The Effect of Person versus AAC Directed Apraxia Therapy on Elicited Imitation for Children with Autism Spectrum Disorder

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AUTISM

- Deficits in 3 areas:
  + 1) Social Interaction
  + 2) Language & Communication
  + 3) Restricted & Repetitive Interests (routines)
- Sensory Processing Deficits
- Joint Attention Deficits
- Imitation Delays
DEVELOPMENTAL APRAXIA OF SPEECH (DAS)

- Neurological disorder
- Difficulty sequencing movements needed to produce a clear and precise sound or utterance (Darley, Aronson & Brown, 1975; Hall, Jordan, & Robin, 2007; Tombin, Morris & Spriestersbach, 2000)
- Sensory integration dysfunction
- Often associated with ASD
AUGMENTATIVE & ALTERNATIVE COMMUNICATION (AAC)

- Augmentative: augment existing speech abilities
- Alternative: providing a substitute for ineffective speech
- Facilitates natural speech
  - Consistent model
  - Immediate reinforcement
- AAC devices are often used with ASD & DAS
  - acquire functional communication
  - develop expressive language
VIDEO MODELING

- Used with children with ASD to teach various communication and daily living skills
- Focus on relevant information
- Effective in gaining attention
- Consistent & repetitive input
Know:
- Traditional model-imitation therapy can increase natural speech (Eikeseth & Nesset, 2003; Daly, Cantrell, Cantrell, & Aman, 1971; Bradford-Heit & Dodd, 1998)
- AAC can facilitate communication & language in children with DAS (Cumley & Swanson, 1999; Bornman, Alant, & Meiring, 2001)
- Video modeling effective in teaching children with autism social & daily living skills (Murzynski & Bourret, 2007; Charlop-Christy & Daneshvar, 2003; Charlop-Christy, Le, & Freeman, 2000)
- Less off-task behavior & more joint attention with AAC ((Probst, 2009)

Don’t Know:
- If video modeling can increase speech/imitation in children with ASD & DAS
PURPOSE OF STUDY

- Limited Research
- Question:
  - Is there a difference in the amount of elicited imitation when using a person-directed stimulus mode versus an AAC-directed stimulus mode for individuals with co-morbid ASD and DAS?
# METHODS: SUBJECTS

<table>
<thead>
<tr>
<th>Subject</th>
<th>Gender</th>
<th>Age</th>
<th>Disorder</th>
<th>Speech</th>
<th>AAC System</th>
<th>High Tech AAC User Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Female</td>
<td>7</td>
<td>ASD/DAS</td>
<td>Nonverbal</td>
<td>Dynavox V</td>
<td>Wants/Needs</td>
</tr>
<tr>
<td>2</td>
<td>Male</td>
<td>9</td>
<td>ASD/DAS</td>
<td>Nonverbal</td>
<td>Dynavox V max</td>
<td>Wants/Needs</td>
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<tr>
<td>3</td>
<td>Male</td>
<td>5</td>
<td>ASD/DAS</td>
<td>Nonverbal</td>
<td>Dynavox V</td>
<td>Wants/Needs</td>
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<tr>
<td>4</td>
<td>Male</td>
<td>5</td>
<td>ASD/DAS</td>
<td>Nonverbal</td>
<td>PECS</td>
<td>Emerging</td>
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<tr>
<td>5</td>
<td>Female</td>
<td>7</td>
<td>ASD/DAS</td>
<td>Nonverbal</td>
<td>PECS</td>
<td>Emerging</td>
</tr>
<tr>
<td>6</td>
<td>Female</td>
<td>7</td>
<td>ASD/DAS</td>
<td>Limited Phonemic Repertoire</td>
<td>Dynavox MT4</td>
<td>Wants/Needs</td>
</tr>
</tbody>
</table>
METHODS: PROCEDURE

- Alternating Treatment Design
- IV: (Randomly presented)
  - 1) Person Directed
    - Student graduate clinician blind to study
  - 2) AAC Directed
    - Dynavox V—4 button grid, each button held a video modeling the target
      - only the AAC device provided the stimulus
- 5 minutes
- Minimum of 20 stimulations
  - Number of stimulations was tallied per subject per condition to measure treatment consistency

<table>
<thead>
<tr>
<th>Non-speech</th>
<th>Phoneme</th>
<th>CVCV</th>
<th>CV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tongue Click</td>
<td>/d/</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>Blow</td>
<td>/h/</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>Lip Pop</td>
<td>/p/</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>Kiss</td>
<td>/m/</td>
<td>.</td>
<td>.</td>
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</table>
DEPENDENT VARIABLE

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Definition</th>
</tr>
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<tbody>
<tr>
<td>Elicited Imitation</td>
<td>Following a model of target speech/non-speech presentation by the clinician/AAC device, subject intentionally produced an accurate imitation of target response or an approximation of the target response versus an inappropriate or disruptive vocalization.</td>
</tr>
</tbody>
</table>

ANALYSIS OF DATA

- Tally number of elicited imitations
- Reported as average number stimulated by each stimulus (AAC or clinician) & average elicited imitations
- Pearson Correlation to determine reliability
  - Intrajudge Reliability: $r = .99$
  - Interjudge Reliability = 96%
RESULTS: GROUP MEAN ELICITED IMITATIONS

Elicited Imitation

- Person Directed
- AAC Directed
Subject 2 Elicited Imitations

- Person Directed
- AAC Directed
Subject 3 Elicited Imitations

- Mean of Elicited Imitations
- Person Directed
- AAC Directed

Graph showing the mean of elicited imitations for Subject 3 over time, with two categories: Person Directed and AAC Directed.
Subject 5 Elicited Imitations

- Mean of Elicited Imitations

Graph showing the mean of elicited imitations for Subject 5, with data points for Person Directed and AAC Directed. The x-axis represents dates from September 29 to December 8, and the y-axis represents the mean of elicited imitations from 0 to 50.
Subject 6 Elicited Imitations

- Person Directed
- AAC Directed
DISCUSSION: RESULTS SUMMARY

- Imitations observed in PD Condition for every subject
- Subjects 1, 4, & 5 appeared to be AAC-oriented (lack of eye contact & more behavior with PD)
- PD condition provided a richer multimodal learning experience through active sensory input (tactile, visual, and auditory)
- No difference in amount of stimulations between the 2 conditions
- Variable to account for results:
  - ASD individual disorder
  - Various levels of DAS
DISCUSSION: COMPARISON TO PAST RESEARCH

- Probst, 2009
  - AAC-directed: more joint attention & less behavior
  - Person-directed: more elicited imitations
- More imitations in PD condition supports findings of imitation from a PD model from Eikeseth & Nesset, 2003 & Daly, et al., 1971
- Speech imitations were observed from the AAC condition as well supporting findings of an overall increase in verbal speech from Cumley & Swanson, 1999 & Bornman, et al., 2001
DISCUSSION

**Strengths**

- Routine Design
- Limited time frame
- Focused/Controlled sensory input
- Due to video modeling both conditions provided rich auditory and visual sensory input
- Intrajudge & Interjudge Reliability
- At least 1 day in between condition presentation to help control for the design
- Random pull-out for Subject’s 1&6
- Random presentation of conditions
- Treatment fidelity
- Clinician was blind to DV

**Weaknesses**

- Small subject size
- Alternating Treatment Design
- Subject Variability in eye contact and orientation to either condition
- Different severities of DAS
- Broad age range of subjects (neuro maturity)
- No accountability for delayed imitation
CLINICAL APPLICATION

- Short intensely focused speech Tx sessions
- AAC good input mode
- PD best for eliciting imitations
- Overall: best strategy=combo:
  + AAC and PD for input
  + PD to elicit imitations and natural speech
DISCUSSION

Future Research:

- Broader Sample (different severity levels of ASD)
- Same severity level of DAS
- Representative ratio of male to female subjects for ASD
- Make the AAC device more visually salient
- Replication to determine generalization of the present study


