OREGON HEALTH & SCIENCE UNIVERSITY

Mobile Technology as Communication Supports for Adults with Primary Progressive Aphasia

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ATIA 2013 Research Symposium

A series of studies: 2004-2012

Do AAC tools improve the quality of conversation by individuals with degenerative language impairment associated with Alzheimer's disease or Primary Progressive Aphasia?

Series of experiments: Methods

1. Consent participant and communication partner in their primary residence;
2. Determine participant's preferred topic and vocabulary;
3. Develop communication board;
4. Conduct videotaped conversations with participant with and without communication support in scripted and naturalistic conditions.

Personalized communication board

Oil Painting

Tomio

Watercolor

Pottery

Hand Painted Pottery

Wedding Cranes

Origami

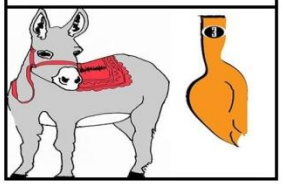
Kuni

Rock Painting

Arts &Crafts

Hand Pottery

Pin the Tail on the Donkey



Birthday Cake

Shell Art

Malheur County Fair

Ceramics

For people with AD and PPA:

- Low tech AAC provides meaningful language support during structured conversations for people with AD and PPA.
- Low tech AAC significantly reduces questions and prompts needed by the conversation partner.
- AAC balances the conversation more.
- This approach should be part of a treatment protocol for AD and PPA .

Next Steps

- Using mobile technology
- Compare vocabulary layouts during conversation (popular apps)
- In naturalistic settings
- Using personally relevant, contextualized photos
- With both PPA and AD participants

Justification

“ I can understand what he is saying when I start the conversation. But when Jim comes up to me and wants to tell me something, and I don’t know the topic, I have no idea what he is talking about!”

PPA Pilot Research Questions

- Does the use of mobile technology for language support improve conversation in people with PPA?
- Do different vocabulary layouts (different apps) in mobile technology affect conversation in people with PPA?

A functional barrier task: Novel activities and conversations

- Making a smoothie
- Potting a plant
- Making a sandwich for lunch

New information

Method: Share new information

- Conduct an activity in the participant's house when the spouse or daughter is NOT present.
- Ask the participant to describe the activity just accomplished to:
  - The RA ***without*** the iPad
  - The spouse/daughter ***with*** the iPad

Device

iPad (3rd gen)
with 16 GB
memory and
wifi
capabilities

Method

- Subjects – 3 men, 1 woman; age: 69-75 yrs
- Dx: Primary Progressive Aphasia
- Setting: Home
- Communication partners: RA for control conversations; wife or daughter for AAC supported conversations

Language Assessment

	Age	**Years Of Ed**	**BNT** Raw Score	**WAB AQ**	**BDAE Oral:Verbal Agility** **Apraxic?**	**NAT Total Correct**
002JA male	76	15	**25**; 3.5 SD below the Mean	91.8 Mild	6:7 No	70%
003WM male	74	12	**46**; .5 SD below the Mean	93.8 Mild	5:7 No	36%
004LS male	69	14	**0**; 8 SD below the Mean	32 Severe	5:7 No	0%
005MC female	75	16	**0**; 8 SD below the Mean	64.9 Moderate	11;13 No	0%

Cognitive Assessment

	Age	Years Of Ed	CLQT Composite Severity Score	Clock Drawing	Comments
002JA male	76	15	3.2 Mild	8 Moderate	Mild Attention and Visuospatial domains; Moderate Executive Function domains
003WM male	74	12	3.6 WNL	1 Severe	Mild Memory & Language domains
004LS male	69	14	1.8 Moderate	0 Severe	Severe Memory, Executive Function and Language domains
005MC female	75	16	1.2 Severe	8 Moderate	Severe Attention, Memory, Language and Visuospatial domains

Observational Scales

	Age	Years Of Ed	PASS Sum of Scores (0-33)	CDR Standard Global Score (0-3)	Supplemental CDR (Behavior and Language items) (0-3)
002JA Male	76	15	4.5	.5	.25
003WM Male	74	12	7.5	.5	1.25
004LS Male	69	14	14	.5	.5
005MC Female	75	16	5	.5	.5

Assessment Summary: 4 participants with PPA

- Expressive language skills mild to severely impaired
- Limited to no presence of oral/verbal apraxia
- Moderate to severe impairment in sentence production
- Formal cognitive skills WNL to severely impaired
- CDR Scores low (.5 of 3): Functional in their day

Comparing 5 layouts:

Does the presentation of language make a difference?

Visual Scene + speech (no label)

- One picture with 9 hot spots
- Started with Scene & Heard by TBoxApps
- Using GoTalk Now by Attainment Co.

Grid: 9 photo + label + speech

- Started with Talk ‘n Photos app
- Changed to GoTalk Now

Grid: 9 photos + speech (no label)

- Pictures obtained during real time activity
- Started with

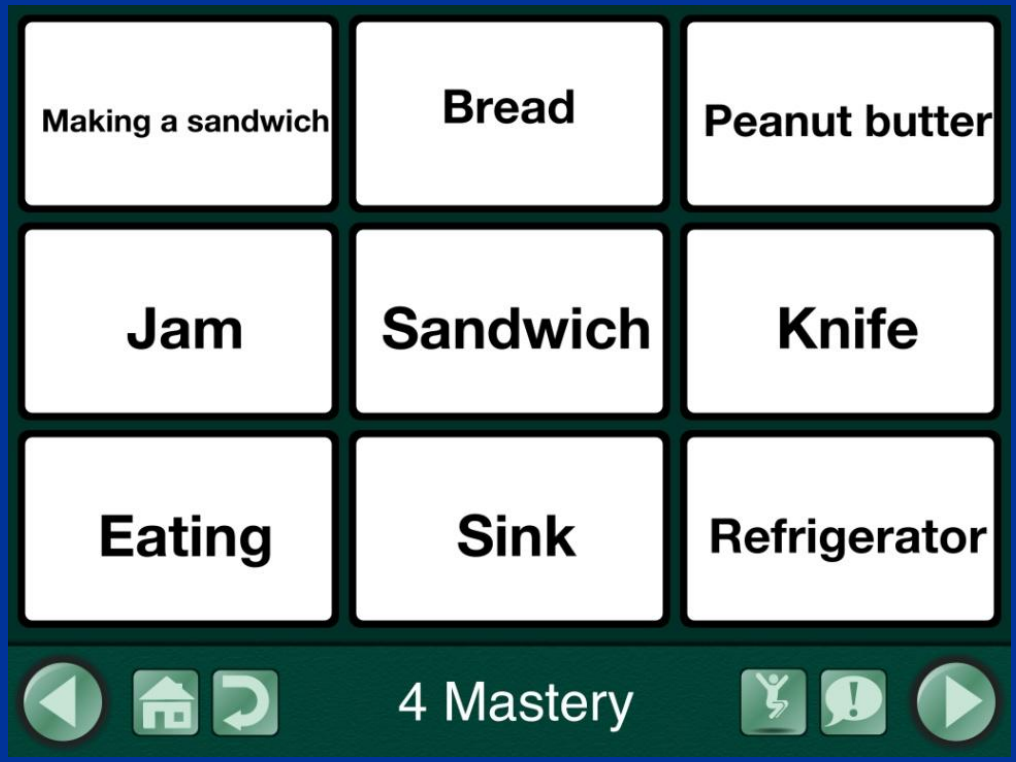
Talk ‘n Photos app

- Changed to

GoTalk Now

Label + speech (no photo)

- Grid with 9 target words
- GoTalk Now by Attainment Co



3 level grids: Photo + label + speech

- 3 photos
- 1 operations button
- Started with

PhotoVOCA app

- Using GoTalk Now

Levels 2 and 3: Photo + label + speech

Comparing 5 vocabulary layouts

1. Visual scene- 9 hot spots + speech (no labels)
2. Grid- 9 buttons, photo + label + speech
3. Grid- 9 buttons photo +speech (no labels)
4. Grid – 9 label + speech (no photo)
5. Three level grids (nested screens)
   - 3 buttons: photo + label + speech
   - 1 operation button

Method: 6 visits and 3 activities

Visits 1 & 2

- Consenting
- Language/cognitive assessment

Visit 3

- Teach participant how to use the chosen 3 layouts (with mastery sandwich screens).
- Show participant and spouse how to use the iPad for a conversation.

Method: Visits 4 - 6

1. Conduct and photograph activity
2. Conduct baseline conversation with RA (no iPad)*
3. Create board layout with 9 messages in randomized condition
   - RA records her speech for the digitized output
   - Use humor and vocabulary of participant when possible *“That smoothie is ugly.”*
   - Each message includes activity name (in case it is the only message selected)
4. Review app for visit and repeat mastery task
5. Conduct iPad conversation with spouse or daughter*

* All conversations are videotaped.

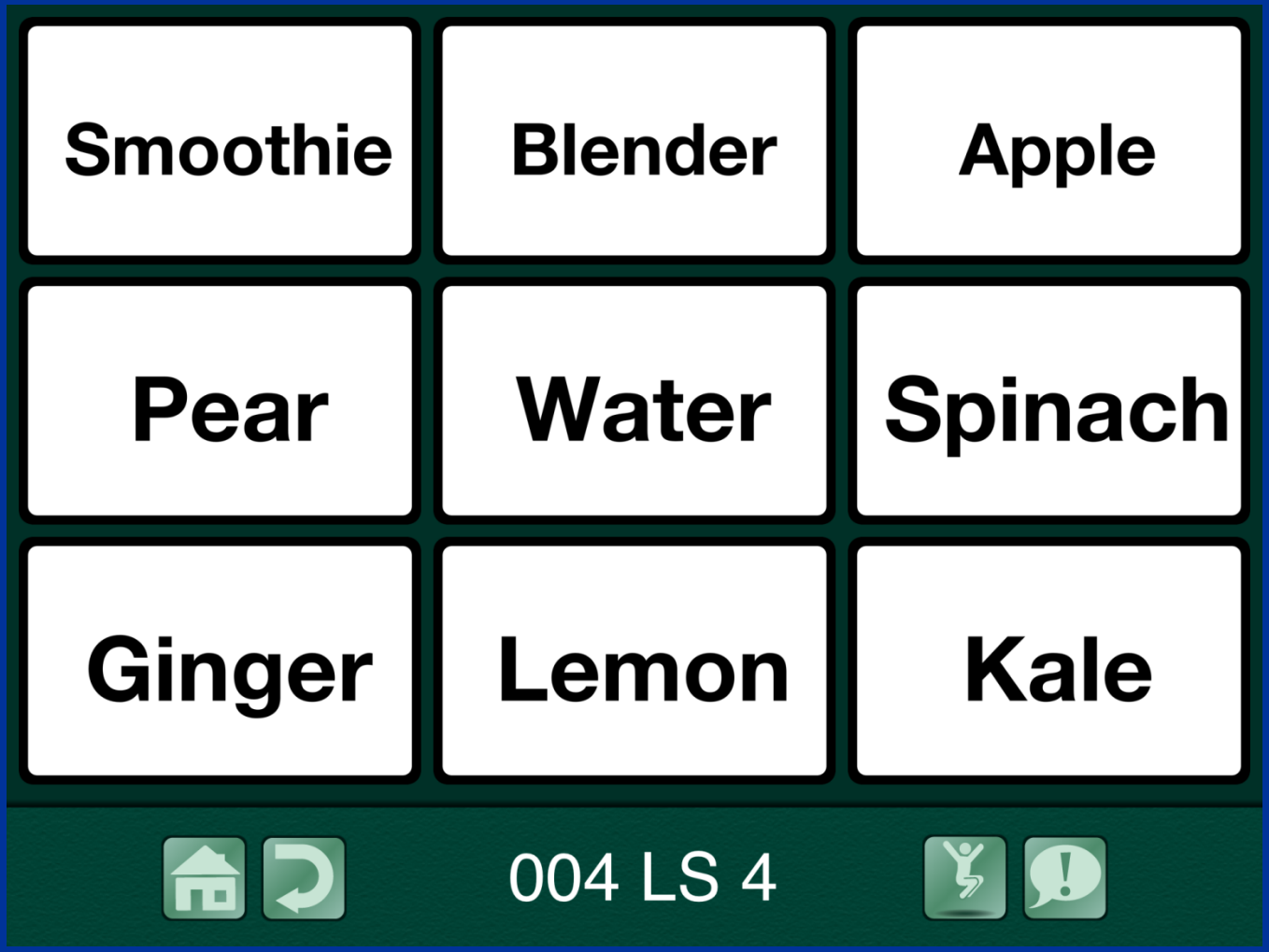
The Conversations and Supports

Activity: Making a sandwich and lunch
Layout condition: Visual scene + 9 hot spots

Activity: Making a sandwich and lunch
Layout condition: 9 grid photo + label + speech

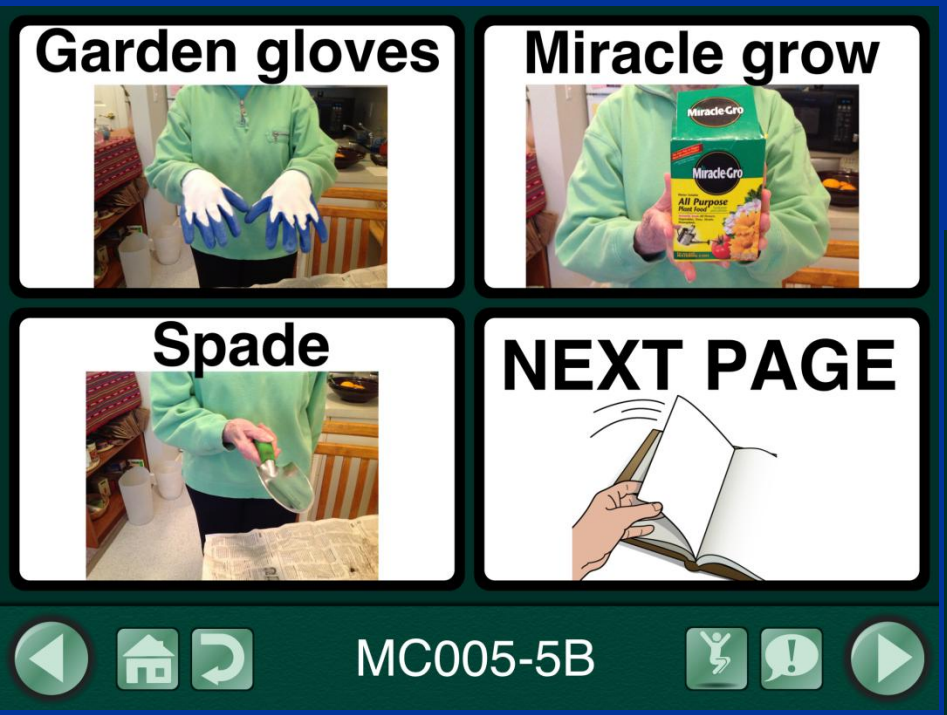
Activity: Potting a plant
Layout condition: 9 grid photo + speech

Activity: Making a smoothie
Layout condition: 9 grid label + speech



Activity: Potting a plant
Layout condition: Nested 3 layers
with photo + label + speech

Levels 2 + 3


Garden gloves
Miracle grow
Miracle-Gro
Miracle-Gro
All Purpose
Spade
NEXT PAGE
MC005-5B


Clay pot
Plant
Water can
GO BACK
MC005-5C

Impressions from pilot data

1. Mobile technology apps support conversation and sharing new information by people with PPA.
   - Each pair agreed that new information was presented with the iPad.
   - The iPad created a more fluent conversation.
   - All spouses reported that they got the gist of the story.

2. *Partner training* is imperative if people are to incorporate technology into conversation.
   - Spouses did not know how to respond to iPad; need training to add technology to their conversational modes. (Perhaps add video review at each visit)
   - Some participants with PPA did not know how to switch strategies between speech and iPad use.
   - ¾ of the participants do not use computers for communication now; adding this medium will require *training* (it's NOT cheating to use the iPad!).

3. Different layouts facilitate lexical support
   - Layouts with written labels are most beneficial. (Reading single words or phrases is a strength for people with PPA.)
   - Users preferred large pictures.
   - The multi-level grids offer operational challenges to people who are not familiar with technology.
   - Layouts without labels may stimulate repetition and practice.

Next steps

- Continue with data collection and analysis
- Teach people with PPA to take photos and place them in apps
- Examine different word functions (nouns, verbs, adjectives)
- Add participants with AD
  - Require spaced retrieval training
  - No speech output condition

Roger's dynamic real time knowledge based updating:

- http://www.polleverywhere.com/multiple_choice_polls/OTAxMzc4Njg2

Webcast references

www.aac-rerc.com

Rehabilitation Engineering Research Center in Communication Enhancement

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Copy of presentation slides at: www.aac-rerc.com
http://www.reknewprojects.org