Novel Word Requests with Picture Symbols across Language Skill Proficiencies of Young Children

Shari L. DeVeney, Ph.D., CCC-SLP
University of Nebraska – Omaha
sdeveney@unomaha.edu

Cynthia J. Cress, Ph.D., CCC-SLP
University of Nebraska – Lincoln
cress1@unl.edu

ASHA Annual Convention
Atlanta, GA
November 15, 2012
Disclosure Statement:
The presenters of this session have no financial or non-financial interest relevant to the topic of this presentation.

Shari L. DeVeney, Ph.D., CCC-SLP
Cynthia Cress, Ph.D., CCC-SLP
• **Late Talkers:**
  – Under age of 3 with language delay
  – Fewer than 50 words
  – No/few 2 word phrases
  – Not secondary to other conditions

• **Subgroups:**
  – Expressive-only language delay
  – Expressive & receptive delay
    • Limited research
• Challenges to Current Subgroup Theory:
  1. Not mutually exclusive
     – Continuum
  2. Not all important aspects considered
     – Novel word learning capacity
  3. Receptive language role
     – Root cause for expressive deficit
Language endowment spectrum (Rescorla, 2002, 2005, 2009)

- **Typically Developing Children**
- **Late Talkers with Expressive-Only Language Delay**
- **Late Talkers with both Expressive And Receptive Language Delay**
- **Expressive Language Verbal Production Skills**

- Underlying Language Knowledge or Processing Abilities
• Novel word learning:
  – Explain subtle differences
  – Sense of receptive deficit
  – Predictive

• Late talkers’ word learning capabilities:
  – Comprehension (Ellis Weismer & Evans, 2002)
  – Verbal production (Ellis Weismer & Evans, 2002)
  – Nonverbal production?
Task difficulty variation:

- **Word form characteristics**
  - Phonotactic probability: frequency of individual sounds/sound combinations occurrence in a given word position
    - Example: “these” vs. “sit”
    - Low: May support new word learning (Storkel, Armbruster, & Hogan, 2006)
      - Stand out; unique
1. What differences, if any, will be seen among typically developing children, late talkers with expressive-only language delay, and late talkers with both expressive and receptive delays in learning to REQUEST new items with representational picture symbols?

2. What differences, if any, will be seen among typically developing children, late talkers with expressive-only language delay, and late talkers with both expressive and receptive delays in learning to COMPREHEND new items with representational picture symbols?

3. For each participant within the three target groups, are there differences within-subject that are associated with the PHONOTACTIC PROBABILITY of the sound sequence present in the target novel words?
3 Typically developing participants (TD1 - TD3)
- Age range: 25-28 months; Mean: 27 months
- Gender: TD1-TD3 = Male
- Cognitive score range: 93-109 SS; Mean: 99

3 Expressive-only language delay (ELT1-ELT3)
- Age range: 25-27 months; Mean: 26 months
- Gender: ELT1 = Female; ELT2 & ELT3 = Male
- Cognitive score range: 89-95 SS; Mean: 92

3 Expressive and receptive language delay (RLT1-RLT3)
- Age range: 24-31 months; Mean: 27 months
- Gender: RLT2 = Female; RLT1 & RLT3 = Male
- Cognitive score range: 86-95 SS; Mean: 91
3 Typically developing participants (TD1 - TD3)
- Expressive Vocabulary: $\uparrow$ 25<sup>th</sup> percentile (CDI)
  Range: 235-516 (25<sup>th</sup>-75<sup>th</sup> percentile); Mean: 347
- Receptive Language: > 1 SD below mean (PLS-5)
  Range: 89-109 SS; Mean: 103

3 Expressive-only language delay (ELT1-ELT3)
- Expressive Vocabulary: $\downarrow$ 10<sup>th</sup> percentile (CDI)
  Range: 36-62 (all ≤ 5<sup>th</sup> percentile); Mean: 48
- Receptive Language: > 1 SD below mean (PLS-5)
  Range: 95-103 SS; Mean: 98

3 Expressive and receptive language delay (RLT1-RLT3)
- Expressive Vocabulary: $\downarrow$ 10<sup>th</sup> percentile (CDI)
  Range: 3-31 (all ≤ 5<sup>th</sup> percentile); Mean: 18
- Receptive Language: ≤ 1 SD below mean (PLS-5)
  Range: 66-79; Mean: 73
All participants

- **Use of gestures**
  - At least 3 (e.g., point, reach, push away)

- **No other conditions**
  - Autism: M-CHAT score ≥ 21
  - Motor & Cognitive: BDI-2 subtest scores > 85

- **Pass Screeners**
  - Independently complete at least 2 trials

- **Parental report of sensory skills**
Goal of the study:
- Teach 8 novel words
- Varied phonotactic probability (4 low; 4 high)
- Play-based
- Using unfamiliar toy referents & picture symbols
Repeated single case design (Kazdin, 2011)

- Three phases:
  a) Baseline
  b) Word learning training
  c) Follow up

- Independent Variables:
  - Group membership (TD, ELT, RLT)
  - Phonotactic probability of target words (Low vs. High)

- Dependent Measures:
  - Production: Words accurately used
    - Uncued & Cued Picture Requests
    - Spontaneous Spoken
  - Comprehension: Words understood
<table>
<thead>
<tr>
<th>Target Novel Words</th>
<th>Positional Segment Frequency</th>
<th>Biphone Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/naʊb/</td>
<td>0.0595</td>
<td>0.0004</td>
</tr>
<tr>
<td>/gɪm/</td>
<td>0.1072</td>
<td>0.0013</td>
</tr>
<tr>
<td>/mɔɪd/</td>
<td>0.0986</td>
<td>0.0004</td>
</tr>
<tr>
<td>/jeɪp/</td>
<td>0.1004</td>
<td>0.0017</td>
</tr>
<tr>
<td>Median value</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.1276</td>
<td>0.0037</td>
</tr>
<tr>
<td>High</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/wɔt/</td>
<td>0.1657</td>
<td>0.0066</td>
</tr>
<tr>
<td>/hɛp/</td>
<td>0.1494</td>
<td>0.0071</td>
</tr>
<tr>
<td>/pɪn/</td>
<td>0.2123</td>
<td>0.0053</td>
</tr>
<tr>
<td>/kʊf/</td>
<td>0.1615</td>
<td>0.0064</td>
</tr>
</tbody>
</table>

Participants

Experimental Design

Experimental Materials

Procedures

Data Analysis
Baseline session

- 8-minute play sessions with researcher (3)
- Comprehension Probes (3)
  - Placed all 8 novel toys in row in front of child
  - For each, “Show me ____.”
- Requesting Task Probe (1)
  - Placed all 8 picture symbols in front of child
  - Prompt: “Do you want the ____ or the ____? Give me the picture.”
- Toy Preference Screener
Word Training Sessions

1. ≥ 60% accuracy on requesting task probe
2. Demonstrated progress beyond baseline levels on comprehension task
3. Received all 8 bi-weekly training sessions

• Each session:
  1) Word training within context of play
  2) Comprehension Probe (1)
  3) Requesting Task Probe (1)

• Word training procedure:
  – Based on “modeling only” treatment condition (Ellis Weismer, Murray-Branch, & Miller, 1993)
  – Target words presented in mass trials
    • 5 models by researcher
    • Followed by 5 opportunities for child to request
Follow up

- Scheduled one week after child’s last word training session
- Comprehension and requesting task probes
- Caregiver-child language sample (including MLU)
- Toy Preference Screener

Interobserver Agreement

- Entire data set randomly assigned to 3 independent coders
- Re-coded 20% of each other’s assigned portions
- Agreement ≥ 84% for all data used in analysis
RQ1: Were there differences among participant groups learning to REQUEST new items with representational picture symbols?

For Uncued Requesting:

✓ Yes, but with some exceptions to the expected pattern

Consistent with current theory:

• 2 of 3 ELTs performed similarly to TD group

Challenges current theory:

• 2 participants’ performances:
  – ELT3: Worse than expected
  – RLT1: Better than expected

DeVeney 11/15/12
RQ1: Were there differences among participant groups learning to REQUEST new items with representational picture symbols?

For Cued Requesting:

✓ Cueing improved % correct novel words for most
✓ Particularly improved for ELT3

Consistent with current theory:
• Cueing improved requesting performance for most
• Not improved for RLT2

Challenges current theory:
• RLT1 performance
RQ1: Were there differences among participant groups learning to REQUEST new items with representational picture symbols?

For Spontaneous Spoken Productions:
- Yes, differences between and among groups

Consistent with current theory:
- ELT group produced more spoken words than RLT group
- 2 of 3 RLTs showed little spoken production

Challenges current theory:
- ELTs said as many target words as TD group
Spontaneous Spoken

Number of Novel Words Produced

TD1
TD2
TD3

ELT1
ELT2
ELT3

RLT1
RLT2
RLT3

DeVeney 11/15/12
RQ2: Were there differences among participant groups learning to COMPREHEND new items with representational picture symbols?

- 3 patterns of comprehension noted between and among groups:
  - Rapid
  - Moderate
  - No/little improvement

Consistent with current theory:
- TD group performance
- 2 of 3 ELTs performance

Challenges current theory:
- 2 participants’ performances:
  - ELT3: Worse than expected
  - RLT1: Better than expected
Background • Research Questions • Methods
Results & Discussion • Clinical Applications • Future Directions • Questions

Comprehension

TD1
TD2
TD3
ELT1
ELT2
ELT3
RLT1
RLT2
RLT3

% Correct Novel Words

DeVeney 11/15/12

Experimental Sessions
• Post hoc findings
<table>
<thead>
<tr>
<th>Expressive Language-only Late Talkers</th>
<th>Expressive Language-only Late Talkers</th>
</tr>
</thead>
<tbody>
<tr>
<td>who do not demonstrate rapid word learning skills</td>
<td>who demonstrate rapid word learning skills</td>
</tr>
<tr>
<td>Expressive And Receptive Language Delayed Late Talkers who do not demonstrate rapid word learning skills</td>
<td>Expressive And Receptive Language Delayed Late Talkers who demonstrate rapid word learning skills</td>
</tr>
</tbody>
</table>

Typically Developing Children
• Rapid word learning as assessment tool
  – May add to standard language assessment
  – Possibly help determine treatment response patterns
• Picture symbols facilitate verbal expression
  – Not commonly used
  – Have available, not ask for use specifically
  – More research/clinical documentation needed
• Limitations
  – Small number of participants
  – Small, limited sample of words
  – Scheduling differences

• Future directions
  – Group design/replication
  – Develop dynamic novel word learning task
  – Facilitating effect of picture symbols on verbal expression
  – Influence of word form characteristics
DeVeney 11/15/12

Nebraska Speech Language Hearing Research Grant
Barkley Memorial Dissertation Fund

Cynthia Cress, UNL
John Bernthal, UNL
Tiffany Hogan, UNL
Calvin Garbin, UNL
Shelly Lawson, UNO
Margaret Mitchell, UNO/UNL
Kelsey Paul, UNO/UCO
Lisa Schlautman, UNO

Participants and families