A Pilot Study Comparing AAC Vocabulary Usage Patterns Based on User Experience

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Research Questions

• What are the differences in augmentative and alternative (AAC) vocabulary usage patterns based on user experience?

• Specifically, what are the differences in the language representation methods (LRMs) of semantic compaction (SEM), spelling (SPE), word prediction (WPR), and single meaning pictures (SMP)?

• What is the word commonality by LRM used by both experts and novices?
Participants

• All have complex communication needs (CCN) and rely on AAC using direct selection
• 4 adults (3 males; 1 female) with cerebral palsy (CP)
  – 2 novice users who had 3 weeks experience with their current AAC program (ages 21 & 22)
  – 2 expert users who had 3 months experience with the same AAC program (ages 22 & 23)
Instrumentation

• All participants used a high technology voice output hybrid display with 128 locations and a touch screen with a language activity program (LAP) that contained 4,000 stored vocabulary items

• All LAPs supported SPE, WPR, SEM, and SMP

• Universal-Language Activity Monitoring (U-LAM) software was used to generate logfiles of device events
Procedure

The picture description task based on the Cookie Theft picture was administered to each participant following the instructions in the manual.
Data Analysis

• Performance Report Tool 1.0 (PeRT) was used to support data analysis.

• Descriptive statistics were used to report:
  – Frequency of core vocabulary use
  – Total number of words
  – Number of different word roots
  – Frequency of LRM use

• Word lists by LRM use were generated to identify commonality between experts and novices.
Reliability

• Interrater reliability
  – For word-by-word agreement was 100%
  – For utterance segmentation was 93%

• Interjudge reliability
  – For word-by-word agreement averaged 95%
  – For utterance segmentation averaged 96%
Results: Language Representation Methods (LRMs)

• Experts used significantly less SPE, WPR, and SMP when compared to novice users.

• Dramatic differences seen in use of alphabet-based methods:
  – Novice 1 spelled 19 words and predicted 27 words. Novice 2 did not use any spelling, but predicted 33 words.
  – Both experts spelled 4 words. Expert 1 predicted 1 work, and expert 2 did not use WPR.
## Results: Frequency of AAC Language Representation Methods (LRMs) in terms of percent (%)

<table>
<thead>
<tr>
<th>Subject</th>
<th>SEM</th>
<th>SMP</th>
<th>SPE</th>
<th>WPR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert 1</td>
<td>97.1</td>
<td>0</td>
<td>1.7</td>
<td>1.2</td>
</tr>
<tr>
<td>Expert 2</td>
<td>96.3</td>
<td>0</td>
<td>3.7</td>
<td>0</td>
</tr>
<tr>
<td>Novice 1</td>
<td>73.7</td>
<td>2.9</td>
<td>10</td>
<td>13.4</td>
</tr>
<tr>
<td>Novice 2</td>
<td>68</td>
<td>3.1</td>
<td>0</td>
<td>28.9</td>
</tr>
</tbody>
</table>
Results: Commonality

• Experts had a total of 32 words in common.
  – Novices used only 25% of these common words.

• Novices used SPE and WPR to access words common to the list of words using SEM by the experts.

• Novices relied on SPE and WPR to access core vocabulary.
# Commonality Word List

32 words were selected in common by the experts using SEM that were selected using SPE or WPR by novices.

<table>
<thead>
<tr>
<th>about</th>
<th>doing</th>
<th>her</th>
<th>mother</th>
<th>running</th>
<th>they’re</th>
</tr>
</thead>
<tbody>
<tr>
<td>and</td>
<td>don’t</td>
<td>home</td>
<td>on</td>
<td>she</td>
<td>to</td>
</tr>
<tr>
<td>because</td>
<td>down</td>
<td>is</td>
<td>or</td>
<td>son</td>
<td></td>
</tr>
<tr>
<td>before</td>
<td>family</td>
<td>like</td>
<td>out</td>
<td>the</td>
<td></td>
</tr>
<tr>
<td>can</td>
<td>for</td>
<td>look</td>
<td>over</td>
<td>them</td>
<td></td>
</tr>
<tr>
<td>children</td>
<td>getting</td>
<td>looks</td>
<td>picture</td>
<td>they</td>
<td></td>
</tr>
</tbody>
</table>
Clinical Implications of Research Results

• Novices rely on familiar text generation methods (e.g. SPE and WPR) at first encounter.
• The learning curve to become an expert using SEM appears to be as short as 3 months.
• LAM data can be used to identify how vocabulary is being accessed.
• Frequency of LRM use can be an indicator of competence and can distinguish a novice from expert user.
• Therefore, clinical intervention at the novice level can focus on identifying words selected using SPE and WPR and providing training on the icon sequences for SEM.
Thank you!

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