Teaching Rule-Based Language to Children using AAC: Research Update

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Two related projects currently underway

• *Teaching children using AAC to ask inverted yes/no questions*
  – Funded by the ASHFoundation
    • Clinical Research Grant
  – Led by Jennifer Kent-Walsh

• *Teaching Children who use AAC to produce rule-based semantic-syntactic relations*
  – Funded by NIH
    • NIDCD grant: #R03DC011610-01A1
  – Led by Cathy Binger
Overview

• Defining the Problem

• Project 1:  *Teaching children using AAC to ask inverted yes/no questions*
  – Aims
  – Intervention approach
  – Method
  – Results

• Project 2:  *Teaching Children who use AAC to produce rule-based semantic-syntactic relations*
  – Aims
  – Intervention Approach
  – Method
  – Stay tuned for results...

• Discussion / Clinical Implications
Defining the Problem

Language-learning expectations often are set too low for children who require AAC

Acquisition of generative, rule-based language is just as important for children who use AAC as for speaking children

Many young children with AAC needs have profiles that indicate the potential to use generative language

Even these children frequently have poor expressive language outcomes (Binger & Light, 2008)

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How Children Learn to use Graphic Symbols for Communication:

_The Translation Hypothesis_

Formulate a mentally represented spoken sentence

(“Woody is laughing”)

Map this message onto single-meaning graphic symbols
Can We Teach Young Children to Map Messages onto Graphic Symbols?

• This task is neither intuitive nor transparent
  – Even young typically-developing children make lots of errors (Sutton et al., 2010)

• But some young children who require AAC rapidly learn to create message combinations
  (Binger, Kent-Walsh, et al., 2008; 2010; Binger & Light, 2007; Kent-Walsh et al., 2010)
The Burning Question

Can we efficiently and effectively teach children to map rule-based linguistic structures using graphic symbols?

Are the meta-linguistic demands too high?
Aims: Project 1

*Teaching children using AAC to ask inverted yes/no questions*

Evaluate Impact of Aided AAC Modeling Intervention on:

**Aim 1**

Productive Use of “To be” Declaratives & “Yes-No” Questions (focus of intervention)
- WOODY IS LAUGHING
- IS WOODY LAUGHING?

**Aim 2**

Generalized Productive Use of Simple Declaratives & “Yes-No” Questions Containing Copulas (related structure)
- WOODY IS HAPPY & IS WOODY HAPPY?

**Aim 3**

Generalized Productive Use of S-V-O Declaratives with Reversible Verbs (unrelated structure)
- WOODY IS PUSHING BULLSEYE
- BULLSEYE IS PUSHING WOODY

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Method

Research Design

- Single Subject Experimental Study
- Multiple Probe Across Subjects
- Preliminary Results
  - Detailed Findings for 1 Participant
Method

Participation Criteria

- Participants meet the following criteria:
  - 4 – 6 years of age with motor speech impairment
    - less than 50% comprehensible speech on “No Context” Condition of Dowden’s (1997) *Index of Augmented Speech Comprehensibility in Children*
  - Previous AAC app use (via iPad) & evidence of grammatically incorrect productions.
  - Expressive Vocabulary of at least 50 words.
  - Hearing/vision/fine motor skills (corrected) within normal limits.
  - Demonstrated comprehension of targeted structures (assessment procedures adapted from Miller & Paul, 1995)
  - Raw score >6 on *Elaborated Sentences and Phrases* subtest of TACL-3 (equivalent to 16th percentile/standard score of 7 for a child aged 3;0)

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Method

Baseline Sessions

1. Probes

- Track progress using probes; 10 probes per target
- Toy Story characters used
Proloquo2Go Display:
Display for Probes

Toy Story Characters
Method

Intervention Sessions

1. Probes
   - Track progress using probes; 10 probes per target
   - Toy Story characters used

2. Contrastive Targets
   - 10 contrasts of each target at the start of each session
   - Mickey Mouse Clubhouse characters used

3. Play
   - Minimum 20 aided AAC models of targets
   - Range 26 – 35 models
   - Elicitation of minimum of 10 participant attempts to produce structures
   - Mickey Mouse Clubhouse characters used

• Length
  – Minimum 25 minutes in length
  • Range 26 – 29 min
Proloquo2Go Display: Intervention
Mickey Mouse Clubhouse Characters
Results
Dependent Measures

• Probes
  – Aim 1: Productions Relating to the Focus of the Intervention
    • Dep Var 1 - Productions of Simple Auxiliary ‘to be’ Declaratives
    • Dep Var 2 – Productions of Yes-No Questions
  – Aim 2: Productions of Related Grammatical Structures
    • Gen Var 1 – Productions of Simple Auxiliary ‘to be’ Declaratives Containing Copulas
    • Gen Var 2 – Productions of Yes-No Questions containing Copulas
  – Aim 3: Productions of Unrelated Grammatical Structures
    • Gen Var 3 – Productions of S-V-O Declaratives with Reversible Verbs
Aims: Project 2

Teaching Children who use AAC to produce rule-based semantic-syntactic relations

• Evaluate the impact of our intervention on:

Aim 1

Productive use of two-term semantic-syntactic relations (focus of intervention)
• Agent-action
  • MICKEY BITES
• Attribute-entity
  • WET MICKEY
• Possessor-entity
  • MICKEY GRAPES

Aim 2

Generalized productive use of untrained semantic-syntactic relations
• Action-object
  • BITES MICKEY
• Agent-action-object
  • MINNIE BITES MICKEY
• Attribute-agent-action
  • WET MICKEY BITES

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Method
Research Design

Single subject experimental study
Multiple probe across participants
Results forthcoming...
Method

Participation Criteria

• Participants meet the following criteria:
  – 4 – 5 years of age with motor speech impairment
    • less than 50% comprehensible speech on “No Context” Condition of Dowden’s (1997) Index of Augmented Speech Comprehensibility in Children
  – No prior AAC experience required
  – Expressive Vocabulary of at least 25 words (any mode).
  – Hearing/vision (corrected) within functional limits for participating in the study
  – Direct selectors
  – Demonstrated comprehension of targeted structures (assessment procedures adapted from Miller & Paul, 1995)
  – Demonstrated receptive-expressive language gap (measured by TACL-3 and Mullen Scales of Early Learning)
Method

Baseline Sessions

1. Probes

- Track progress using probes; 10 probes per target
- Mickey Mouse Clubhouse characters used
Proloquo2Go Display:
Display for Probes

Mickey Mouse Clubhouse
Characters
Intervention Approach

*Same as for Project 1*

**Intervention techniques**
- Contrastive targets
- Aided AAC models

**Intervention highlights**
- The necessity of producing each word in a sentence
- The importance of word order

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### Method

#### Intervention Sessions

| 1. Probes                  | • Track progress using probes; 10 probes per target  
<table>
<thead>
<tr>
<th></th>
<th>• Mickey Mouse Clubhouse characters used</th>
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| 2. Contrastive Targets    | • 10 contrasts of each target at the start of each session  
|                           | • Toy Story characters used                         |
| 3. Play                   | • Minimum 20 aided AAC models of targets per session  
|                           | • Elicitation of minimum of 10 participant attempts to produce structures  
|                           | • Toy Story characters used                         |

- **Length**
  - Minimum 25 minutes in length
Proloquo2Go Display: Intervention
Toy Story Characters
Intervention
Concentrated Models and Play
 Intervention

2. Concentrated Models & Contrastive Targets

Alien’s cup vs. Alien’s spoon

Model on iPad
Intervention

3. Play

• Interactive play
  – Aided AAC models of targeted structure
  – At least 20 models per session
  – At least 10 participant attempts
Discussion: Predictions (Not results yet!)

(#1) Those with relatively strong receptive language skills should master the linguistic structures taught

(#2) They may produce all sentence elements within highly related linguistic structures

(#3) Some may generalize to unrelated structures
Discussion:
Theoretical Implications &
Future Directions

• Teaching children to map rule-based linguistic structures using graphic symbols
  – Study 1
    • Results from only one child presented for Study 1; evidenced clear and consistent signs of mastery
    • Two other children completing study
    • Need replication with more children
  – Study 2
    • One child completed very similar study (pilot)
      – Mastered 2 of 3 targets
      – Lower receptive language than those for NIH study
    • 16 children will eventually be enrolled in current project
      – To be continued...
Other Items of Possible Interest

• SIG 12 Newsletter
  – Jennifer Kent-Walsh and I are co-editing this for the December, 2012 and April, 2013 issues
    • All articles focus on *Partner Instruction in AAC*

• AAC journal article coming soon
  – *Personnel Roles in the AAC Assessment Process*
  – Others in the works:
    • Meta-analyses of partner instruction in AAC
    • Methodological standards and practices in AAC (with Ralf Schlosser & colleagues)

• New website should be online with the month!
  – [www.aacinfo-ucf.unm.edu](http://www.aacinfo-ucf.unm.edu)
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• Binger C, Kent-Walsh J, Ewing C, Taylor S. (2010). Teaching educational assistants to facilitate the multisymbol message productions of young students who require augmentative and alternative communication. AJSLP, 19, 108-120.


