Variable effects of AAC input/output on conversations in dementia

Oregon Health & Science University Portland, Oregon

REKNEW-AD

- Reclaiming
- Expressive
- Knowledge
- in Elders
- With
- Alzheimer’s disease
Premise for REKNEW-AD research

- Pairing external aids with familiar and spared skills (such as page turning, reading aloud, autobiographical memories) maximizes a person’s opportunity for success.
- These skills are based on intact procedural memory.
- Symbolic representations may serve as semantic primes to stimulate lexical retrieval during conversation in moderate Alzheimer’s disease (modAD).
- Knowledge of input/output modes most appropriate for adults with modAD is useful in designing AAC supports.
Study 1 Question: Do AAC supports improve conversation by individuals with moderate Alzheimer’s disease?

**DESIGN:** # subjects per AAC-supported conditions

<table>
<thead>
<tr>
<th>Output Mode</th>
<th>Input Mode</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Print only</td>
<td>2-D + Print symbols</td>
<td>3-D + Print symbols</td>
<td></td>
</tr>
<tr>
<td>Voice output</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>No voice output</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10</strong></td>
<td><strong>11</strong></td>
<td><strong>9</strong></td>
<td></td>
</tr>
</tbody>
</table>

- Conditions are varied between subjects.
- Each subject participates in 4 conversations without AAC device and 4 with AAC device that was randomly assigned input and output modes.
- 1 control (without AAC) and 1 experimental (with AAC) conversation conducted at each visit.
Study 1 subjects with moderate Alzheimer’s disease (N=30)

Diagnosis of probable or possible AD by a board certified neurologist; Vision and hearing within functional limits; English as primary language; Exclude those with prior neurological diagnoses or communication disorders.

<table>
<thead>
<tr>
<th>Gender</th>
<th>23 Females</th>
<th>7 Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Mean = 74 yr.</td>
<td>Range = 50-94</td>
</tr>
<tr>
<td>MMSE (0-30)</td>
<td>Mean = 12</td>
<td>Range = 5-18</td>
</tr>
<tr>
<td>CDR (0-2)</td>
<td>Mean = 1.73</td>
<td>Range = 1-2</td>
</tr>
<tr>
<td>FLCI (0-88)</td>
<td>Mean = 61</td>
<td>Range = 27-85</td>
</tr>
</tbody>
</table>
Study 1 Method

1. Randomly assign subject to input/output condition;
2. Determine subject’s preferred topic and vocabulary;
3. Develop communication device;
4. Conduct 8 10-minute videotaped conversations in homes with and without the AAC device.
Study 1 results

1. Voice output distracts subjects with modAD and depresses performance. *(Fewer total # utterances and more 1-word utterances are produced with voice output)*

2. AAC supports placed in front of persons with modAD does not affect conversation. *(No specific input condition was beneficial; attention to board or physical reference to board was minimal or nonexistent for many subjects)*
Study 2 Question: Do AAC supports combined with spaced retrieval priming exercises improve conversation by individuals with moderate Alzheimer’s disease?

**DESIGN:** # subjects per AAC-supported condition

<table>
<thead>
<tr>
<th>Input Mode</th>
<th>4</th>
<th>7</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print only</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-D + Print symbols</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-D + Print symbols</td>
<td></td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

- Conditions are varied between subjects.
- Each subject participates in 3 conversations with AAC device (all preceded by spaced retrieval exercise) and 6 without AAC device (half preceded by spaced retrieval exercise).
- 1 conversation conducted at each visit.
- Each conversation includes the identical set of probes and sabotages that address a subject’s autobiographical topics.
Study 2 subjects with moderate Alzheimer’s disease (N=15)

Diagnosis of probable or possible AD by a board certified neurologist; Vision and hearing within functional limits; English as primary language; Exclude those with prior neurological diagnoses or communication disorders.

<table>
<thead>
<tr>
<th>Gender</th>
<th>12 Females</th>
<th>3 Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Mean = 77 yr.</td>
<td>Range = 60-92</td>
</tr>
<tr>
<td>MMSE (0-30)</td>
<td>Mean = 16</td>
<td>Range = 10-18</td>
</tr>
<tr>
<td>CDR (0-2)</td>
<td>Mean = 1.47</td>
<td>Range = 1-2</td>
</tr>
<tr>
<td>FLCI (0-88)</td>
<td>Mean = 71</td>
<td>Range = 61-84</td>
</tr>
</tbody>
</table>
Study 2 Method

1. Randomly assign subject to input condition;
2. Determine subject’s preferred topic and vocabulary;
3. Develop communication device;
4. Develop standard set of 10 questions and sabotages for conversation protocol;
5. Conduct spaced retrieval priming exercise before each AAC-supported and half of unsupported (control) conversations.
6. Conduct 10-minute videotaped conversations in homes with and without the AAC device, using standard 10-question/sabotage protocol.
Study 2 results

1. Subjects used the AAC device more when conversations were primed. (References to AAC device during conversations quadrupled, as compared to Study 1)

2. AAC combined with spaced retrieval exercise improved access to topical vocabulary. (In AAC-supported conversations, subjects used significantly more targeted words represented on the AAC device, as compared to control conditions.)

3. 2 and 3 dimensional symbols + print facilitate use of AAC device. (Subjects made significantly more references to the AAC device when the board contained 2 dimensional+print or 3 dimensional+print symbols, as compared to print alone.)
Clinical message:
AAC WITHOUT TRAINING IS NO AAC AT ALL!
ACKNOWLEDGEMENTS

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“Well, I could use this board to talk from breakfast to hell and back!”