*Language Development and Disorders in AAC:*
*Translating Knowledge into Practice*

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# Session Objectives

- Learn how to apply your knowledge of language development and assessment to the design and fabrication of communication displays
- Name at least two of the variables associated with setting AAC language goals for children with a range of disabilities
- Discuss the impact of a language disorder on the development of aided syntactic and pragmatic goals

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# Key Terms

- Speech-<u>Language</u> Pathologist
- Augmentative and Alternative <u>Communication</u>
- Language vs. Communication
  - Language is a system of gestures, <u>grammar,</u> signs, sounds, symbols, or words, which is used to represent and <u>communicate</u> concepts, ideas, meanings, and thoughts.
  - Communication is the process of exchanging information usually via a common system of symbols.

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## AAC Language Intervention Goals

- Communicative intent
- Semantic or Vocabulary acquisition
- Symbolic development
- Communicative functions
- Pragmatic rules of discourse
- Development of Syntax (grammar)
- Translating language knowledge to comprehending and producing text

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## Essence of Effective AAC Intervention

- Establishing appropriate intervention goals based upon the augmented communicator's age and language abilities
- Selecting and organizing a "vocabulary set" appropriately matched to the user's language abilities and communication goals
- Integrating use of the AAC system (i.e., enabling communication) in functional and meaningful activities

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## Requisites for Facilitating Language Development in AAC

- Understanding the normal language acquisition process
- Implementing the appropriate intervention strategies and tools for augmented communicators

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## The Preintentional Child
### (Birth - 8 months)

- Patterns of Performance
  - Demonstrates little evidence of goal-oriented actions
  - Does not carry-out intentional communication

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## The Intentional Child
### (8-12 months)

- Patterns of Performance
  - Does not yet use words
  - Acts on new objects in rapid succession
  - Can imitate on-going actions
  - Begins to engage in joint attention

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## The Sensorimotor Child
### Stage 5 - (12-18 Months)

- Patterns of Performance
  - Uses communicative gestures with stereotyped vocalizations
  - Requests objects, attention, or object removal
  - Understands words when referents are present
  - Acquired 10-30 words
  - Unable to bring an object or action to mind on the basis of a symbol or label

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## Representational Thought
### Stage 6 - (18-24 months)

- Patterns of Performance
  - Understands words when referents are NOT present
  - Understands action words out of routines
  - Carries out 2-word conversations
  - Begins to understand questions

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## Stages of Syntactic and Morphologic Development

- MLU can serve as a predictor of the complexity of language of the young English-speaking child.
- MLU
  - relates to age,
  - is reliable,
  - is a good predictor of language development (i.e., utterance complexity - up to an MLU of 4.0)
  - may increase by 1.2 morphemes per year from 18 mos – 5 years

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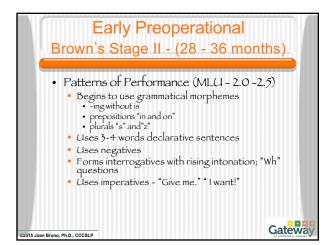Gateway
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## Brown's Stage I - (15-30 months)

- Sentence Length 1.75 morphemes
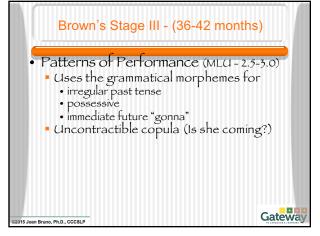- 50-60 word vocabulary
- Operations of Reference
  - Nomination
  - Recurrence
  - Negation - denial, rejection, non-existence
- Semantic Relations
  - Agent+Action;
  - Action +Object;
  - Agent+Object;
  - Action +Locative;
  - Entity + Locative;
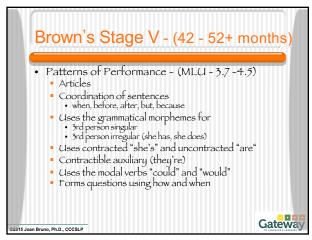  - Posssessor + Possession;
  - Entity+Attributive; Demonstrative+Entity

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## Early Preoperational
### Brown's Stage II - (28 - 36 months)

- Patterns of Performance (MLU - 2.0 -2.5)
  - Begins to use grammatical morphemes
    - -ing without is
    - prepositions "in and on"
    - plurals "s" and"z"
  - Uses 3-4 words declarative sentences
  - Uses negatives
  - Forms interrogatives with rising intonation; "Wh" questions
  - Uses imperatives - "Give me." " I want!"

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### Brown's Stage III - (36-42 months)

- Patterns of Performance (MLU - 2.5-3.0)
  - Uses the grammatical morphemes for
    - irregular past tense
    - possessive
    - immediate future "gonna"
  - Uncontractible copula (Is she coming?)

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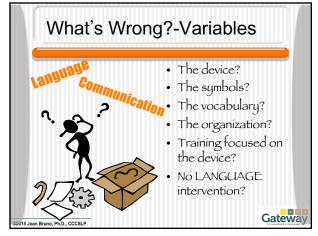
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### Brown's Stage IV - (40-46 months)

- Patterns of Performance (MLU - 3.0-3.7)
  - Articles
  - Regular past tense (-ed)
  - 3rd person regular present tense
  - Uses well-formed negatives
  - Uses tag questions, who, why

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## Brown's Stage V - (42 - 52+ months)

- Patterns of Performance – (MLU – 3.7 -4.5)
  - Articles
  - Coordination of sentences
    - when, before, after, but, because
  - Uses the grammatical morphemes for
    - 3rd person singular
    - 3rd person irregular (she has, she does)
  - Uses contracted "she's" and uncontracted "are"
  - Contractible auxiliary (they're)
  - Uses the modal verbs "could" and "would"
  - Forms questions using how and when

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## …and along comes a child needing AAC

- You panic …
- Mom tells you, "My child needs a device, NOW!"
- You panic …
- …eventually the child has a device …
- You panic …
- You try to teach the child to use the device …
- You panic …
- 3 years later … the child only uses the device in circle …

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## What's Wrong?-Variables

Language
Communication

- The device?
- The symbols?
- The vocabulary?
- The organization?
- Training focused on the device?
- No LANGUAGE intervention?

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## AAC Intervention Strategies
### The Preintentional Child - (Birth - 8 months)

- Skills
  - Demonstrates little evidence of goal-oriented actions
  - Does not carry-out intentional communication

- AAC Strategies
  - Use symbols that are common objects
  - Facilitate child-caregiver interaction
  - Create opportunities for the child to develop social bonds
  - Use gestures when interacting
  - Teach signs/symbols in meaningful repeated routines

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## AAC Intervention Strategies
### The Intentional Child - (8-12 months)

- Skills
  - Does not yet use words
  - Acts on new objects in rapid succession
  - Can imitate on-going actions
  - Begins to engage in joint attention

- AAC Strategies
  - Use signs, objects and spoken words in "play" (i.e., functional and meaningful) routines
  - Focus on communicative interactions
  - Encourage joint attention in activities

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## AAC Intervention Strategies
### The Sensorimotor Child - Stage - 5 (12-18 Months)

- Skills
  - Uses communicative gestures with stereotyped vocalizations
  - Requests objects, attention, or object removal
  - Understands words when referents are present
  - Acquired 10-30 words
  - Unable to bring an object or action to mind on the basis of a symbol or label

- AAC Strategies
  - Facilitate comprehension and use of objects and/or signs
  - Use pictures (e.g., symbols) to enhance comprehension (Aided Language Stimulation)
  - Provide opportunities to express – "Want"; "Lookit!"; "Don't want!"
  - Intervention must focus on referents that are present

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**AAC Intervention Strategies**
Representational Thought - (18-24 months)
Brown's Stage I - (15-30 months)

- Skills
  - Understands words when referents are NOT present
  - Understands action words out of routines
  - Carries out 2-word conversations
  - Begins to understand questions

- AAC Strategies
  - Use pictures or other symbols (e.g., objects; signs, gestures) to enhance comprehension
  - Use pictures/objects to evoke absent objects
  - Teach a symbolic means for referencing objects – symbol, sign, pointing, looking
  - Stimulate the use of actions, requests, responses to ?s, single words in succession
  - Model and stimulate pivot-word utterances (Aided Language Stimulation)
  - Use symbols communicatively throughout the course of daily activities, routines and play.

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**AAC Intervention Strategies**

- Brown's Stage I – (MLU 1.5 – 2.0)
  - Communication displays to include words across grammatical categories enabling expression of:
    - Operations of Reference
      - Nomination
      - Recurrence (more)
      - Negation - denial, rejection, non-existence (no, don't)
    - Semantic Relations
      - Agent + Action;
      - Action + Object;
      - Agent + Object;
      - Action + Locative;
      - Entity + Locative;
      - Possessor + Possession;
      - Entity + Attributive;
      - Demonstrative + Entity
  - Systematically increase size of vocabulary set (50-60 symbols)

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**AAC Intervention Strategies**

- Early Preoperational
  Brown's Stage II – (MLU – 2.0 – 2.5)
  - Communication displays to include:
    - grammatical morphemes (-ing, -s)
    - core word vocabulary
    - question words
    - negatives
  - Use symbols communicatively throughout the course of daily activities, routines and play.
  - Aided Language Stimulation, Modeling

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## AAC Intervention Strategies

- Brown's Stage III – (MLU 2.5-3.0)
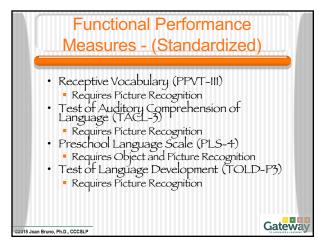  - Communication displays expanded to include:
    - irregular past tense
    - possessives
    - Use of the copula (is, are, etc)
    - question words – who and why
    - negatives
  - Facilitate use of AAC system in multiple environments within a range of activities.
  - Aided Language Stimulation, Modeling

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## AAC Intervention Strategies

- Brown's Stage IV – (MLU 3.0-3.7)
  - Communication displays expanded to include:
    - Articles
    - Regular past tense (-ed)
    - 3rd person regular present tense
    - Questions words – who, why
  - Use AAC system in a range of spoken and written communication activities.

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## AAC Intervention Strategies

- Brown's Stage V – (MLU 3.7– 4.5)
  - Communication displays expanded to include:
    - Third person irregular (does, has, etc.)
    - Contractions (if high tech device is used)
    - Modal verbs – could and would
    - Question words – how and when
  - Use AAC system in a range of spoken and written communication activities.

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## Assessing Language Performance

… a means of guiding selection of appropriate goals and intervention strategies …

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## Assessing Language Performance

- Can use "Formal" or informal measures
- "Formal" testing is not –
- Testing enables …
  - Develop a comparative index of children's strengths and weaknesses
    - If tests are reliable, the examiner can have confidence in the results
    - If tests are valid, the examiner will know what abilities are being evaluated
  - Determine children's competencies => functional performance level(s) in order to establish appropriate intervention goals
  - Design/select an appropriate AAC system
  - Document progress and/or outcomes

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## Functional Performance Measures - (Standardized)

- Receptive Vocabulary (PPVT-III)
  - Requires Picture Recognition
- Test of Auditory Comprehension of Language (TACL-3)
  - Requires Picture Recognition
- Preschool Language Scale (PLS-4)
  - Requires Object and Picture Recognition
- Test of Language Development (TOLD-P3)
  - Requires Picture Recognition

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## Functional Performance Measures (Not Standardized)

- Communication Matrix
  - Design to Learn - Charity Rowland
  - Tangible Symbols
- Test of Aided-Communication Symbol Performance© (TASP)
  - Objective, systematic, measure outcomes
  - Symbol and Field Size
  - Grammatical Encoding
  - Categorization Skills
  - Syntactical Performance

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## PPVT

- "…an individually administered, untimed, norm-referenced, wide-range test … of receptive vocabulary
- Results (raw scores) can be converted to the following age-referenced normative scores: SS, %ile, age equivalents.
- Select from a field of 4 - Use optimal response mode (e.g., pointing, eye-gaze, yes/no)
- Reliable measure for persons w/ CP using yes/no.
- Provide deviation and developmental types of norms
- PPVT-III & WISC are highly correlated - (the Verbal IQ correlation is slightly higher than Performance and Full Scale IQ correlations)

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## TACL

- Designed to test understanding of the structure of spoken language
  - Grammatical Morphemes (i.e., prepositions, noun number, verbs, auxiliary, adjectives, and adverbs)
- Norms 3-0 through 9-11
- Provides age-referenced norms - SS, %ile, age equivalent (language ages)
- Easily adapted for children w/ physical disabilities
- Select from a field of 3 - Use optimal response mode (e.g., pointing, eye-gaze, yes/no)
- No information about whether or not it correlates w/ PPVT or WISC

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## Preschool Language Scale

- Measures children's receptive and expressive language performance
- "Useful tool for severely involved children"
- Expressive test asks children to name objects, use concepts that describe objects and express quantity, use specific prepositions, grammatical markers and sentence structure.
- Norms Birth through 6 years 11 months
  - Total Language, Auditory Comprehension, Expressive Communication, SS, %ile, Language Age Equivalents
- Information from PLS can be used for a portfolio assessment

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## Preschool Language Scale

- Receptive
  - Use optimal response mode (e.g., pointing, eye-gaze, yes/no)
- Expressive
  - Use multi-modal approaches for responses (e.g., speech, gestures)
  - Aided AAC device or language board as alternative (Must be familiar with vocabulary contents and organization)

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## PLS- (Required vocabulary - 29 Months)



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## TOLD - P
## Grammatical Completion

- Designed to assess children's ability to recognize, understand and use common English morphological forms.
- Measures the ability to complete a partially formed sentence by supplying a final word that has a proper morphological form.
- Norms 4-0 through 8-11
- The following age-referenced norms - SS, %ile, age equivalent (language ages)
- Tests that share the same type of quotients as the TOLD-P3 include Kaufman Assessment Battery, WISC

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## TOLP-P

- Receptive
  - Picture Vocabulary
  - Grammatic Understanding
  - Word Discrimination
- Expressive
  - Oral Vocabulary
  - Sentence Imitation
  - Grammatic Completion

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## Communication Matrix

- An assessment tool designed to pinpoint exactly how an individual is communicating (Dr. Charity Rowland, 1990; www.designtolearn.com)
- Provides a framework for determining logical communication goals.
- Use to document the expressive communication skills of children who have severe or multiple disabilities, including children with sensory, motor and cognitive impairments.
- Optimal resource for assessing children who can benefit from use of "Tangible Symbols"

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## What Are Tangible Symbols?

- The symbols are concrete and permanent. They exist in a permanent display and don't have to be recalled from memory.

- They may be manipulated by both the user and the communication partner.

- The relationship between symbol and referent is obvious (iconic) to the individual user, since it is based on the user's own experience.

- Three-dimensional symbols are useful for people without sight, since they are tactually discriminable.

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## Who Needs Tangible Symbols?

- Individuals who lack the skills to communicate clearly using other abstract symbol systems such as sign language, photos or picture symbols.

- Individuals of all ages with severe cognitive limitations who have the following disabilities:
  - severe mental retardation
  - developmental disabilities
  - autism or pervasive developmental disorders
  - severe vision impairment
  - severe orthopedic impairment
  - deaf-blindness

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Test of
Aided-Communication
Symbol
Performance

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**Test of Aided-Communication Symbol Performance**

· A tool for assessing the range of symbolic skills needed to:

- Design a communication board;
- Select an appropriate device page set and
- Establish appropriate AAC intervention goals for symbolic and syntactic development

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**Test of Aided-Communication Symbol Performance**

• Subtests
- Symbol Size and Number
  • Selecting grid and symbol size
- Grammatical Encoding
  • Vocabulary Representation – nouns, verbs, etc
- Categorization Abilities
  • Basic and Category Exemplar
- Syntactical Performance
  • Ability to generate multi-word messages beyond "I want …"

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### Symbol Size and Number

- How many symbols can be on a page or board?
- What size should the symbols be?
  - Smaller symbols => more symbols
- Does the individual demonstrate memory for location?
- Nouns are used for all stimulus items

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### Symbol Size and Number



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### Symbol Size and Number



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**Grammatical Encoding**

- Grammatical class rather than "Symbol Set" (e.g., PCS, Minspeak®) influences symbol recognition and identification performance.
- Nouns Symbols (i.e., people, objects)
  - Easier to identify than adjectives, verbs, etc
  - Most commonly used on early boards
- Symbols of other grammatical classes (i.e., verbs, adverbs)
  - Often require teaching
  - Not always included on young children's early communication displays
- An individual's ability to recognize symbols needs systematic evaluation & teaching

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**Grammatical Encoding**

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**TASP** — Test of Aided-Communication Symbol Performance

Syntactic Performance

- Assesses client's ability to form:
  - S-V; S-V-O, S-V-Prep/Adj-O; present progressive, article use (i.e., syntactical performance up to 2.6 year level)
- Test boards range in symbol complexity
- Tasks
  - Imitation
  - Response to Questions
  - Picture Description

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Syntactic Performance

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Syntactic Performance

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**Test Outcomes**

- Guides AAC intervention goals and strategies
  - Utilization of signs, gestures, tangible symbols
  - Language Board development; Page set selection
    - Topic vs Grammatical - core word vs phrases and messages
    - Number of symbols; Symbol size
    - Grammatical categories of symbols used
- Defines abilities
  - Grammatical encoding abilities
  - Categorical skills - basic or category exemplar
  - Syntactical - core word vs phrases and messages
- Directs intervention goals
  - Symbol teaching - recognition, identification, symbolic level
  - Expressive language
  - Categorization

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**Communication (Language) Boards and/or AAC Device:**
**Considerations and Ingredients**

* Content:
* Organization
* Representation          Vocabulary
* Encoding

* Syntactic Considerations
* Pragmatic Considerations

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## Vocabulary Selection and Organization Considerations

- User's Abilities – (M.A. - C.A. Gap)
  - Receptive/expressive language
  - Symbol recognition & identification
  - Sequencing skills
  - Categorization skills
  - Association performance
  - Pragmatic abilities

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## Vocabulary Selection

- Communication Environments
  - Play activity
  - School activity
  - Home
- Needs
- Interests
- Goals
  - Syntax
  - Pragmatics

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## Vocabulary Selection

- Select from each of the following domains
  - Core vs. Fringe vocabulary
    - eat, drink vs. pilgrim, Thanksgiving
  - Content vs. Function words
    - play vs. with
  - Concrete vs. Abstract symbols
    - sleep vs. want

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## Vocabulary Organization

- Topical
  - Goal
  - Organization
    - Random
    - Alphabetical order
    - Use in a dialogue
    - Sequence of events
    - Categories
  - Message selection
  - Integration into functional activities

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## Vocabulary Organization

- Conversational
  - Create novel messages
  - Single word ⟺ complex messages
  - Syntactical development considerations
    - Organization
    - Fitzgerald Key
    - Word Categories
    - Frequency of Occurrence
  - Efficiency

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## Vocabulary Organization

- Fitzgerald Key
  - Approach to teach language to the deaf
  - Format mirrors simple declarative sentence
  - Color-coding utilized

- Who -Verb- Little words -Words that tell -What -Where -When

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## Basic Goal of
## Language Intervention

- "… to facilitate communication functioning and to minimize the existing or potential social, behavioral, and academic penalties associated with children's language deficits.
- (Fey et al., 1995)

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## Basic Goals Underlying AAC
## Intervention

- Communication
- Participation within the classroom
- Functional use of preprogrammed messages, scripts
- Pragmatic competence

Language
- Achieving core competencies
- Words and word-morphology features enable self-generated messages
  - Grammatical competence
- Pragmatic competence

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## AAC Intervention Strategies
## 5 Principles of Grammatic Intervention
## for Children with AAC

- Principle 1:
  - The basic goal of all grammar interventions should be to help children improve in the use of grammar so they become better communicators in conversation, narration, exposition, and other textual genres in written and oral modalities.
- Principle 2:
  - The specific goals of grammatical intervention should be based on the child's "functional readiness" and need for the targeted forms.

(Fey et al., 2008)

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**AAC Intervention Strategies**
5 Principles of Grammatic Intervention

- Principle 3:
  - The social, physical, and linguistic contexts of intervention should be manipulated to provide frequent opportunities for both adult models of and child (mis-) use of specific grammatical targets.
- Principle 4:
  - Immature child utterances should be systematically contrasted with more grammatically complete adult forms, using sentence recasts.

(Fey et al., 2008)

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**AAC Intervention Strategies**
5 Principles of Grammatic Intervention

- Principle 5:
  - Telegraphic models should be avoided and replaced by grammatical models in well-formed phrases and sentences.

(Fey et al., 2008)

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**Why Are These Intervention Principles Important?**

- Many users of AAC systems do not demonstrate "mature" syntactical performance
- Language and Literacy are related
- Academic "success" is predicated upon language and literacy performance
- We must determine for whom, and when, syntactical competency should be an intervention goal?
- Inappropriate goals can lead to negative outcomes

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## AAC Intervention Issues

- Considerations affecting language development in AAC
  - Acquisition of aided language may both differ and share qualities with typical language development
    - Linguistic
    - Communicative
    - Cognitive processes
  - "Planned" vs. "Natural" course (i.e.,environment dependent)
    - Possible constraints on intervention – thereby acquisition – caused by prejudices and inappropriate understanding of development

(von Tetzchner, 1999)

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## "Variables Associated with *the* Planned Course"

- Adults decide when they provide the child access to his/her communication system.
- Opportunities for communication may be reduced,
- Adults who design their systems select the child's lexicon,
- Communication displays may or may not include words across all grammatical classes and they also may or may not include grammatical morphemes.
- Children dependent upon graphic symbols as their mode of communication have few, if any, models for learning to develop language through use of an aided language system.

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## Aided Language Input

- Communication partner uses AAC to provide language input
  - Provides a model for AAC system use
  - Illustrates the use and power of the system
  - Demonstrates that AAC is a functional and powerful means of communication
- Strategies for building comprehension and expression within the aided modality
  - Augmented Communication Input (Romski, 2002)
  - Aided Language Stimulation (Goossens',Crain and Elder,1992)
  - Modeling (Bruno, 1986)

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## ALS w/ a Language Board



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## ALS w/ a Dynamic Display Device



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## Issues Effecting Acquisition of Language for AAC Users

- Developmental Patterns Noted in Use of Graphic Symbols
  - Effect of age on the use of word order
  - Use of standard English word order increases w/ age
  - Youngest children
    - Single sign utterances
    - Attempted to encode action information verb-label
  - Older children
    - Produced more multi-unit sequences
    - Transitioned onto standard English word order

Gloria Soto, 1999

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## Issues Effecting Acquisition of Language for AAC Users

- Language Development
  - Normal
    - Development follows a predictable course
  - Delayed
    - Develops skills according to this predicable course, but at a slower rate
  - Disordered
    - An impairment in comprehension and/or use of spoken, written and/or other symbol system that may involve the form, content and/or function in any combination

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## Issues Effecting Acquisition of Language

- Language Disorder
  - Deviant development
  - Cause: dysfunction of brain centers for language and cognition
  - Language Etiologies
    - Specific Language Impairment +
    - Cognitive Impairment (e.g., Down's)
    - Autism
    - Acquired Brain Injury

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## Language Etiologies

- Specific Language Impairment
  - Hearing w/in normal limits
  - No organic abnormalities
  - Cognition w/in normal limits
  - Impairments specific to language
    - Excessive use of single word utterances
    - Greater omissions of verb inflections e.g., past tense (-ed), present tense (-s)
    - Less complex verb phrases
  - Children w/ CP, Apraxia w/out cognitive deficit

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## Language Etiologies

- Cognitively Impaired
  - Language difficulties greater than matched typical children
    - Shorter, less complex sentences
    - Restricted word meanings
    - Slow vocabulary growth
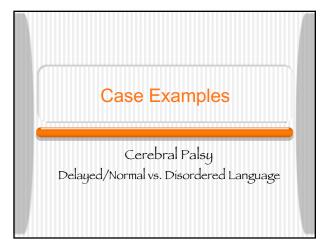  - Severity of cognitive impairment affects goals, strategies and outcomes
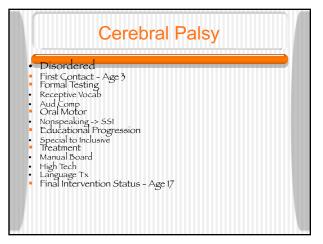
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## Language Etiologies

- Autism
  - A spectrum disorder - mild to profound
  - Pragmatic language impairment
  - Shorter less complex sentences
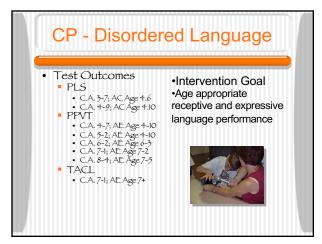  - Restricted word meanings
  - Slow vocabulary growth

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## AAC Intervention- Goal Setting

1. Can the selected intervention approach positively impact of the development of syntactic skills?
2. Can the selected intervention approach positively impact of the development of pragmatic skills?
3. Is progress related to cognition, the intervention approach, the AAC system, and/or diagnosis?

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## Case Examples

Cerebral Palsy
Delayed/Normal vs. Disordered Language

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## Cerebral Palsy

- Disordered
  - First Contact - Age 3
  - Formal Testing
  - Receptive Vocab
  - Aud Comp
  - Oral Motor
  - Nonspeaking -> SSI
  - Educational Progression
  - Special to Inclusive
  - Treatment
  - Manual Board
  - High Tech
  - Language Tx
  - Final Intervention Status - Age 17

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## CP - Disordered Language

- Test Outcomes
  - PLS
    - C.A. 3-7; AC Age 4.6
    - C.A. 4-9; AC Age 4.10
  - PPVT
    - C.A. 4-7; AE Age 4-10
    - C.A. 5-2; AE Age 4-10
    - C.A. 6-2; AE Age 6-3
    - C.A. 7-1; AE Age 7-2
    - C.A. 8-4; AE Age 7-5
  - TACL
    - C.A. 7-1; AE Age 7+

•Intervention Goal
•Age appropriate receptive and expressive language performance



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## CP - Disordered Language

•AAC Intervention
•C.A. 3-7; Manual Board (MB) -Syntactical Development S-V-O, prep
•C.A. 4-7; MB;LightTalker in Tx - Syntactical Development S-V-O, prep
•C.A. 5-2; LightTalker in Tx - Syntactical Development S- is V+ing -O
•C.A. 6-2; Liberator - Syntactical Development S- is V+ing -O; icon seq
•C.A. 7-1; Liberator - Syntactical Development S- is V+ing -O; icon seq
•C.A. 8-4; Speaking Dynamically - S- is V+ing; Prep, articles;past tense
•C.A. 10; Speaking Dynamically +Co:Writer; MB; S- is V+ing; Prep, articles;past tense
•C.A. 12; Co:Writer - Alphabet Board; S- is V+ing; Prep, articles;past tense; spelling, phonics
•C.A. 15; DynaMyte w/ word prediction (zoom keys); spelling, phonics
•Oral-Motor Status
•C.A. 4-7 - 9 (approx) No Speech
•C.A. 10 -> SSI

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## CP - Disordered Language

- Final Intervention Status - C.A. 17-6;
  - PIAT -
    - Reading Comprehension Grade 3.3
    - Mathematics Grade 6.6
    - Spelling 3.4
  - PPVT
    - A.E. - 12-6; SS - 88
  - Binet Memory for Objects
    - A.E. - 12-5

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## CP - Disordered Language

- Expressive Language Performance
  - Speech primary mode of communication w/ familiar listeners
  - Slow gains in syntactical development
    - Unaided output matches aided output - tensing errors; irregular verb errors
  - DynaMyte as back up to speech w/ unfamiliar listeners
    - Spelling w/picture/ word prediction
  - Co:Writer for written communication
    - Prediction aids grammatical performance
- Barriers to Goal Achievement - Adult Syntax
  - Memory for sequences, and device contents and location was poor throughout intervention
  - Disliked use of AAC device
  - Passive communicator
  - Slow gains in syntactical development => Language Disorder

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## Cerebral Palsy

- Delayed (Bilingual)
  - First Contact - Age 3
  - Formal Testing
    - Receptive Vocab
    - Aud Comp
  - Oral Motor
    - Nonspeaking
  - Educational Progression
    - Special to Inclusive
  - Treatment
    - Manual Board
    - High Tech
    - Language Tx
  - Final Intervention Status - Age 13

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## CP - Normal Language Skills

- Test Outcomes
  - PLS
    - C.A. 3-2; AC Age 2.2
    - C.A. 4-3; AC Age 3.10
  - PPVT
    - C.A. 4-3; AE Age 4-0
    - C.A. 5-2; AE Age 4-10
    - C.A. 6-3; AE Age 6-3
    - C.A. 7-3; AE Age 8-2
    - C.A. 8-2; AE Age 9-11
  - TACL
    - C.A. 7-3; AE Age 7+

- Intervention Goal
- Age appropriate receptive and expressive language performance

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## CP - Normal Language Skills

- AAC Intervention
  - C.A. 3; Manual Board (MB) -Syntactical Development S-V-O, prep
  - C.A. 4; DigiVox + MB - Syntactical Development S- is V+ing -O, prep
  - C.A. 5; DigiVox + MB - Syntactical Development- past, irregulars, coordination of sentences
  - C.A. 6; DynaVox2C - past, irregulars, coordination of sentences C.A. 7; DynaVox2C - Increase MLU
  - C.A. 8; DynaVox2C - Increase MLU; improve conversational skills
  - C.A. 10; DynaVox 3100 + Co:Writer; spelling, phonics, pragmatics
  - C.A. 12; DynaVox 3100 + Co:Writer + alphabet board;
- Oral-Motor Status
  - C.A. 3 - 10+ ; intermittent words, understood by familiar listener
  - C.A. 11 -> SSI, very limited speech, understood by familiar listener

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## CP - Normal Language Skills

- Final Intervention Status – C.A. 12-1;
  - PIAT –
    - Reading Comprehension Grade 8.4
    - Mathematics Grade 7.6
    - Spelling 8.2
  - PPVT
    - A.E. - 11-7; SS - 97
  - Binet Memory for Objects
    - A.E. - 12-5
  - Kaufman Word Order
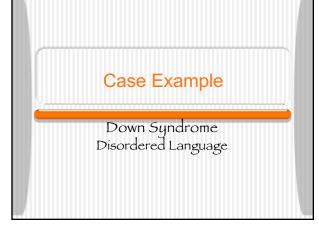    - > 12-6
  - Kaufman Spatial Memory
    - 10-3

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## CP - Normal Language Skills

- Expressive Language Performance
  - Speech + alphabet board primary modes of communication w/ familiar listeners
  - DynaVox or alphabet board - modes of communication used w/ unfamiliar listeners
  - Consistent gains in syntactical development
  - DynaVox + Co:Writer for written communication
  - Above grade level academic performance; Honor student
  - Understands English, Russian, Hebrew, Spanish
- Goal Achievement - Age Appropriate Syntax
  - Achieved between 7 - 8 years of age => Delayed Language

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## Case Example

Down Syndrome
Disordered Language

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## Down Syndrome

- Broad IQ range –
  - Near normal -> severe
  - Average 45-55 range
- Language is more impaired than cognitive functions (Tager-Flusberg, 1999)
- Pragmatics is area of strength (Coggins, Carpenter & Owens, 1983)

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## Pragmatic Functioning in Down Syndrome

- Children w/ Downs expressed the same range of "communicative intents" as matched normally developing children (Coggins, Carpenter & Owens, 1983)
  - Made relatively fewer requests than normal peers
  - Comments, protests, and answers were relatively equal
- Communication focused more on social interaction than to regulate the environment
- Ability to maintain a topic over an increasing # of turns was higher than matched peers
  - (Bloom, Rocissano, & Hood, 1976; Brown, 1980, Beeghly, Weiss-Perry, & Cicchetti, 1990).

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## Clinical Implications

- Communication focused more on social interaction than to regulate the environment
- Ability to maintain a topic over an increasing # of turns was higher than matched peers
  - Core Word vs Pre-programmed messages
  - Expectations re: Initiation of Communication
  - Need for vocabulary to match needs, wants
  - May be beneficial for device to contain messages enabling conversational terns

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## Lexical Development in Down Syndrome

- The early words of children with Down syndrome are similar to those of normally developing children in that they label objects at a basic level (i.e., car, dog) rather than the subordinate (i.e., BMW, terrier) or superordinate (I.e., vehicle, animal)
- Older children w/ Down's often continued to name pictures at the basic level
- Children w/ Down syndrome demonstrate good categorization skills at the "basic level" (Tager-Flusberg, 1999)

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## Clinical Implications

- Ability to label objects at a basic level (i.e., car, dog)
- Good categorization skills at the "basic level"
  - Core Vocabulary should be at the basic level
  - Need to utilize a device with a simple categorization organization strategy (i.e. household, sports, vs Things, Sensory)

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## Syntactic and Morphological Development in Down Syndrome

- Down children w/ IQ below 50 may not combine words until they are 5 or 6 (i.e., 2.5 -3 M.A.)
- These children may never move beyond early stages of grammatical development
- Relative to the size of their vocabulary, they use shorter and simpler sentences (i.e., generally don't go beyond an MLU of 3)
- Development does continue beyond adolescence

(Tager-Flusberg, 1999)

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## Clinical Implications

- May never move beyond early stages of grammatical development
- Generally don't go beyond an MLU of 3
  - Use core words for clarification and repair
  - Accept and Expect telegraphic messages

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## Patterns of Language in Down Syndrome

- Problems in language development and use cannot be explained by intellectual impairment alone
  - Tend to be more passive and show less initiation in interactions
  - Instances of deviant auditory processing
  - Strength in visual processing
  - Often demonstrate good pragmatic skills

(Karisa Launonen, 1996)

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## Clinical Implications

- Often demonstrate good pragmatic skills
  - Pragmatic development is a key component of AAC intervention for students w/ Down syndrome.

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## Syntactic and Morphological Development in Down Syndrome

- Language is disordered not delayed Demonstrate difficulties in passivization
  - Reduced comprehension of reflexive pronouns
  - These difficulties do not necessarily stem from low levels of intellectual development (i.e. not found in WS subjects)
  - Linguistic development lags behind cognitive development
  - Morphosyntax lags behind lexical knowledge and pragmatics

(Perovic, 2002; Ring & Clahsen, 2003)

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## Clinical Implications

- Language is disordered not delayed Demonstrate difficulties in passivization
  - AAC device selection and intervention goals MUST respect deviations and limitations imposed by a language disorder
  - The fact that a device can perform many high level linguistic and/or syntactic operations does not mean that owning such a device will enable your student to perform those level linguistic and/or syntactic operations

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## Case Example - Down Syndrome

- Functional Description
  - PLS
    - C.A. 5-1; AC Age 2.2
  - PPVT
    - C.A. 5-1; AE Age 2-10
  - Yes/No – emerging
  - Scan a field of 30 – 1/2"*1/2" symbols
  - Good memory for location but disorganized scanning
  - Uses gross gestures
  - 1-2 word messages on manual board
  - Severe oral apraxia

•Intervention Goals
•Use manual board for syntax training and to enable expression of needs and wants
•Use of voice-output device for participation in class and to gain attention in a socially appropriate manner

Replace Photo of Arielle

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## Case Example - Down Syndrome

- AAC Intervention - School/Family Goals
- C.A. 5*
- Manual Board -Syntactical Development S-V; V-O; S-O;ans. ?;
- DigiVox - social interaction and class participation
- C.A. 7 - Spontaneous - Gestures/Signs; Single words
- DynaMo - Syntactical Development S-V-O; ans. ?;
- C.A. 8; Spontaneous - Gestures/Signs; Single words
- DynaMo - Syntactical Development S-V-O; ans. ?;
- C.A. 9; Spontaneous - Gestures/Signs; Single words
- DynaMyte - Syntactical Development S- is V+ing -O; prep phrases
- C.A. 10 - Spontaneous - Gestures/Signs; Single words + some 2 word
- DynaMyte - Syntactical Development S- is V+ing -O; prep phrases, articles
- C.A. 11; - Spontaneous - Gestures/Signs; Single words + some 2-word
- DynaMyte Syntactical Development S- is V+ing -O; prep phrases, articles
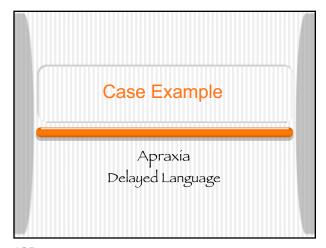
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## Case Example - Down Syndrome

- Final Intervention Status – C.A. 11-6;
  - PPVT
    - A.E. – 3-11 SS – 40
  - TACL
    - A.E. < 3
  - Kaufman Word Order
    - A.E. – < 3
  - Kaufman Word Order
    - A.E. – < 4

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## Case Example - Down Syndrome

- Expressive Language Performance
  - Gestures are the primary mode of communication w/ familiar listeners
  - Minimal gains in syntactical development
    - Spontaneous unaided output > aided output
    - Structured aided output > aided spontaneous output
    - Spontaneous aided output < unaided output
  - Functional yes/no
  - Uses some vocalizations w/ communicative intent
  - Skills reflect -> Language Disorder
- Barriers to School/Family Goal - Age Appropriate Syntax
  - Cognitive deficit
  - Language Disorder
    - Device goals appear to be out of sync w/ developmental abilities and translate to a "rote" skill than functional ability

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## Case Example

Apraxia
Delayed Language

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## Case Example - Apraxia

- Test Outcomes
  - PLS – C.A. 3-4; AC Age 2.10
  - PPVT – C.A. 5-6; AE Age 7-10
  - TACL – C.A. 5-6; AE Age 5-3
  - Kaufman WO – C.A. 5-6; A.E. 4-0
  - Kaufman SM – C.A. 5-6; A.E. 4-3
- Functional Performance
  - Field Size / Number
    - Age 3 - 15 symbols
    - Age 5.6 - 32
    - Age 6.3 - 10 * 30 ; Fitz Key w/ subsets
  - Memory
    - Excellent short-term for imitative tasks
    - Difficulty w/ long-term
  - ?? Learning Disability??
    - Difficulty learning colors, numbers, letters, symbols or concepts…
    - Comfort w/ and prefers routines

•Intervention Goal
•Age appropriate receptive and expressive language performance

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## Case Example - Apraxia

- AAC Intervention
  - C.A. 3;
    - Manual Board (MB) +Tech Speak - Syntactical Development S-V-O, Participation w/ TechSpeak;
  - C.A. 4;
    - E-Talk - I want + object; (Patterned responses) ; Set of topic pages; not language based; school participation
  - C.A. 5 = >
    - Manual Board - Syntactical Development - S- is V+ing -O, prep; oral-motor intervention
- Oral-Motor Status
  - C.A. 3 - 5;
    - Speech attempts understood by familiar listener, messages 1 – 2 word utterances
  - C.A. 6
    - Speech increasing, uses to complement aided messages; messages beginning to include articles, prepositions, morphemes

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## Case Example - Apraxia

- Expressive Language Performance
  - Has a manual board w/ >150 symbols segmented into logical groups w/ < 30 symbols per grouping
  - Uses speech as primary mode supported w/ her board as a back up
  - Aided performance - Telegraphic, however,
  - Uses speech to add function words and prepositions, yielding well-formed sentences
  - Unable to speak when she points and vice versa
  - Emergence of speech shows gains in syntactical development
- Goal Achievement - Age Appropriate Syntax
  - Present performance => Delayed Language

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## Case Study - Autism Case #1

- Functional Performance
  - Highly Self-directed
  - Minimal motivators outside of foods
  - Unsuccessful w/ signs or PECS
- Evaluation Outcomes
  - Symbol Recognition - Real objects of desired foods, unable to recognize photos or abstract symbols
  - Symbol Identification - No identification skills
  - Categorization skills - none
  - Memory - Memory for location is excellent

•Intervention Goal
•Utilize a formalized Tangible Symbol System to request needs and wants

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## Case Study - Autism Case #1

- **AAC Intervention Strategies**
  **The Preintentional Child - (Birth - 8 months)**

- AAC Strategies
  - Use symbols that are common objects
  - Facilitate child-caregiver interaction
  - Create opportunities for the child to develop social bonds
  - Use gestures when interacting
  - Teach signs/symbols in meaningful repeated routines

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Gateway
TO LANGUAGE & LEARNING

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## Case Study -
## Autism Case #1

- **AAC Intervention Strategies**

**The Intentional Child - (8-12 months)**

- AAC Strategies
- Use signs, objects and spoken words in "play" (i.e., functional and meaningful) routines
- Focus on communicative interactions
- Encourage joint attention in activities

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Gateway

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## Case Example -
## Autism Case #2

- Functional Performance
  - Self-directed
  - Minimal motivators outside of foods
  - Leads adult to desired object to gain assistance
- Test Outcomes/Functional Performance
  - Symbol Identification – emerging
  - Field Size /Number – 3 to 12
  - Categorization – Unable
  - Memory – For location is excellent

- Intervention Goal
- Utilize a Picture Exchange System (PECS)

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## Case Example -
## Autism Case #2

**AAC Intervention Strategies**

**Sensorimotor Child - Stage - 5 (12-18 Months)**

- AAC Strategies
- Facilitate comprehension and use of objects and/or signs
- Teach use of pictures (e.g., symbols) to enhance comprehension (Aided Language Stimulation)
- Provide opportunities to express – "Want"; "Lookit!"; "Don't want!"
- Intervention must focus on referents that are present

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## Case Example - Autism Case #2

**AAC Intervention Strategies**

Representational Thought - (18-24 months)

Brown's Stage I - (15-30 months)

- AAC Strategies
- Use pictures or other symbols (e.g., objects; signs, gestures) to enhance comprehension
- Use pictures/objects to evoke absent objects
- Teach a symbolic means for referencing objects - symbol, sign, pointing, looking
- Stimulate the use of requests, responses to ?s, single words in succession
- Use symbols communicatively throughout the course of daily activities, routines and play.

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## Case Example - Autism #3

- Functional Performance
  - Not dependent upon motivators for participation
  - Successful w/ PECS
- Test Outcomes
  - Field Size /Number-field of 32 – 128
  - Symbol Identification - N, V, Adj/Adv, Prep, Locative
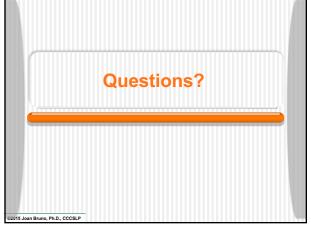  - Categorization  - Basic & Grammatical
  - Memory
  - Syntactic Needs and Performance - Uses "I want" in rote pattern
  - Understands action words out of routines

- Intervention Goal
- Utilize an AAC device beyond "I want ...."

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## Case Example - Autism Case #3

- Functional Performance
  - Not dependent upon motivators for participation
  - Successful w/ PECS
- Test Outcomes
  - Field Size /Number-field of 32 – 128
  - Symbol Identification - N, V, Adj/Adv, Prep, Locative
  - Categorization  - Basic & Grammatical
  - Memory
  - Syntactic Needs and Performance - Uses "I want" in rote pattern
  - Understands action words out of routines

- AAC Strategies
- Use pictures/objects to evoke absent objects
- Stimulate the use of action words within requests, responses to ?s, etc
- Encourage use of single words in succession
- Model and stimulate pivot-word utterances (Aided Language Stimulation)
- Use symbols communicatively throughout the course of daily activities, routines and play.

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## Closing Comments

- Aided AAC performance is a translation of spoken language whereby users of AAC recode language reflecting their language abilities
  - Language Delayed
    - Develop skills in the predictable order, but at a slower rate
  - Language Disordered
    - Demonstrate deviant development of language form, content and/or use
- Aided output is further impacted by
  - Factors related to a "Planned vs. "Natural" course
  - Cognition,
  - Age
  - Diagnosis, Neurological status

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## Questions?

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## Closing Comments

- Belief
- AAC intervention goals must be supported by our knowledge of normal language acquisition and patterns of language performance within various language etiologies.
- It is unlikely that AAC users can exceed the language milestones achieved by their speaking peers who demonstrate language disorders.

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