Communication Supports for Persons with Dementia

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REKNEW-AD team:
(Reclaiming Expressive Knowledge in Elders with Alzheimer’s Disease)

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Goals for today’s presentation

• Gain familiarity with AAC (augmentative and alternative communication);
• Understand the issues around AAC and dementia;
• Learn about current research being conducted on AAC and adults with moderate Alzheimer’s disease.
What is AAC?

Augmentative and Alternative Communication refers to any strategy, technique or tool that enhances, replaces, augments or supplements an individual’s communication capabilities.
Augmentative Communication Approaches

- Speech
- Vocalization
- Gestures
- Eye gaze
- Body language
- Sign language

- Paper and pencil
- Communication books
- Communication boards and cards
- Talking toys
- Speaking computers
- Talking typewriters
- Voice output communication aids
Who is an AAC User?

Anyone whose communication is adversely affected by an impairment in speech, language, cognition, and/or physical abilities.
Communication impairments leading to AAC use

- Physical impairments
  - ALS (Lou Gehrig’s Disease)
  - Cerebral Palsy
  - Spinal Cord Injury
  - Parkinson’s Disease
  - Multiple Sclerosis

- Cognitive impairments
  - Traumatic brain injury
  - Mental retardation
• Language Impairment
  – Aphasia from a stroke
  – Autism
• Sensory Impairment
  – Blindness
  – Deafness

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• The father with ALS who chooses to use a ventilator and be part of his family as his girls grow up.
• The person with ALS who chooses to work from home.
• The woman with Parkinson’s Disease in a nursing home near her grandkids.

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• The man with aphasia at home with his elderly wife.
• The young man with a closed head injury at a SNF.
• The daughter with a fast growing glioblastoma.
• The preacher with olivo-ponto-cerebellar degeneration (OPCD).
Individuals with dementia, traditionally, have not been listed as a clinical group that has benefited from AAC.
Premise of pairing AAC and dementia

- Pairing the external aid with familiar and spared skills (such as page turning, reading aloud) should maximize a person’s opportunity for success.

- These skills are based on intact procedural memory.

- The stimuli are relevant to a person’s ADLs.
So, what AAC strategies and aids should we consider for adults with dementia?
Electronic Devices

• Speech generating devices
  – Synthesized speech output
  – Digitized speech output

• Computers (Handheld, wearable, or desktop)
  – Dedicated versus integrated devices
  – Software purposes:
    • Schedules
    • Reminders
    • Augmented input or output
AbleLink Handheld Visual Compass

AbleLink WebTrak

ERI
Picture
Planner

Dec 15, 1999 to Dec 21, 1999
Fri 12/17/99
8:00 AM 9:00 AM
Fri 12/17/99
Sat 12/18/99
8:00 AM 9:00 AM
Sat 12/18/99
Sun 12/19/99
8:00 AM 9:00 AM
Sun 12/19/99
Mon 12/20/99
8:00 AM 9:00 AM
Mon 12/20/99

bowling church class
External memory aids:

- Notebooks,
- cards,
- communication boards,
- calendars,
- signs,
- timers,
- labels,
- color codes,
- tangible visual symbols)
Good morning, Mom!

It is Tuesday and I am at work.
I'll be home for lunch at 11:30.

Watch TV
Fold the laundry
Love,
Jane

Today is Monday, April the 12th
9:00 Take a bath
12:00 Eat lunch
3:00 Mary will visit

The Election
- I am a Democrat.
- I vote at Polk School.
- My cousin Bob was the Mayor of Smithville in 1962.

- Made individualized memory wallets or cards
- Persons with mild AD
- Measured outcomes of conversations between trained caregivers (spouse, adult child, day staff)
- Wallets: Pictures and words for 3 topics:
  - Family names
  - Biographical information
  - Daily schedules.
Results

- Increased the frequency of factual information;
- Decreased the rate of ambiguous, perseverative, erroneous, or unintelligible utterances;
- Increased the conversational responsibility (turn taking) of person with dementia;
- Increased the number of on-topic statements during a conversation.
Now we know that non-electronic AAC options work. How can we examine these approaches further?
3 things to consider for each aid:

1. The messages or language in the aid;
2. How those messages are presented;
3. The output, or result, of selecting a message from the aid.
What messages should be chosen?

- Autobiographical memories might be accessible.
- Messages that affect the environment might be more meaningful.
- Message topics have been documented within the language of elders.
**Some elder speak topics**


<table>
<thead>
<tr>
<th>Emotional</th>
<th>Family Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Losing something important</td>
<td>Birth of sibling</td>
</tr>
<tr>
<td>Being embarrassed</td>
<td>Someone’s death</td>
</tr>
<tr>
<td>An argument</td>
<td>Child’s first day of school</td>
</tr>
<tr>
<td>Pet dying</td>
<td>First house</td>
</tr>
<tr>
<td>Being discipline at school</td>
<td>Moving to new home</td>
</tr>
<tr>
<td>Being lost</td>
<td>Moving to new school</td>
</tr>
<tr>
<td>Meeting a special friend</td>
<td>First love</td>
</tr>
<tr>
<td>Being chosen</td>
<td>Wedding</td>
</tr>
<tr>
<td>Wearing a special piece of clothing</td>
<td>Engage</td>
</tr>
<tr>
<td>Holiday</td>
<td>First dance</td>
</tr>
<tr>
<td></td>
<td>First child</td>
</tr>
</tbody>
</table>
Levels of representation

- Concept of “apple”
  - Auditory-verbal: WORD: say “APPLE”
  - Visual-verbal: Symbol: write APPLE
  - The tactile symbol: (The tactile Object of APPLE)
  - The visual symbol: Black & white picture
    Colored drawing
    Photograph
Symbol: visual or auditory representation for a referent

- Color
- Size
- Level of representation
  - Iconicity: Ease of symbol recognition
    - Transparent symbols- visually resemble their referents.
    - Opaque symbols- visual relationship to referent is not obvious. **DUCK**
What will be the result of symbol selection?

- Communication partner validates message.
- Electronic voice output that labels the symbol.
Neither **input mode** (symbols) nor **output mode** (+/- presence of voice output) has been experimentally controlled in research on AAC devices to enhance communication for adults with AD.
Current funded research question:

• Do AAC tools improve the quantity or quality of conversation by individuals with moderate Alzheimer’s disease?
Specific Aims

• 1. To compare the effects of different input modes in an AAC device on conversational skills of persons with moderate AD.
   – Print alone
   – Print + photographs
   – Print + 3-dimensional miniature objects
   – Photographs alone
   – 3-dimensional miniature objects alone
   – Control condition (no board).
2. To compare the effects of output mode in an AAC device on the conversational skills of persons with moderate AD.

– Digitized speech output
– No speech output
3. To determine whether the effectiveness of input modes on the AAC device varies with severity of language impairment of persons with moderate AD.

- Top half scorers on the Functional Linguistic Communication Inventory (FLCI)
- Bottom-half scorers on the Functional Linguistic Communication Inventory (FLCI)
4. To determine whether the effectiveness of output modes on the AAC device varies with severity of language impairment of persons with moderate AD.

- Top half scorers on the Functional Communication Inventory (FLCI)
- Bottom-half scorers on the Functional Linguistic Communication Inventory (FLCI)
Social Validation Aim:

5. To determine whether the effects of using an AAC device is viewed as successful by conversational partners.

6. To determine if the language symbols for each aid is translucent and represents the user’s concepts.
### Design for participants/board conditions

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>No Board</th>
<th>Print only</th>
<th>Print + 2-D symbols</th>
<th>Print + 3-D symbols</th>
<th>2-D symbols only</th>
<th>3-D symbols only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice output</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>No Voice Output</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Totals</td>
<td>60</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>
Questions you should be asking by now:

• What do these AAC devices look like?
• What do they sound like?
• What are the different input modes (symbols?)
• How does a participant use the device?
Flexiboard with 2-D symbols
Flexiboard with 3-D symbols

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Subject’s conversation
Subject Criteria

• Diagnosis of probable or possible AD by a board certified neurologist;
• Clinical Dementia Rating (CDR) = 1 or 2;
• Mini Mental Status Examination (MMSE) = 5-18 within 6 months of enrollment in study (or we administer);
• Vision and hearing within functional limits;
• English as primary language.
Exclusion criteria

History of other neurologic or psychiatric illness (no CVA, reported alcohol abuse, traumatic brain damage, reported recent significant psychological or speech/language disorder).

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### Subjects to date (4/2006)

<table>
<thead>
<tr>
<th>Subject</th>
<th>N=20</th>
<th>(4 withdrew)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>6 Males</td>
<td>14 Females</td>
</tr>
<tr>
<td>Age</td>
<td>Mean – 75.7 yrs</td>
<td>Range – 50 – 91 yrs.</td>
</tr>
<tr>
<td>MMSE</td>
<td>Mean-10.65</td>
<td>Range-5 – 17</td>
</tr>
<tr>
<td>CDR</td>
<td>Mean-1.7</td>
<td>Range-1 - 2</td>
</tr>
<tr>
<td>FLCI</td>
<td>Mean-50.35</td>
<td>Range-27 –80</td>
</tr>
</tbody>
</table>
Method

1. Identify participant and randomly assign to condition;
2. Determine participant’s preferred topic and vocabulary;
3. Develop communication device with randomly assigned symbols (+/-voice output);
4. Conduct 10 videotaped conversations:
   a) 5 conversations with assigned board;
   b) 5 conversations with no board (control);
5. Collect caregiver surveys on translucency of symbols.
6. Collect caregiver surveys on success of each conversation.
11 Conversation Conditions
(5 conversations each for an experimental & control conditions)

Control (No board)
2-D symbol
+ digitized speech output
- voice output

2-D symbol + print
+ digitized voice output
- voice output

3-D symbol
+ digitized voice output
- voice output

3-D + print
+ digitized voice output
- digitized voice output

Print
+ digitized voice output
- voice output
Outcome Measures

• The utterance is the unit of measurement
Outcome Measures
Outcome Measures
Results from first subject
Number of utterances/condition

![Bar chart showing number of utterances for Print and Voice conditions with Presence and Absence.

- Print: Presence (1400), Absence (800)
- Voice: Presence (1000), Absence (600)
### Number of utterances/condition

<table>
<thead>
<tr>
<th></th>
<th>Percent nonproductive utterances</th>
<th>Percent productive utterances</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Print conditions</strong></td>
<td>26%</td>
<td>74%</td>
</tr>
<tr>
<td><strong>No print conditions</strong></td>
<td>22%</td>
<td>78%</td>
</tr>
<tr>
<td><strong>Voice output conditions</strong></td>
<td>6%</td>
<td>94%</td>
</tr>
<tr>
<td><strong>No voice output conditions</strong></td>
<td>26%</td>
<td>74%</td>
</tr>
</tbody>
</table>
Acknowledgements

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