Predictors of Language Outcomes in Beginning Communicators Learning AAC

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• Brady &Thiemann-Bourque, 2007-2012
What is AAC?

- Any nonspeech means to aid expressive and receptive communication is considered AAC, so this would include natural gestures, signs, PECS, picture selection, voice output communication aids, picture schedules, object cues, talking books......
What is AAC?
Purpose of the research

- What differentiates rapid vs. slow language learners?
- Population: Preschool children with complex communication needs
- Why we care: We need to identify appropriate communication interventions
- What child and environmental variables influence communication success over the preschool years?
Potential Child Differences

- What may relate to or predict spoken language development?
  - Cognitive skills (Mullen test)
  - Expressive and/or receptive language skills (PLS-4, and PPVT-IV)
  - Prelinguistic communication skills (joint attention, and/or behavior regulation)
  - Play – indiscriminate to functional to symbolic
Potential Environment Differences

What may relate to gains in spoken language

- Adult input at school
- Adult input at home
- Intensity and consistency of AAC use at school and home (e.g., monthly surveys)
Participants

- Between 3 and 5 years at start
- Severe language impairments, with less than 20 different spoken words at start
- All learning or on IEP to learn one type of AAC system (PECS, VOCA, objects, signs)
- English as primary language
Large Study

- Participants:
  - N = 96; average age 49.23 months, range is 26-71 months
  - Range of diagnoses and cognitive delays
- Five testing and observation sessions completed for each child
  - 6 months between each measure
- Data collection to be completed in March, 2012
METHODS
Data Collection

- Standardized testing:
  - Measures: Mullen Scale of Early Learning
  - Preschool Language Scale-4
  - Social Communication Questionnaire
  - Peabody Picture Vocabulary Test-IV

- Scripted interaction assessment

- Play assessment

- Direct observations at home and school
Scripted Assessment: Time 1
Scripted Interaction Assessment: Time 3
Data from scripted interaction

- Responses in highly structured context
  - 6 behavior regulation and 6 joint attention
  - Play context is consistent across children

- Communication measures of interest
  - Rates - of child and adult communication acts
  - Forms - gesture, AAC, vocalizations, speech
  - Functions - social interaction, behavior regulation, or joint attention
  - Use of repairs to communication breakdowns
Play Assessment: Time 1
Play Assessment: Time 5
Data from play assessment

- Same five toy sets – 3 min long
- Score for complexity of play observed across toy sets
- Indiscriminate - functional play/object use - functional combinational - symbolic
- Score for the number of different toys with which the child engages
- Total play acts observed (weighted score)
Direct Observation of Communication

- Live and videotaped observations of children communicating in real contexts at home and school
- Child communication acts coded
  - Initiation, response, repair
  - Mode of communication (gesture, AAC, speech)
  - Function: BR, JA, SI (if video recorded)
- Adult communication acts coded
  - Initiation, response, prompt
  - Mode of communication (gesture, AAC, speech)
PDA, Noldus Observer
RESULTS
Sample of participants in study for minimum one year (N = 69)

- Children separated into 3 groups based on changes in communication skills from Time 1 to Time 3
- Variability in development of expressive vocabulary words (spoken or with AAC)
  - High Stars = 40+ words and/or word combinations
  - Mid Stars = 20 to 40 words
  - Low Stars = less than 20 words
Sample: N=69

<table>
<thead>
<tr>
<th></th>
<th>High Stars</th>
<th>Mid Stars</th>
<th>Low Stars</th>
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<tbody>
<tr>
<td>Chronological Age</td>
<td>48mon</td>
<td>50mon</td>
<td>49mon</td>
</tr>
<tr>
<td>Age Range</td>
<td>37 to 67mon</td>
<td>37 to 71mon</td>
<td>37 to 66mon</td>
</tr>
<tr>
<td>Total children</td>
<td>23</td>
<td>23</td>
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Olathe Participants: N = 11

<table>
<thead>
<tr>
<th></th>
<th>High Stars</th>
<th>Mid Stars</th>
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<tbody>
<tr>
<td>Time 1</td>
<td>0</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Time 5</td>
<td>3</td>
<td>3</td>
<td>5</td>
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</table>
What separated the ‘Mid Stars’ from the ‘High Stars’?

- Joint attention skills within the Scripted Communication Assessment
- Adult input at home
- Auditory comprehension skills (PLS-4)

*These 3 variables accounted for 36% of the variance*
Joint attention
What separated ‘Low Stars’ from the ‘Mid Stars’ and ‘High Stars’?

- Behavior regulation skills within the Scripted Communication Assessment
- Nonverbal IQ on the Mullen
  - Visual reception and Fine Motor
- Weighted total play score

*These 3 variables accounted for 65% of the variance*
Behavior regulation
Changes in Rate per Minute of Child Communication Acts Over 2.5 Years Olathe: Scripted Assessment
Difference in Total Play Acts

- **Time 1**
  - HS: 33
  - MS: 26
  - LS: 15

- **Time 3**
  - HS: 33
  - MS: 26
  - LS: 15

- **Time 5**
  - HS: 33
  - MS: 26
  - LS: 15
Changes in Rate per Minute of Child Communication Acts Over 2.5 Years: Olathe Live School Observations - 2 hrs.
Changes in Rate per Minute of Adult Input Over 2.5 Years Later
Olathe Live School Observations - 2 Hrs

![Bar chart showing changes in rate per minute of adult input over 2.5 years later in Olathe Live School Observations - 2 Hrs.](chart.png)
DISCUSSION
Treatment implications

- Behavior regulation matters!
  - BR predict severity of autism and communication progress from 18mon to 3yrs (Wetherby et al., 2007)
  - Teach to request, protest objects or actions

- Joint attention matters!
  - How can we teach children to communicate more joint attention – scanning between 2 objects, 3-point gaze shifts, visually attractive choice of two toys, hold up to eye level
More implications...

- **Play matters!**
  - How can we help children to improve their play with different objects, in a functional way?
  - How can we set up preschool routines to encourage symbolic and combined play?

- **Input matters!**
  - How can we help teachers and parents to talk more and provide more language input?
  - How can we teach peers/classmates to interact more with AAC systems?
Complexity of Communication Scale
(Brady, Thiemann-Bourque, et al., 2011; AJSLP)

0 No Response
1 Alerting - a change in behavior, or stops doing a behavior

Pre-Intentional 2 - 6

2 Single orientation only -- on an object, event or person; can be communicated through vision, body orientation, or other means.
3 Single orientation only + 1 other PCB (potentially communicative behavior)
4 Single orientation only + more than 1 PCB
5 Dual orientation – between object and object
6 Dual orientation – shift in focus between a person and an object or between a person and an event
Intentional Non-Symbolic 7 – 9

7a Triadic orientation (e.g. eye gaze or touch from object to person and back)

7b Dual orientation + 1 or more PCB (e.g., dual focus + gesture, dual focus + gesture + vocalization, switch closure)

8 Triadic orientation + 1 PCB (e.g. triadic + vocalization)

9 Triadic orientation plus more than 1 PCB (e.g. triadic plus vocalization and differential switch closure)

Intentional Symbolic 10 – 11

10 One-word verbalization, sign or AAC symbol selection

11 Multi-word verbalization, sign or AAC symbol selection
Questions for School Staff

- What factors do you think account for differences in development of speech or lack thereof as we observed in our data?
- What are some of the challenges to using AAC in the classroom? Some benefits?
- Why is PECS chosen over VOCA over sign?
- What determines when a new mode or system is introduced or discontinued?
- How might your school develop or change current practices based on our data?
Publications

