

*Language Development and Disorders in AAC:  
Translating Knowledge into Practice  
Part 2*

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Communication Technology Resources  
www.CTR-NJ.com

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**Session Objectives**

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- Help you to apply your knowledge of language development and disorders to goal setting in AAC intervention
- Develop an awareness of some of the variables associated with setting AAC language goals for children with a range of disabilities.

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**Key Terms**

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

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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

<b>Communication</b>	<b>Language</b>
<ul style="list-style-type: none"><li>Participation within the classroom</li><li>Functional use of preprogrammed messages, scripts</li><li>Pragmatic competence</li></ul>	<ul style="list-style-type: none"><li>Achieving core competencies</li><li>Words and word-morphology features enable self-generated messages<ul style="list-style-type: none"><li>Grammatical competence</li></ul></li><li>Pragmatic competence</li></ul>

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### 10 Principles of Grammatical Intervention for Children with SLI

<b>Question for Language Interventionist</b> <ul style="list-style-type: none"><li>How do we best facilitate the child's development of grammar in a manner that is mindful of other problems the child has or can be projected to develop? (Fey et al., 2005)</li></ul>	<ol style="list-style-type: none"><li>“...help the child achieve greater facility in the comprehension and use of syntax and morphology in the service of conversation, ...in both written and spoken modalities.”</li><li>Grammatical form should rarely be the <i>only</i> goal that is targeted in an intervention program.</li><li>Select intermediate goals in an effort to stimulate the child's language acquisition <b>process</b> rather than to teach specific language forms.</li></ol>
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**10 Principles of Grammatical Intervention for Children with SLI**

**Question for Language Interventionist**

- How do we best facilitate the child's development of grammar in a manner that is mindful of other problems the child has or can be projected to develop?

(Fey et al., 2005)

- 4. The specific goals of grammatical intervention must be based upon the child's "functional readiness" and need for the targeted forms.
- 5. Manipulate the social, physical, and linguistic context to create more frequent opportunities for grammatical targets.
- 6. Exploit ... the written modality to develop appropriate contexts for specific intervention targets.

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**10 Principles of Grammatical Intervention for Children with SLI**

**Question for Language Interventionist**

- How do we best facilitate the child's development of grammar in a manner that is mindful of other problems the child has or can be projected to develop?

(Fey et al., 2005)

- 7. Manipulate the discourse so that targeted forms are rendered more salient in pragmatically appropriate contexts.
- 8. Systematically contrast forms used by the child with more mature forms from the adult grammar, using sentence recasts. (Use of Aided Language Stimulation)
- 9. Avoid telegraphic speech ...
- 10. Use elicited imitation to make targeted forms more salient and to give the child practice with ... patterns that are difficult to produce. (Use of Aided Language Stimulation)

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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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## What Influences the Output Strategy?

- “Linguistically structured input, and not modality, is the critical factor required to trigger language acquisition”
  - Speaking Child - Typical input consists of the full language model
    - Input offers a direct match for development of expressive language
  - In AAC - Typical input consists of the full language model in speech, w/ occasional use of lexical items, usually content words in the aided language modality.
    - Input offers only a limited basis for the development of expressive language

(Loncke, Clibbens, Arvidson, & Lloyd, 1999)

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12

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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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13

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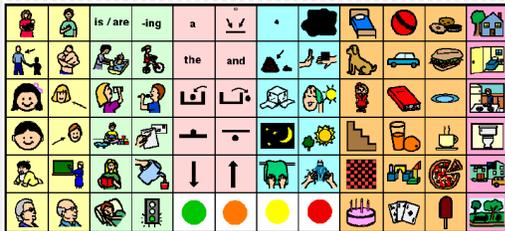
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## Sample Language Board



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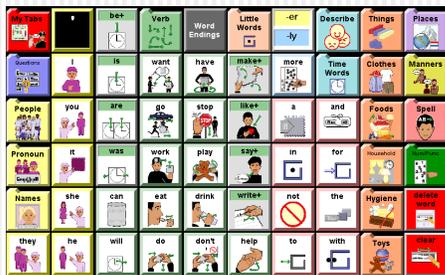
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## Sample Dynamic Device Page



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### Issues Effecting Acquisition of Language for AAC Users

- Structural Regularities Found in Graphic Symbol Communication
  - Metalinguistic strategies used to compensate for lack of available symbols
    - Semantic bypasses
      - Using another symbol w/ similar meaning (e.g., "LET ME FINISH." vs Don't interrupt me.)
    - Phonological similarity
      - Using a symbol whose spoke label sounds like the intended one (e.g., "EYE" instead of "I")
    - Word modification markers
      - "The opposite of"; "sounds like"
  - Dominance or Co-construction
    - Speaking partner plays a dominant role in a conversation
    - Co-formulation of messages; speaking partner clarifying and filling in parts of messages

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16

### 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

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17

### Issues Effecting Acquisition of Language for AAC Users

- Language Development
  - Normal
    - Development follows a predictable course
  - Delayed
    - Develops skills according to this predictable 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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18

### 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
    - Autism
    - Acquired Brain Injury

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19

### 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

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20

### Language Etiologies

- Cognitively Impaired
  - Language difficulties greater than matched typical children
    - Shorter, less complex sentences
    - Restricted word meanings
    - Slow vocabulary growth

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21

## Language Etiologies

- Autism
  - Pragmatic language impairment
  - Shorter less complex sentences
  - Restricted word meanings
  - Slow vocabulary growth

  
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22

## AAC Research Needs

- “Studies are needed to help clarify whether graphic symbol communication should be considered as a *linguistic phenomenon* (i.e., with intrinsic and coherent organization) separate from spoken language or as a *translation of spoken language* (i.e., with direct links to spoken language).”  
(Sutton, A., Soto, G. & Blockberger, S., 2002.)

  
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23

## AAC Intervention- Goal Setting

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

  
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24

## Intervention Study

- Intervention Study
  - Camp Chatterbox, Pennsylvania - 2003
  - Perform Pre/Post testing to determine whether participation in an intensive therapy program using aided-language stimulation results in a significant change in campers' syntactical performance when using a
    - Manual topic board, or a
    - Navigational device

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25

## Rationale for The Study

- Obligation to Payers
  - CSH Foundation
  - Referring Schools
  - Families of campers
- Obligation to Parents
  - Goal(s) for coming to camp
    - Have fun
    - Communicate w/ peers
    - Improve language competence
      - Grammatical
      - Pragmatic
      - Initiation

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26

## Subjects

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27

### Subjects

P	PPVT		TACL		Average AML <sup>a</sup>
	SS	AE	SS	AE	
1	40	3-11	1*	<3.0	1
2	40	3-11	4*	5.0	2-3
3	46	5-5	2*	4-3	1
4	88	8-6	10*	9-0	2-3
5	48	5-2	6*	6-3	2-3
6	43	5-10	4*	5-3	2-3
7	107	5-3	15	6-6	1-2
8	105	7-11	9	5-3	1
9	109	7-3	14	8-0	1-2

<sup>a</sup>Average Aided Message Length (AML) – information provided by parents as part of intake information.

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28

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- ### Methodology
- CSH Test (ie., TASP)
    - Symbol Size & Field Number
    - Grammatical Encoding
    - Categorization Skills
  - Pretest -
    - CSH Subtest for Syntactical Performance
    - CSH Subtest for Navigational Skills
    - On Both Measures
      - Obtain levels for Length of Modeled/Imitated Utterances
      - Obtain levels for Length of Utterance in Elicited/Picture Description Task
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29

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- ### Pre-Test Manual Board Task
- Modeling/Imitation
    - Modeled a series of 2, then 3 word sentences on 32 location Fitzgerald Key board w/ no word morphology features - child was to imitate sentence
    - Modeled 4 word and is+-ing sentence formats on 72 location Fitzgerald Key board w/ articles, auxiliaries, and present and past tense markers (-ing, -ed) - child was to imitate sentence
    - Response scored based upon utterance length
  - Picture Description Task
    - Followed modeling of 3 word sentence form
    - Presented stimulus picture, child used symbols to describe the picture.
    - Response scored based upon utterance length
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30

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## Pre-Test Navigational Task

- Modeling/Imitation
  - Modeled same sentence set on dynamic display VOCA
  - 2 Different Page Sets used
    - 1) Page set had 40 locations for 3 - word;
      - organized according to the Fitzgerald Key format w/ no word morphology features,
      - Folders for People, Verbs, Things, and Places
    - 2) Page set for is + -ing sentence format had 40 locations
      - organized according to the Fitzgerald Key format articles, auxiliaries, and present and past tense markers (-ing, -ed) on MAIN page; Folders for People, Verbs, Things, and Places
  - Child was to imitate sentence
  - Response scored based upon utterance length
- Picture Description Task
  - Followed modeling of each sentence form
  - Child used symbols to describe a series of pictures.
  - Response scored based upon utterance length

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31

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## Methodology

- Intervention
  - Campers grouped according to age and ability.
  - Use Aided Language Stimulation (ALS) for all treatment sessions for 5 consecutive days;
  - Modeled utterances were 1 "step" above present performance as defined on pretest
  - One 45 min. session w/ topic board (arts & crafts)
  - Recreational activity between interventions
  - One 45 min. session w/ navigational device (Tx)

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32

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## Methodology

- Post Test
  - Final day of program - (after lunch)
  - Same measures as the pretest for both conditions
    - CSH Subtest for Syntactical Performance
      - Topic board
    - CSH Subtest for Navigational Skills
      - Dynamic Display (VOCA) device
  - Testing clinician differed from treating clinician

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33

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### Results

Performance	Communication Board			Dynamic Display SGD		
	MML	S-V-O	S-is-V-ing-O	MML	S-V-O	S-is-V-ing-O
Improvement	4	7	4	5	3	1
No change	5	2	5	4	6	7
Decrease	0	0	0	0	0	1

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34

- ### Summary/Discussion
- A week-long therapy program using Aided Language Stimulation resulted in changes in utterance length (UL) when using manual boards and dynamic display VOCAs
    - Improvements made in both Modeled UL and Elicited UL
  - Variables impacting results
    - Small N
    - Heterogeneous group of subjects
    - Subjects all had VOCA's so their prior experience effected progress
    - Complexity of the Board (i.e., # of symbols) appeared to impact performance
      - Some of the more cognitively impaired subjects performed worse when the # of symbols increased
      - Younger and higher functioning subjects appeared to expand their length and complexity of utterances
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35

- ### Acquisition of Language by AAC Users
- #### Hypothesis
- Aided AAC performance is a **translation** of spoken language. AAC users **recode language** on the basis of their language abilities.
- Normal (acquired disability)
    - Age appropriate aided output
  - Language Delayed (developmental disability)
    - Develops skills in the predictable order, but at a slower rate
  - Language Disordered
    - Deviant development of language form, content and/or use
- and their aided output is further impacted by
- Factors related to a "Planned" vs. "Natural" course
  - Cognition
  - Age
  - Diagnosis, Neurological status
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36

## Case Studies

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### Cerebral Palsy Delayed/Normal vs. Disordered Language

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## Cerebral Palsy

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<ul style="list-style-type: none"><li>• Disordered<ul style="list-style-type: none"><li>▪ First Contact - Age 3</li><li>▪ Formal Testing<ul style="list-style-type: none"><li>• Receptive Vocab</li><li>• Aud Comp</li></ul></li><li>▪ Oral Motor<ul style="list-style-type: none"><li>• Nonspeaking -&gt; SSI</li></ul></li><li>▪ Educational Progression<ul style="list-style-type: none"><li>• Special to Inclusive</li></ul></li><li>▪ Treatment<ul style="list-style-type: none"><li>• Manual Board</li><li>• High Tech</li><li>• Language Tx</li></ul></li><li>▪ Present Status - Age 17</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Delayed (Bilingual)<ul style="list-style-type: none"><li>▪ First Contact - Age 3</li><li>▪ Formal Testing<ul style="list-style-type: none"><li>• Receptive Vocab</li><li>• Aud Comp</li></ul></li><li>▪ Oral Motor<ul style="list-style-type: none"><li>• Nonspeaking -&gt; SSI</li></ul></li><li>▪ Educational Progression<ul style="list-style-type: none"><li>• Special to Inclusive</li></ul></li><li>▪ Treatment<ul style="list-style-type: none"><li>• Manual Board</li><li>• High Tech</li><li>• Language Tx</li></ul></li><li>▪ Present Status - Age 13</li></ul></li></ul>
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## CP - Disordered Language

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<ul style="list-style-type: none"><li>• Test Outcomes<ul style="list-style-type: none"><li>▪ PLS<ul style="list-style-type: none"><li>• C.A. 3-7; AC Age 4-6</li><li>• C.A. 4-9; AC Age 4-10</li></ul></li><li>▪ PPVT<ul style="list-style-type: none"><li>• C.A. 4-7; AE Age 4-10</li><li>• C.A. 5-2; AE Age 4-10</li><li>• C.A. 6-2; AE Age 6-3</li><li>• C.A. 7-1; AE Age 7-2</li><li>• C.A. 8-4; AE Age 7-5</li></ul></li><li>▪ TAACL<ul style="list-style-type: none"><li>• C.A. 7-1; AE Age 7+</li></ul></li></ul></li></ul>	<ul style="list-style-type: none"><li>• Intervention Goal<ul style="list-style-type: none"><li>• Age appropriate receptive and expressive language performance</li></ul></li></ul> 
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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

- Present 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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41

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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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42

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### CP - Normal Language Skills

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- 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
  - TAACL
    - C.A. 7-3; AE Age 7+
- Intervention Goal
  - Age appropriate receptive and expressive language performance





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43

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### CP - Normal Language Skills

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- AAC Intervention
  - C.A. 3; Manual Board (MB) - Syntactical Development S-V-O, prep
  - C.A. 4; DigVox + MB - Syntactical Development S-is V+ing -O, prep
  - C.A. 5; DigVox + 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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44

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### CP - Normal Language Skills

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- Present 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 Study

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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48

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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, 1985)
  - 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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49

### 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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50

### 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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51

### 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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52

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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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53

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### Case Study - Down Syndrome

- Functional Description
  - PLS
    - C.A. 5-4; AC Age 2.2
  - PPVT
    - C.A. 5-1; AE Age 2-10
  - Yes/No - emerging
  - Scan a field of 30 1/2" x 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



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54

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### Case Study - 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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55

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### Case Study - Down Syndrome

- Present 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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56

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### Case Study - 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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57

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# Case Study

## Apraxia Delayed Language

58

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# Case Study - Apraxia

- Test Outcomes
  - PLS - C.A. 3-4; AC Age 2;10
  - PPVT - C.A. 3-6; AE Age 7-10
  - TACL - C.A. 3-6; AE Age 3-9
  - Kaufman WC - C.A. 3-6; A.E. 4-0
  - Kaufman SM - C.A. 3-6; A.E. 4-3
- Functional Performance
  - Field Size / Number
    - Age 3 - 15 symbols
    - Age 3-6-32
    - Age 6.5-10\*30; Fitz Key w/ subsets
  - Memory
    - Excellent short-term for imitative tasks
    - Difficulty w/ long-term
  - ?? Learning Disability??
    - Difficulty learning colors, numbers, letters, symbols of concepts...
    - Comfort w/ and prefers routines

• Intervention Goal  
• Age appropriate receptive and expressive language performance



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59

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# Case Study - 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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60

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## Case Study - 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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61

## Case Studies

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### Schizencephaly Delayed Language/Disordered

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62

## Schizencephaly

- Camper
  - First Contact - Age 8-2
  - Educational Summary
    - Writing performance
    - Syntactical goals
  - Oral Motor
    - Nonspeaking -> SSI
  - Educational Progression
    - Inclusive
  - Treatment
    - Manual Board
    - High Tech
    - Language Tx
  - Present Status - Age 10-6
- CSH Patient
  - First Contact - Age 3.3
  - Formal Testing
    - Receptive Vocab
    - Aud Comp
  - Oral Motor
    - Nonspeaking -> SSI
  - Educational Progression
    - Special to Inclusive
  - Treatment
    - Manual Board
    - High Tech
    - Language Tx
  - Present Status - 5

  
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63

## Camper - Schizencephaly

- Functional Description
  - AAC System
    - Liberator w/ Unity
  - School Reports - CA 8
    - 1st & 2nd Grade performance in reading and math
  - Learning icon sequences
  - Could create a S-V-O sentence in response to pictures and questions
  - Spontaneous communication - speech approximation
  - Moderate dysarthria/pseudobulbar palsy
- Camp Goals
  - Facilitate device use in fun and functional setting
  - Increase peer interaction
  - Develop a back-up manual system
  - Facilitate use of AAC system in multiple environments



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64

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## Camper - Schizencephaly

- AAC Intervention
  - C.A. 4 - 8; Liberator - Learning icon sequences; Syntactical Development S - V -ing - prep - O; past tense
  - C.A. 9; Pathfinder - Syntactical Development S - V -ing - prep - O; articles, prepositions, coordination of sentences
  - C.A. 10 Pathfinder - Improve syntactical performance; improve written communication performance for paragraphs
- Oral-Motor Status
  - C.A. 8; intermittent utterances, understood by familiar listener or if context is known

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65

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## Camper - Schizencephaly

- Present Status - C.A. 10-2
  - PPVT
    - A.E. - 8-6; SS - 88
    - TAFL - 9-0
    - Binet - 8-9
    - Kaufman Word 5-6
    - Kaufman Spatial 5-9
  - Aided Language Performance
    - Message length 4-6 words
    - Inconsistently uses is +V-ing, and past tense, pronouns and prepositions, adjectives and adverbs
  - Unaided Language Performance
    - Gestures, facial expression, word approximations

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66

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## Camper - Schizencephaly

- Long Term Goal
  - Age appropriate expressive language performance
    - Performance Variables
      - PPVT SS - 88
      - Consistent but very slow progress in expressive language performance
      - Delayed academic performance in reading and spelling
      - CA = 11 years
  - Present Performance
    - Language Disordered

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67

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## CSH - Schizencephaly

- Functional Description
  - Intervention Goals
    - Age appropriate expressive language performance using an aided AAC approach
      - Design manual Communication board using Fitzgerald Key format
      - Teach language through play
      - Facilitate use of board in multiple environments
- People-Action-Little Words-Things-Places



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68

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## CSH - Schizencephaly

- AAC Intervention
  - C.A. 3; Manual Board (MB) -Syntactical Development- S - V -ing - prep - O;
  - C.A. 4; Manual Board (MB) -Syntactical Development- S - V -ing - prep - O,;
  - C.A. 5; DynaVox + MB - Syntactical Development- past, past tense, plurals, Increase MLU
- Oral-Motor Status
  - C.A. 3; intermittent utterances, understood by familiar listener or if context is known

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69

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## CSH - Schizencephaly

- Present Status - C.A. 5-3
  - PPVT
    - A.E. - 4-8; SS - 107
  - DynaVox in Tx (Gateway 60) => to school and home
  - Manual board across contexts
  - Aided Language Performance
    - Message length 4-6 words
    - Inconsistently uses is +V-ing, and past tense, pronouns and prepositions, adjectives and adverbs
  - Unaided Language Performance
    - Gestures, facial expression, word approximations

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70

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## CSH - Schizencephaly

- Long Term Goal
  - Age appropriate expressive language performance
    - PPVT SS - 107
    - Consistent progress in expressive language performance
  - Present Performance => Language Delayed
- Possible barriers to goal achievement
  - Acceptance of use of aided AAC approach
  - Consistency in communication performance expectations

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71

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## Closing Comments

### Hypothesis

- 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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72

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## Closing Comments

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### Hypothesis

- There may be a “Critical Period” during which we can *distinguish* between who may be -  
**Language Delayed vs Language Disordered**
- The “Critical Period” may occur somewhere between  
**7 - 8 years of age**
- May be related in part to visual development (i.e., memory and sequencing)

  
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73

## Closing Comments

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### 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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74

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76

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77

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78

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