes Observation	Lifter, Edwards, Avary, Anderson, and Sulzer-Azaroff [1988] Fewell and Rich [1987] Ungerer and Sigman [1981]	●
Transdisciplinary Play-Based Assessment	Cognitive development Communication Social-behavior Motor skills	0–6 years	Structured probes Observation	Linder [1993]	○
Warwick Symbolic Play Test	Symbolic play and complexity	18 months to 6 years	Structured probes Observation	Doswell, Lewis, Sylva, and Boucher [1994]	○

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○ = Unlikely to yield meaningful results.

MINIMALLY VERBAL: LANGUAGE DOMAIN

Table 1. Language Measures

Assessment name	Variables assessed	Age range	Assessment context	Citation	Rating
Language Use Inventory	Pragmatic language	18–47 months	Parent report	O'Neill [2002]	◖
Peabody Picture Vocabulary Test—IV	Receptive vocabulary	2; 6–90 years	Standardized	Dunn and Dunn [2004]	●
The MacArthur-Bates Communicative Development Inventories (CDI)	Receptive and expressive language	8–37 months*	Standardized parent report	Fenson et al. [2006]	◖
Preschool Language Scales-5	Auditory comprehension	Birth–7; 11	Standardized	Zimmerman et al. [2011]	◖
Reynell Developmental Language Scales-III	Verbal comprehension Expressive language	1–6 years	Standardized	Edwards et al. [1999]	◖
Sequenced Inventory of Communicative Development—Revised	Receptive language Sound and speech discrimination Awareness and understanding	4–48 months	Standardized	Hedrick et al. [1984]	◖
Test of Early Language Development—3	Receptive language	2; 0–7; 11 years	Standardized	Hresko et al. [1990]	◖
Language Samples	Expressive language gestures	All ages	Observation Natural contexts and Structured probes	Costanza-Smith [2010] Rojas and Iglesias [2010] Romski et al. [2010] Kaiser and Roberts [2013]	●
Vineland Adaptive Behavior Scales-II	Receptive language Expressive language Written language	0–90 years	Parent report Teacher report	Sparrow, Cicchetti, and Balla [2005]	◖

*This measure is not validated on school-aged children, but was included because the raw scores have frequently been used in research and clinical practice with older children.
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○ = Unlikely to yield meaningful results

REVIEW ARTICLE

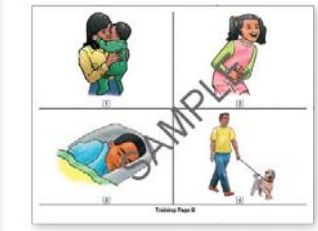
Assessing the Minimally Verbal School-Aged Child With Autism Spectrum Disorder

Connie Kasari, Nancy Brady, Catherine Lord, and Helen Tager-Flusberg

PEABODY PICTURE VOCABULARY TEST-IV PPVT-IV

Dunn & Dunn, 2007

- Measure of receptive vocabulary
  - 228 words
    - Nouns, verbs, attributes
- Age range: 2 years; 6 months to 90+ years
- Completion time: 10-15 minutes



MINIMALLY VERBAL: LANGUAGE DOMAIN

- Language Sampling
  - Requires recordings of communication, communicative partners determining context, and length of session (Kover et al, 2012)
  - **requires defining what is a communicative act a priori
- Requires analyses of ***ALL*** communicative skills
  - Amount, rate, and types of communicative behaviors
  - Gestures
  - Play skills (sensory/exploratory, functional, nonfunctioning, pretend)

PHASES (TAGER-FLUSBERG ET AL, 2009)

- First/Single Words
- Word Combinations
- Sentences

Defining Spoken Language Benchmarks and Selecting Measures of Expressive Language Development for Young Children With Autism Spectrum Disorders

FIRST/SINGLE WORDS (TAGER-FLUSBERG ET AL, 2009)

Defining Spoken Language Benchmarks and Selecting Measures of Expressive Language Development for Young Children With Autism Spectrum Disorders

Lang. phase	Lang. domain	Measure(s)	Variables	Range in typical development	Examples	Minimum criteria
First Words 12–18 months	Phonology	NLS	CV combinations	CV-CVC	Hi, Mommy	CV
		NLS	Consonant inventory	2–8 different consonants	m, b, y, n, w, d, p, h (Early 8)	4 consonants
	Vocabulary	NLS	# different words used referentially in 20 min	2–15 words	More, bubble, go, open, ball	5 types and 20 tokens
		Parent report	# different word roots	(range for 13–18 months)	MCDI	AE for 15 months
		Direct assessment	Confrontation naming	(range for 13–18 months)	Mullen; Reynell	AE for 15 months
	Pragmatics	NLS	# different communicative functions	2–5 functions	Comments; request	Comments + 1 other

Individuals who use non-imitated spontaneous single words referentially and symbolically to communicate both present and non-present objects and events.

FIRST/SINGLE WORDS: BENCHMARKS

- Phonology
  - Measures recommended: Natural Language Sample
    - Consonant-vowel combinations
    - Consonant Inventory
  - Minimum criteria:
    - Consonant-vowel structure of: CV
    - **OR** Consonant inventory: use of 4 consonants

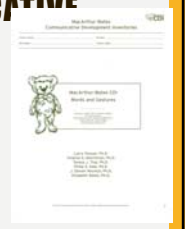
FIRST/SINGLE WORDS: BENCHMARKS

- Vocabulary
  - Measures recommended: Natural Language Sample, Parent Report, and Direct Assessment
    - # of diff words used (NLS within 20 minutes)
    - # of different word roots (Parent Report Mac-Arthur Bates CDI)
    - Confrontational naming (Direct assessment Mullen, Reynell)
  - Minimum criteria :
    - # of diff words: 5 words and 20 tokens (i.e. use words 20x)
    - **OR** # of diff word roots: AE of 15m
    - **OR** Confrontational naming: AE of 15m

FIRST/SINGLE WORDS: BENCHMARKS

- Pragmatics
  - Measures recommended: Natural Language Sample, Direct assessment
    - # of diff communicative functions used (NLS within 20 minutes, CSBS)
  - Minimum criteria:
    - 1 comment + 1 other (e.g. social interaction, behavior regulation)
    - **OR** AE for 15 months on CSBS

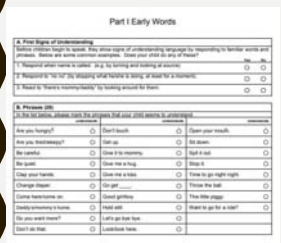
MAC-ARTHUR BATES COMMUNICATIVE DEVELOPMENTAL INVENTORIES



- Parent Caregiver Report
- Used to evaluate: language and communication skills
- Age range: 8-37 months (may be used for older individuals with developmental delays) with 3 versions:
  - Words & Gestures (8-18 months)
  - Words & Sentences (16-30 months)
  - CDI III-Vocabulary Inventory (30-37 months)
- Time commitment: 20-40 minutes to complete; 10-15 minutes to score

Words & Gestures

- Part 1: Early Words
  - A: First signs of Understanding
  - B: Phrases (understands)
  - C: Starting to Talk
  - D:Vocabulary Checklist
- Part 2: Actions and Gestures
  - A: First Communicative Gest
  - B: Games and Routines
  - Actions with Objects
  - Pretending to be Parent
  - Imitating other Actions


Part I Early Words

Part II Actions and Gestures

MAC-ARTHUR BATES COMMUNICATIVE DEVELOPMENTAL INVENTORIES

- Useful measure for children with ASD:
  - Researchers have used the CDI cross-sectionally to characterize early communicative development in an ASD population (Charman, Drew, Baird,& Baird, 2003)
  - Demonstrates predictive validity of later language development (Luyster, Lopez,& Lord, 2007; Luyster et al, 2007)

WORD COMBINATIONS (TAGER-

Defining Spoken Language Benchmark and Selecting Measures of Expressive Language Development for Young Children With Autism Spectrum Disorders

Lang. phase	Lang. domain	Measure(s)	Variables	Range in typical development	Examples	Minimum criteria
Word Combinations 18–30 months	Phonology	NLS	CV combinations Word structures % fully intelligible # consonants	CV-CCVCC 1- to 3-syllable words 40%–80% 8–18 consonants	Go, drink Early 8 + t, ng, k, g, f, v, sh, j	Closed syllables CVC and 2 syllable words 50% intelligible 10 consonants
	Vocabulary	NLS Parent report Direct assessment	# different words used referentially in 20 min # different words Confrontation naming	10–50 words (range for 21–27 months) 21–27 months (age range)	MCDI, LDS EOWVT-R	30 words 24 month AE 24 month AE
	Grammar	NLS Parent report Direct assessment	MLU Mean length in words of 3 longest utterances	MLU 1.1–2.4 (in morphemes) (range for 21–27 months; on MDCI: 2.6–5.5)	MCDI	MLU = 1.8 MCDI: 3.8
	Pragmatics	NLS Parent report	# different communicative functions Proportional use of JA + Social/Total Comm acts Conversational functions Inventory of child's communicative use	2–6 functions .3–.7 Responds and initiates 21–27 months (age range)	See article text Comments, request; turn-taking Answers/asks question LUI	24 month AE Comments, request, turn-taking 0.5 2 initiations + 2 responses 24 month AE

Possess a vocabulary that is increasing in size, includes nouns, verbs, descriptors, and combine 2-3 words that are use for several different communicative functions.

WORD COMBINATIONS: BENCHMARKS

- Phonology
  - Measures recommended: Natural Language Sample
    - Consonant vowel combinations
    - Word structures
    - Intelligibility
    - Consonant inventory
  - Minimum criteria:
    - uses closed syllables
    - **OR** CVC with 2 syllables
    - **OR** 50% intelligible
    - **OR** Uses 10 consonants

WORD COMBINATIONS: BENCHMARKS

- Lexicon
  - Measures recommended: Natural Language Sample, Parent Report, Direct Assessment
    - # of different words used (within 20 min NLS)
    - # of different word roots on parent report (MCDI, LDS)
    - Confrontational naming via direct assessment (EOWVT-R)
  - Minimum criteria:
    - Uses 30 words
    - **OR** receives 24 month age+ range via parent report and/or direct assessments

WORD COMBINATIONS: BENCHMARKS

- Grammar
  - Measures recommended: Natural Language Sample, Parent Report, Direct Assessment
    - MLU
    - Mean Length of Words in 3 longest utterances
  - Minimum criteria:
    - Uses Mean Length of Utterance (MLU) of 1.8+
    - **OR** MCDI 3.8

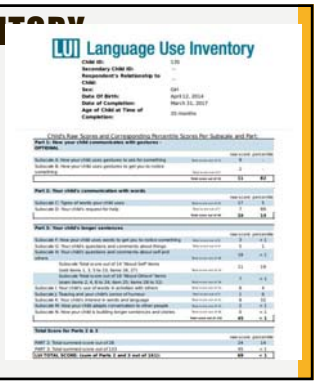
WORD COMBINATIONS: BENCHMARKS

- Pragmatics
  - Measures recommended: Natural Language Sample, Parent Report
    - Number of different communicative functions
    - Proportion of social-interaction acts with joint attention acts
    - Conversational functions:
    - Inventory of Communicative uses
  - Minimum criteria:
    - Demonstrates: comments, requests, turn-taking
    - **OR** Demonstrates 2 initiations and 2 responses in conversation
    - **OR** Proportion of social-interaction acts with joint attention=.05
    - **OR** Inventory of communicative acts AE is 24m on parent report (LUI)

LANGUAGE USE INVENTORY

- O'Neill, 2009
- Parent Questionnaire, with 20-30 min for completion
- Evaluates: social pragmatic use of language
- Ages: 18-47 months, with norms for each month
- 180 questions:
  - 3 Parts, with 14 subscales

*used in several studies with children with ASD



LANGUAGE DEVELOPMENT SURVEY

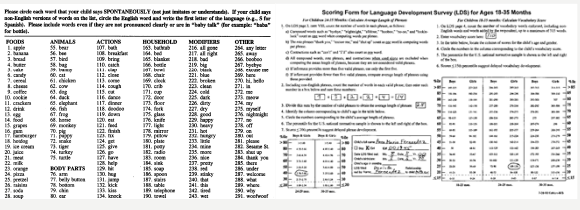
(Rescorla, 2009)

- Parent questionnaire

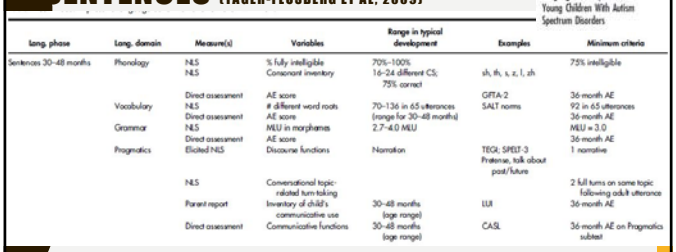
Ages: 18-35 months

Focuses on expressive vocabulary and emerging word combinations

- 310 words within 14 semantic categories (e.g. toys, body parts, food, animals)



SENTENCES (TAGER-FLUSBERG ET AL, 2009)



Combine words into clausal structures/sentences, demonstrate use of some morphological markers (e.g. plurals, prepositions, verb endings) and utilize their large vocabs for several communicative purposes with different communicative partners in various contexts

SENTENCES: BENCHMARKS

- Phonology:

  Measures recommended: Natural Language Sample (NLS), Direct Assessment
  - % intelligible
  - Consonant inventory
  - Age Equivalent score on direct measure (GFTA)

  - Minimum criteria:
    - Criterion of 75% intelligibility in a natural language sample
    - **OR** a 36-month level/age equivalent on a direct assessment measure (GFTA)

SENTENCES: BENCHMARKS

- Vocabulary:
  - Measures recommended: Natural Language Sample (NLS), Direct Assessment
    - # of different words (Salt Norms)
    - Age equivalent score

  - Minimum criteria:
    - 92 words in 65 utterances
    - **OR** 36 month age-equivalent criterion on a direct assessment measure

SENTENCES: BENCHMARKS

- Grammar:
  Measures recommended: Natural Language Sample (NLS), Direct Assessment
  - MLU in morphemes via NLS
  - Age equivalence score on direct assessment

  – Minimum criteria:
  - MLU 3.0
  - **OR** 36-month AE

SENTENCES: BENCHMARKS

- Pragmatics
  Measures recommended: Natural Language Sample (NLS), Direct Assessment
  - Discourse Functions (TEGI, SPELT)
  - Conversational related turn taking
  - Inventory of Communicative Use
  - Communicative Functions

  – Minimum criteria:
  - 1 Narrative
  - **OR** 2 full turns on conversational topic following adult utterance
  - **OR** 36 month AE on parent report (LUI)
  - **OR** 36 AE on pragmatic subtest (CASL)

COMPLEX/FLUENT LANGUAGE

–Have large vocabularies

–Communicate about range of topics
- Including abstract ideas and hypotheticals

–Use complex grammar
- E.g. relative clauses, sentential complements

–With variety of partners in different settings

FLUENT/COMPLEX LANGUAGE: NLS

- Context:
  – Play, Conversation, Narrative, Semi-structured (e.g. ADOS)
- Setting:
  – Home, school, research lab, clinic
    - Live data collection or recorded
- Conversational partner:
  – Researcher/examiner, parent
- Length may be determined by:
  – 1) minimum number of utterances needed
  – 2) **OR** minimum amount of time required for reliable/valid measure

Barakova & Tager-Flusberg, 2018

FLUENT/COMPLEX LANGUAGE

- Responsiveness
  – # of times individual responds to partner's utterances
- Discourse management
  – E.g. turn-taking, initiating topics, maintain, giving and reading cues
- Presupposition
  – What does the partner know and/or need to know
- Conversational manner
- Communicative functions
  – Directing others, self-directing, reporting, reasoning, predicting, empathizing, etc.
  – *Proportion

LANGUAGE SAMPLES

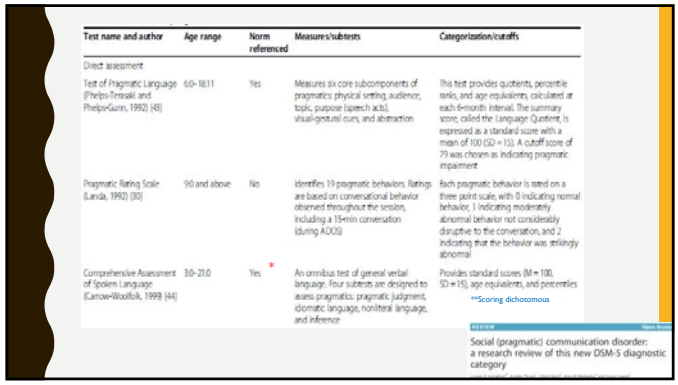
Systematic Elicitation Procedures:

1. Provide prompts to elicit a variety of "mini-samples" within a sample
   a. Personal retell
   b. Narrative
   c. Exposition
2. Use **pause time** to facilitate initiation of topics
3. Ask questions about **emotional reactions to events**
4. **Stage a communication breakdown**
   a. Repeat child's statement incorrectly
   b. Ask for a clarification

LANGUAGE SAMPLES: CONVERSATION
YALE IN VIVO PRAGMATIC PROTOCOL

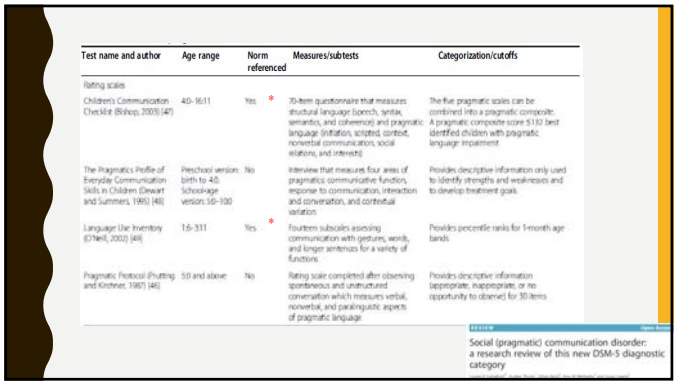
30 minute structured conversation

- **19 Scripted pragmatic probes 4 domains of behavior**
  - Discourse management (e.g., topic maintenance)
  - Communicative functions (e.g., hypothesizing, commenting)
  - Conversational repair
  - Presupposition (e.g., ambiguous pronoun, contingent comments)
- **Dynamic assessment** with scores for **cues** and **errors**
  - Cue scores
    - Expectant waiting
    - Gesture/facial expression
    - Nonspecific verbal cue/repetition
    - Specific verbal cue
  - Error score (**0**/correct; **1**/mildly inappropriate; **2**/incorrect)



Test name and author	Age range	Norm referenced	Measures/subtests	Categorization/cutoffs
Direct assessment				
Test of Pragmatic Language (Phelps-Terasaki and Phelps-Gunn, 1992) [43]	6:0–18:11	Yes	Measures six core subcomponents of pragmatics: physical setting, audience, topic, purpose (speech acts), visual-gestural cues, and abstraction	This test provides quotients, percentile ranks, and age equivalents, calculated at each 6-month interval. The summary score, called the Language Quotient, is expressed as a standard score with a mean of 100 (SD = 15). A cutoff score of 79 was chosen as indicating pragmatic impairment
Pragmatic Rating Scale (Landa, 1992) [30]	9:0 and above	No	Identifies 19 pragmatic behaviors. Ratings are based on conversational behavior observed throughout the session, including a 15-min conversation (during ADOS)	Each pragmatic behavior is rated on a three point scale, with 0 indicating normal behavior, 1 indicating moderately abnormal behavior not considerably disruptive to the conversation, and 2 indicating that the behavior was strikingly abnormal
Comprehensive Assessment of Spoken Language (Carrow-Woolfolk, 1999) [44]	3:0–21:0	Yes *	An omnibus test of general verbal language. Four subtests are designed to assess pragmatics: pragmatic judgment, idiomatic language, nonliteral language, and inference	Provides standard scores (M = 100, SD = 15), age equivalents, and percentiles **Scoring dichotomous

Social (pragmatic) communication disorder: a research review of this new DSM-5 diagnostic category

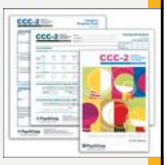


Test name and author	Age range	Norm referenced	Measures/subtests	Categorization/cutoffs
Rating scales				
Children's Communication Checklist (Bishop, 2003) [47]	4:0–16:11	Yes *	70-item questionnaire that measures structural language (speech, syntax, semantics, and coherence) and pragmatic language (initiation, scripted, context, nonverbal communication, social relations, and interests)	The five pragmatic scales can be combined into a pragmatic composite. A pragmatic composite score ≤132 best identified children with pragmatic language impairment
The Pragmatics Profile of Everyday Communication Skills in Children (Dewart and Summers, 1995) [48]	Preschool version: birth to 4:0. School-age version: 5:0–10:0	No	Interview that measures four areas of pragmatics: communicative function, response to communication, interaction and conversation, and contextual variation	Provides descriptive information only used to identify strengths and weaknesses and to develop treatment goals
Language Use Inventory (O'Neill, 2002) [49]	1:6–3:11	Yes *	Fourteen subscales assessing communication with gestures, words, and longer sentences for a variety of functions	Provides percentile ranks for 1-month age bands
Pragmatic Protocol (Prutting and Kirchner, 1987) [46]	5:0 and above	No	Rating scale completed after observing spontaneous and unstructured conversation which measures verbal, nonverbal, and paralinguistic aspects of pragmatic language	Provides descriptive information (appropriate, inappropriate, or no opportunity to observe) for 30 items

Social (pragmatic) communication disorder: a research review of this new DSM-5 diagnostic category

CHILDREN'S COMMUNICATION CHECKLIST 2ND ED. (CCC-2)

- Bishop, 2006
- Measures pragmatic abilities in context of overall language skills
- Provides 70 items into 10 subscales:
  - **Speech** ("leaves off beginning or endings of words")
  - **Syntax** ("leaves out 'is'")
  - **Semantics** ("forgets words he or she knows")
  - **Coherence** ("confuses the sequence of events when trying to tell a story")
  - **Initiation** ("it is difficult to stop him or her from talking")
  - **Scripted Language** ("provides over-precise information in his or her talk")
  - **Context** ("misses the point of jokes and puns")
  - **Nonverbal Communication** ("does not look at the person he or she is talking to")
  - **Social Relations** ("appears anxious in the company of other children")
  - **Interests** ("shows interest in things or activities that most people would find unusual")



CHILDREN'S COMMUNICATION CHECKLIST 2ND ED. (CCC-2)

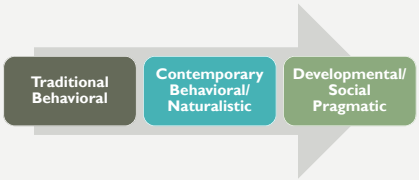
- Yields **two scores**:
  - **General Communication Composite (GCC)**
    - M = 100; SD = 15
  - **Social Interaction Difference Index**
    - Scores between -10 to 10 are obtained by 90% of the normative population
    - Scores ≥ 11 suggest syntactic/semantic impairment
    - Scores ≤ -11 suggest pragmatic language impairment
  - Research score: **Pragmatic Composite**
    - **Six pragmatic language scales (E, F, G, H, I, and J)**
    - M = 60; SD = 18
- CCC-2 is one of few norm-referenced and validated questionnaires to measure pragmatic deficits.
- Found to distinguish children with communication impairments from peers without communication impairments & identify children with disproportionate pragmatic/social difficulties (in relation to structural language impairment) (Norbury, Nash, Baird, & Bishop, 2003)

CCC-2 PROFILE EXAMPLE

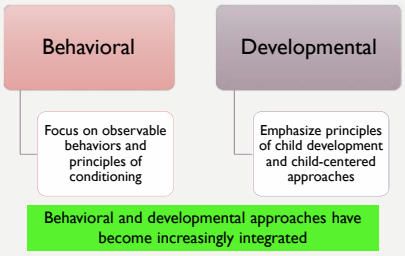
Scale	*Raw Score*	*Scaled Score*	*Composite Score*	*Percentile*	*90% CI*	*95% CI*
A. Speech		8				
B. Syntax		8				
C. Semantics		7				
D. Coherence		4				
E. Initiation		4				
F. Scripted language		7				
G. Context		8				
H. Nonverbal communication		3				
I. Social relations		3				
J. Interests		5				
General Communication Composite — GCC[1]			76			
Social Interaction Difference Index — SIDI[2]		-12				
Consistency Check[3]		1				

INTERVENTION

CONTINUUM OF INTERVENTION APPROACHES



CONTINUUM OF INTERVENTION APPROACHES



Journal of Autism and Developmental Disorders
August 2015, Volume 45, Issue 8, pp 2411-2428

Naturalistic Developmental Behavioral Interventions: Empirically Validated Treatments for Autism Spectrum Disorder

- implemented in natural settings,
- involve shared control between child and therapist,
- utilize natural contingencies,
- and use a variety of behavioral strategies to teach developmentally appropriate and prerequisite skills

NATURALISTIC DEVELOPMENTAL BEHAVIORAL INTERVENTIONS

- Common Features
  - Three Part Contingency (antecedent-response-consequence)
- Manualized Practices
  - Clear procedures carefully described
- Fidelity of Implementation Criteria
- Individualized Treatment Goals
- Ongoing Measurement of Progress
- Child Initiated Teaching Episodes
- Environmental Arrangement
- Natural Reinforcement for Enhancing Motivation
- Use of Prompting and Prompt Fading (scaffolding, cueing)
- Balanced Turns within Object or Social Play Routines
- Modeling
- Adult Imitating of Child's Language, Play, or Body Movements
- Broadening the Attentional Focus of the Child

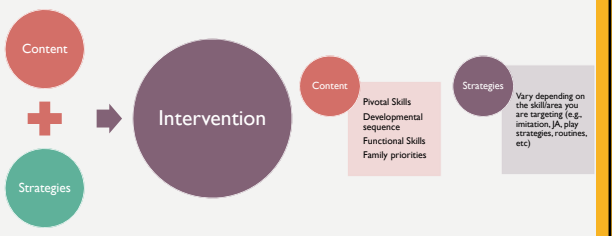
EFFECTIVE PROGRAMMING

- No single educational strategy is best for all children with ASDs
- Many different interventions have led to improved outcomes for children and families
- Intervention can include home-, center-, and community-based services and parent training

Educating Children with Autism

Committee on Educational Interventions for Children with Autism, National Research Council
ISBN: 0-309-51278-6, 324 pages, 6 x 9, (2001)
This PDF is available from the National Academies Press at: http://www.nap.edu/catalog/10017.html

COMPONENTS OF COMMUNICATION INTERVENTION



Crais, 2011

WHAT DO WE MEAN BY PIVOTAL SKILLS?

Skills that will lead a child to develop or use many other skills

Crais, 2011

EXAMPLES OF PIVOTAL SKILLS
(RELATED TO SOCIAL-COMMUNICATION AND LANGUAGE OUTCOMES)

- Attending to people and objects in the environment
- Imitation
- Intentional nonverbal communication
- Shared attention/joint engagement
- Joint attention
- Functional and symbolic play

Crais, 2011

- For young children with ASD, targeting pivotal behaviors promotes better communication and language outcomes
- A variety of programs and strategies promote pivotal skills
- Not all programs focus equally on or have demonstrated efficacy for each pivotal skill
- **Research on content of effective communication interventions is still in its infancy**

CRAIS, 2011

INTERVENTION STRATEGIES MAXIMIZE...

The child's interests	• use preferred objects and activities • start at the child's level
The predictability of events	• create play routines • use visual cues and supports
The child's likelihood of success	• use physical prompts as needed • start at the child's level
The child's motivation to communicate	• create surprising/silly events • place objects out of reach, pause during play routines • Forced choice assessment
The clarity of expectations	• limit language and use consistent vocabulary • provide visual cues

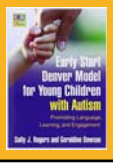
Stone, 2009

"Adults cannot directly teach children all the skills needed for adult life.

Appropriate learning depends on the child himself or herself taking on the responsibility for learning throughout the day by imitating others, engaging others, and exploring the potential of the various environments."

Rogers and Vismara (2008)

GOAL WRITING



SHORT-TERM LEARNING OBJECTIVES

- What is short-term?
  - 12 weeks
- Has to start with assessment
- Each skill to be taught:
  - Measurable learning objective
  - Antecedent event (discriminative stimulus)
  - Behavioral Response
  - Generalized Mastery Level
- Should be developed in conjunction with the parents

BALANCING OBJECTIVES

- Choose a balanced # of objectives across developmental domains
  - Don't emphasize one at expense of others
    - Receptive communication, expressive communication, social skills, daily living
- Why?
  - Counteract the natural tendency to emphasize domain in which child has weaknesses
    - Writing goals only on most affected areas can lead to frustration
    - Progress likely to be slowest and teaching most difficult
  - Don't only focus on strengths
    - Often core deficits of autism (e.g., social reciprocity) are neglected
    - Unbalanced teaching only accentuates uneven pattern of strengths and weakness seen in autism

HOW MANY OBJECTIVES?

- Write 2-3 objectives for each domain
  - Approx 20 total objectives – manageable in 12 weeks
- Having more objectives helps you, the therapist, think of teaching targets within activities
- Be aware when the same underlying skill will logically affect dev't in two domains
  - You can write related objectives for both domains

    Ex. Objective for using 10 different specific verbs (expressive), then write a receptive objective using the same 10 verbs

HOW TO SELECT SKILL CONTENT

- Your assessment guides this:
  - The first items that are inconsistent or failed
- You need to project learning rate over 12 weeks
  - What can the child accomplish given consistent (daily) teaching?
  - Children with ASD who have skills relative to their ages in domains such as language, cognitive and fine motor tend to learn more rapidly
    - So don't pick the first few items they failed, but rather later skills that address those earlier failed skills
- Keep objectives challenging but accomplishable
- When in doubt, be conservative
  - Builds confidence for everyone

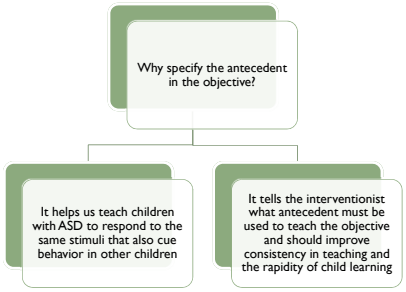
ELEMENTS OF THE OBJECTIVE

- Statement of the Antecedent Stimulus
- Statement of the Behavior to be Demonstrated
- Specification of the Criterion that defines mastery
- Specification of the Criterion that indicates generalization

STATEMENT OF THE ANTECEDENT STIMULUS

Response to someone's behavior	• Approaching an adult who calls your name • Taking a toy when someone hands it to you
Response to environmental cue	• Ex. Transitions in a pre-k classroom– lights, bells, songs
Response to internal cue	• Getting a drink when thirsty, requesting food when hungry, choosing a toy and playing with it in free play
Some behaviors are part of a chain or sequence and are cued by the preceding behavior	• Turning off water when you have finished washing hands

STATEMENT OF THE ANTECEDENT STIMULUS



STATEMENT OF THE ANTECEDENT STIMULUS

How do you choose the antecedent in the objective?

1. Always consider the antecedent in the natural environment
   - Home, preschool, daycare that elicit the behavior in typically developing children of the same age
   - This is always the best one to choose
2. If this doesn't feel appropriate, then think about how adults would typically instruct a child of this age to do this behavior in a natural setting?
   - What language/gestures would they use?
   - IMPORTANT: the child does not have to understand the antecedent in order for you to specify it

EXAMPLES

- When an adult establishes eye contact, waves, and says "bye-bye"
- When another child approaches, extends his or her hand to an object the child is holding, and asks for a turn, to share or to give
- When the child approaches the toilet and stands within 12-18 inches in front of it

- When the target is a ***spontaneous social behavior***, the antecedent can be harder to specify
  - What is the antecedent to a **spontaneous greeting**? Is it seeing a familiar person for the first time that day? Hour?
    - The familiar person is likely also looking at you and smiling
    - When XX first enters tx room and the therapist approaches him with EC and a smile, XX will wave
  - What is the antecedent to a **spontaneous request**?
    - When XX enters the kitchen and approaches a drink container that is prominent but out of reach, he will look at the adult and ask "drink, please"
  - Both situations – environmental stimulus that proceeds behavior

BEWARE

- People often mistakenly treat a setting as an antecedent
- A setting is a situation or environment in which a behavior occurs
  - "in the classroom" or "during 1:1 tx"
- A behavior may occur under more than one stimulus condition
  - Objective could specify several appropriate conditions
  - "XX will establish eye contact and say "help me" to her partner while offering the object in three conditions: when presented with a container she cannot open; when she cannot complete a fastener on her clothing; and when she cannot locate the correct position for a puzzle piece"

STATEMENT OF THE BEHAVIOR TO BE DEMONSTRATED

- Only real evidence of child learning = an observable child behavior
- We cannot observe knowledge of color concepts, but we can observe children matching and sorting by color, naming colors, and selecting colors by name
- We tend to think in abstract terms regarding child development – can feel difficult to translate a concept like 'knowledge of' 'has concept of' 'engages in' into a clear observable behavior

STATEMENT OF THE BEHAVIOR TO BE DEMONSTRATED

- Visualize the child performing the objective- what are they doing? What muscles have moved? What action occurred?
- A single objective may involve more than one behavior
  1. behaviors are combined in a motor sequence
     - Cleaning up involves placing or sorting things into containers and putting the containers away on shelves or drawers
     - Advanced JA involves pointing, combined with EC and gaze shifts from object to person, and often accompanied by vocal
     - "In response to an adult saying, XX look!, while looking at and pointing to the object on the shelf or floor from a distance of up to 10 feet, XX will visually follow the point, look at the object, and then make eye contact with the adult at first opportunity, three times in a 20-min period, in 3 consecutive sessions, and for two or more different adults"

STATEMENT OF THE BEHAVIOR TO BE DEMONSTRATED

Multiple behaviors in one objective involves using the same class of behaviors (like naming, pointing, or imitating, for multiple examplars)

- Verb use is a good example
- "……, XX will use 10 different action words (verbs) appropriately to describe acts of self other, or object during …."
- This is measurable without listing the specific verbs to be used – any 10 verbs would pass this objective

– IF THE SPECIFIC VERB matters (really difficult for child or quite necessary for communication)

  – …., XX will use the following 5 verbs: give, help, up, down, and finished, in two-word utterances during snack routines……

SPECIFICATION OF THE CRITERION THAT DEFINES MASTERY

- Each objective needs to specify criterion for judging successful learning and mastery of the objective
  - Helps focus the teaching on a certain level of achievement
  - Allows one to be VERY clear about whether the child has succeeded or failed and gives feedback about whether they are learning the skill or not
- Setting mastery criteria at an appropriate level of difficulty is based on your knowledge of child's developmental rate
  - They should achieve it with 12 weeks
- A criterion for success may specify:
  - the number of skills learned (naming 8 colors),
  - latency of response (within 2 seconds),
  - a level of independence (without any prompts)
  - temporal duration (10 minutes of independent and appropriate play with no adult prompts)

BEWARE OF PERCENTAGE STATEMENTS

- Common mistake to overuse percentage statements
  - Don't always characterize master of behaviors well
- Percentages work best when the objective involves a number of behaviors over a percentage of time
  - Naming 10 action words in response to adult questions in an hour of interactive play
  - "during a 15-minute dramatic play activity involving vehicles, action figures, and props, XX will use 10 different actions words either in response to partner questions and comments or to narrate his own play, in 80% of play sessions for five consecutive sessions"
  - So..X will need to produce 10 different actions words 4 days out of 5 in a row
- BUT for certain skills like EC, coordinating EC with language, etc. percentage is not a good criterion
  - EC does not happen continuously and so specifying that X will make EC 80% of the time in a 1-hr session does not work
  - Rather EC happens at certain times in interactions: when initiating a new exchange
  - "XX will use EC combined with speech or gesture during at least 3 of 5 requests

OTHER TIPS FOR DEFINING MASTERY

– Need to specify quantity, accuracy, fluency, or latency of performance, AND level of independence

- Should be what is expected for young kids which is NOT always completely independent
- Typically developing toddlers often receive prompts, assistance, repeated reminders
- "with no more than two redirections" "without more than two motor or verbal prompts" "response at first request (no adult repetition)"

SPECIFICATION OF THE CRITERION THAT INDICATES GENERALIZATION

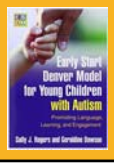
- Performance of the skill in more than one natural environment, performance using several different objects or materials, and/or with multiple people
- For behaviors that don't occur often throughout a day (returning greetings), you might want to see behavior in most opportunities over 3-4 consecutive days
- For complex behaviors that occur often (washing hands) you could get representative sample in 1-2 days

Unless objective is very specific to an environment, object, or person – each 12-week objective should include a statement that behavior will occur in **two or more environments, with two or more materials, and with two or more people**

WRITING FUNCTIONAL OBJECTIVES

- Treatment is HARD WORK!!
- Takes time to teach skills – make sure your time is well spent and children are learning **adaptive skills that will serve them in multiple environments** – antecedent statement should target functional, adaptive use of the behavior
- Expressive language: we don't walk around naming things – we use language to request, begin and end interactions, share our interests, etc.
- How do you check functionality of objective?
  - Imagine a typically developing child of the same sage carrying out the objective – is it something they would typically do? Or be expected to do? Where? With whom? With what materials? In response to what stimuli?

DAILY TEACHING TARGETS



DAILY TEACHING TARGETS

- To map out teaching targets:
  - Combine knowledge of developmental sequences in the various domains with process of task analysis
- Basic task analysis can be done watching someone perform the steps and describe each action
- You need to imagine or anticipate how the skill will develop over the teaching period based on previous experiences and knowledge of development
  - These are DEVELOPMENTAL TASK ANALYSES
    - They incorporate knowledge of typical development

OBJECTIVE EXAMPLE:

DURING SOCIAL GAMES WITH OBJECTS (BUBBLES), XX WILL MAKE JOINT ATTENTION BIDS TO SHARE AFFECT INVOLVING EC WITH HIS PARTNER VIA ALTERNATING GAZE AND SMILING THREE OR MORE TIMES IN A 10-MINUTE PERIOD ACROSS 3 CONSECUTIVE SESSIONS, FOR TWO OR MORE PARTNERS AND OBJECTS

LEARNING STEPS

- Makes EC occasionally to continue interaction
- Makes EC repeatedly and consistently to continue interaction
- Occasionally directs smile with EC to continue interaction
- Consistently directs smile with EC to continue interaction
- Alternates gaze and smile between partner and object 3 or more times during activity
- Alternates gaze and smile with two or more partners, for two or more object games, three or more times during activity

*no specific #, but usually 4-6 – enough steps so progress can be documented from week to week assuming the skills is being taught consistently

WORK FROM THE ENDS TO THE MIDDLE

- **First step** is baseline performance
  - Behavior the child exhibits in relation to the stimulus at the present moment in time
- **Last step** is the fully mastered objective
- **Middle Steps**:
  - Dev't sequence (follow typical dev't)
  - Behavior chains (putting shirt on)
  - Increasing frequency or adding content (naming colors, identifies 10 body parts)
    - Content: Usually based on quantity (name 2 colors, 3 colors, 4 colors – not on specific colors red, then green, then blue)
    - Frequency: one time every 10 minutes, 3 times every 10 minutes
  - Linking existing behaviors to new antecedents
    - Skill is in the child repertoire- but does not consistently occur in the presence of specified antecedent
    - Learning steps will focus on eliciting behavior through prompting in response to desired antecedent and fading prompting
    - Teaching techniques will largely rely on prompting/fading, but the child learning steps should focus on independence

ASHA GOAL EXAMPLES WITH PIVOTAL SKILLS

https://www.asha.org/uploadedFiles/ASHA/Practice_Portal/Clinical_Topics/Autism/Sample%20Intervention%20Goals.pdf

	Prelinguistic Stages	Emerging Language Stages	Advanced Language Stages
Joint Attention	• Orienting toward people in the social environment • Responding to a caregiver's voice • Shifting gaze between people and objects • Pairing communication gestures with gaze and/or physical contact when requesting and protesting as culturally appropriate • Directing another's attention for the purposes of sharing an interesting item or event • Attending to emotional displays of distress or discomfort • Sharing positive affect • Initiating social routines	• Expanding communication functions to seek specific emotional responses from others (e.g., seeking comfort, greeting others, showing off) • Commenting to share enjoyment and interests • Recognizing and describing emotional states of self and others	• Understanding what others are indicating with gaze and gestures • Determining causal factors for emotional states of self and others • Using emotions of others to guide behavior in social interactions (e.g., selecting topics based on another's preferences, praising others, sharing empathy) Considering another's intentions and knowledge (e.g., requesting information from others, sharing information about past and future events)

	Prelinguistic Stages	Emerging Language Stages	Advanced Language Stages
Social Reciprocity	• Responding to the bids of others • Initiating bids for interaction • Increasing frequency of spontaneous bids for communication • Developing persistence in communication attempts	• Increasing frequency of communication across social contexts and interactive partners • Maintaining interactions by taking turns • Providing contingent responses to bids for interaction initiated by others • Recognizing and attempting to repair breakdowns in communication	• Engaging in topic maintenance (e.g., providing expansion comments) • Maintaining conversational exchanges with a balance between comments and requests for information • Providing essential background information • Initiating and maintaining conversations that are sensitive to the social context and the interests of other

	Prelinguistic Stages	Emerging Language Stages	Advanced Language Stages
Language and Related Cognitive Skills	• Using a range of gestures to share intentions (e.g., giving, showing, waving, pointing) • Using effective strategies for protesting, exerting social control, and emotional regulation in order to replace potential problem behaviors used for these functions • Pairing vocalizations with gestures to share intentions • Observing and imitating the functional use of objects • Turning pages and pointing to pictures in books	• Expanding word knowledge and use to include not only object labels, but also action words, modifiers, and relational words • Understanding and using more creative combinations of words • Understanding and using more sophisticated grammar • Engaging in representational play • Understanding sequences of events in stories, attending to beginning and rhyming sounds, and naming alphabet letters • Producing a variety of speech sounds	• Enacting social sequences in a representational manner by incorporating themes or modifications introduced by others (e.g., role -playing and visualizing an event before it takes place) • Understanding and using nonverbal gestures, facial expressions, and gaze to express and follow subtle intentions (e.g., sarcasm and other nonliteral meanings) • Understanding and using intonation cues to express and follow emotional states • Understanding and using more sophisticated syntax to provide background information for one's listener • Understanding and using more sophisticated syntax to show relationships between sentences in conversational discourse • Demonstrating story grammar knowledge, decoding, and letter –sound correspondence and expanding literacy skills (e.g., reading comprehension and written expression) • Problem solving, self - monitoring, goal -directed behavior (i.e., executive functioning

	Prelinguistic Stages	Emerging Language Stages	Advanced Language Stages
Behavioral and Emotional Regulation	• Attending to salient aspects of the social environment • Expanding the use of conventional behaviors to regulate one's emotional state (e.g., covering one's ears to block out noise, carrying a preferred toy into an unfamiliar setting to assist in the transition, removing oneself from a situation when overwhelmed) • Protesting undesired activities	• Requesting a soothing activity when distressed • Requesting a break from a given activity • Requesting assistance from others • Using language to maintain engagement within an activity (e.g., "first … then") • Using language to talk through transitions across activities • Expressing one's emotional state and the emotional state of others	• Preparing and planning for upcoming activities • Perceiving one's actions within social events and predicting social behavior in others in order to self-monitor • Negotiating and collaborating within interactions with peers

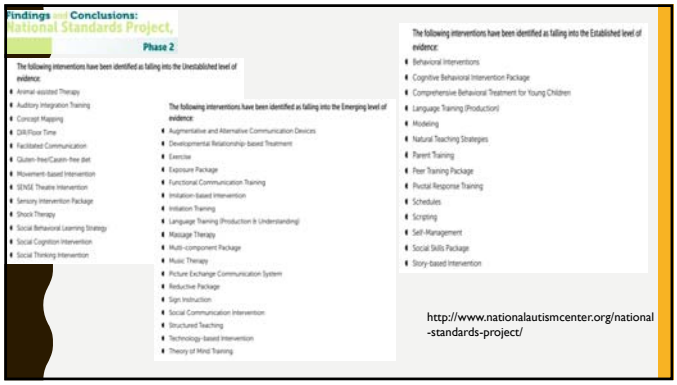
ASD INTERVENTIONS

Comprehensive Treatment Models

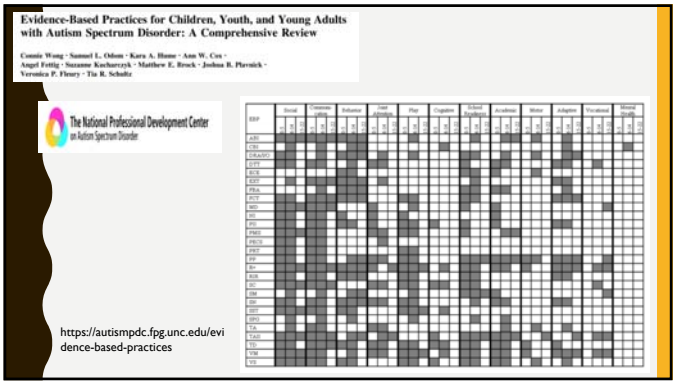
- Consist of a set of practices designed to achieve a broad learning or developmental impact on core deficits of ASD

Focused Intervention Practices

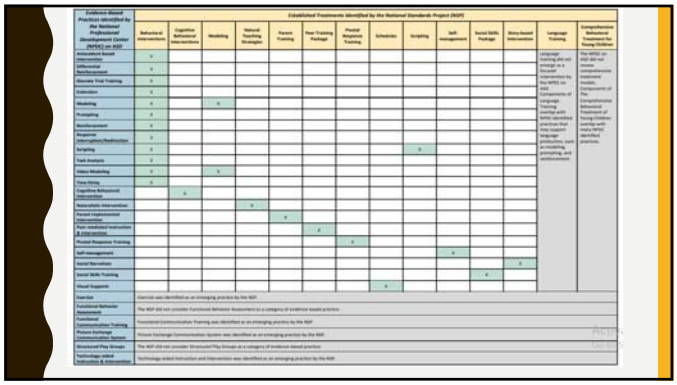
- Designed to address a single skill or goal
- Operationally defined, address specific learner outcomes, and tend to occur over a shorter time period than CTMs
- Can be considered the building blocks of educational programs for ASD, and are highly salient features of CTMs
- e.g., video modeling

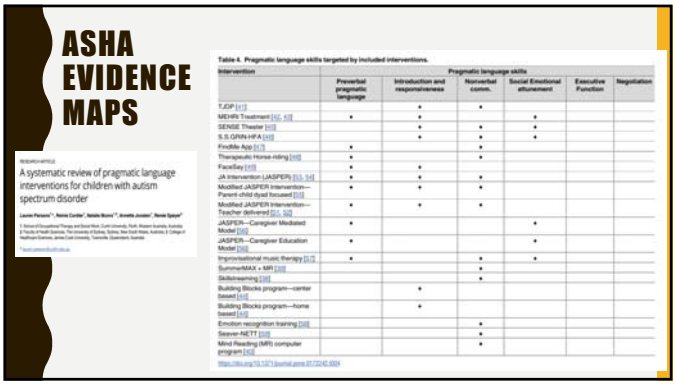


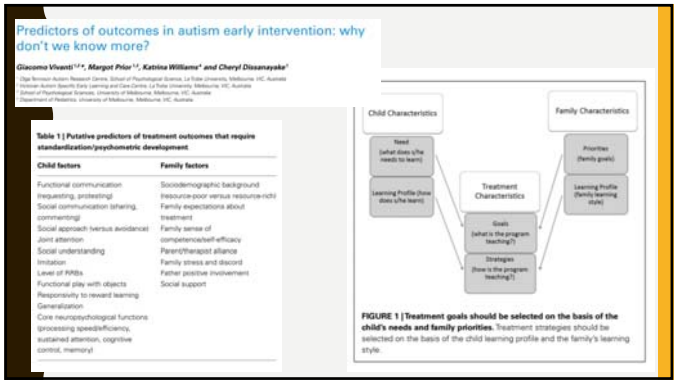
http://www.nationalautismcenter.org/national-standards-project/

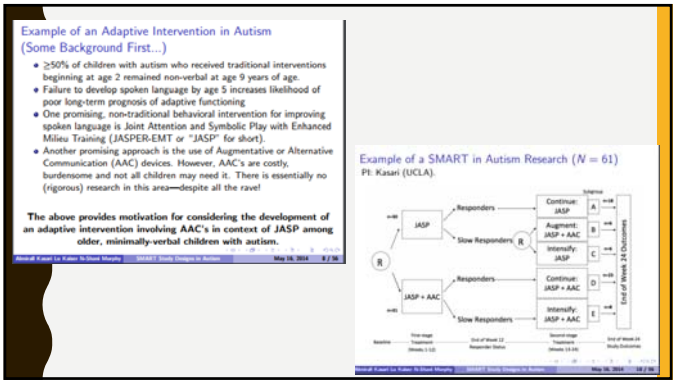


https://autismpdc.fpg.unc.edu/evidence-based-practices









RESOURCES FOR OVERVIEW OF TREATMENTS IN ASD…

- Autism Speaks
  - http://www.autismspeaks.org/what-autism/treatment
- Autism Navigator
  - http://resources.autismnavigator.com/Account/Login?ReturnUrl=%2F

ASHA TAKE ACTION
ISSUE BRIEF

AUTISM SERVICE ALTERNATIVES

ACTION

Provide all appropriate therapies to children with autism spectrum disorder (ASD) and that Congress does not pass legislation that could have the unintended consequence of designating applied behavioral analysis (ABA) therapy as the sole means to treat ASD. ASHA urges members of Congress to use caution when writing ASD legislation to ensure that all therapies, not just ABA therapy, are included for coverage.

WHAT YOU NEED TO KNOW?

There is a growing trend in both education and health care settings to utilize ABA therapists to provide services to children identified with ASD. Although ABA may be an effective therapy, so are others, such as speech-language pathology.

WHAT YOU NEED TO SAY?

- ASHA does not oppose the use of ABA services; however, singling it out in legislation as the only treatment for behavioral health issues for individuals with developmental disabilities—including those with ASD—limits consumer and parental choice.
- According to reports from speech-language pathologists, students with ASD are being denied necessary speech and language services.
- ASHA members believe this trend is due to some school systems' sole reliance on ABA therapists to oversee, recommend, and provide services to students with ASD.
- The exclusive use of ABA interventions for these students violates their right to a free appropriate public education (FAPE) as mandated under the Individuals with Disabilities Education Act (IDEA).
- In Tricare, the Department of Defense's health care program, there are efforts under way that may have the unintended consequence of denying habilitative services to some individuals with developmental disabilities by restricting the choice of treatment—and, hence, provider—to ABA therapy.
- Both the Centers for Medicare & Medicaid Services (CMS) and the U.S. Department of Education have issued guidance on this concern.
  - CMS guidance states, "While much of the current national discussion focuses on one particular treatment modality called Applied Behavioral Analysis (ABA), there are other recognized and emerging treatment modalities for children with ASD."
  - The U.S. Department of Education guidance document recognizes the importance of speech-language pathology services and the necessary role of a speech-language pathologist in both evaluation and