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Study 2: Effect of Training on AAC Use

The Question

Our goal was to find out how we could help people with dementia related to Alzheimer's disease (AD) maintain their ability to communicate for as long as possible.

What did we decide to do, and why?

As Alzheimer's disease progresses, people lose the ability to remember words and even important events in their lives. Because of this, their ability to have meaningful conversations begins to falter. They become isolated from their families and friends and their quality of life is reduced. We thought if we could support their ability to remember words about things that were important to them we might also help them maintain the ability to have conversations. An earlier study of ours (Study 1) investigated the use of Alternative and Augmentative Communication (AAC) for this purpose. In that study we found that people with AD often were uncertain about using the AAC tools we presented to them, or even failed to recognize their presence. We also discovered that AAC tools with "voice output" ("spoken" labels made by a recorded voice) were not helpful and seemed to distract the users.

So we asked ourselves how we should be presenting AAC tools to people with AD, and how we might teach them about using them so that those tools were accessible and useful. Study 2 was developed to investigate ways to encourage people with AD to use an AAC device to help them converse. An important part of the study was the inclusion of a way to teach the participants about the AAC device and how to use it. The method we chose to encourage participants to use their AAC device is called "spaced retrieval" training, also called priming.

What is AAC?

AAC includes a wide variety of tools used to replace speech (for people who cannot speak) or to supplement speech. An AAC device can be many things; basically it is anything that supports

communication by reducing the demands on the speaker. For a person with physical speech difficulties it may be an electronic keyboard that the person can activate to "speak" recorded words or phrases. For people with AD, the goal is different. They usually can speak perfectly well, but they have difficulty finding the words they need to express themselves. An AAC device that could reduce the demands on their memories by providing words and/or images related to the subject of a conversation might provide them great support in conversing. Possibilities include devices with pictures, objects or printed labels that remind the speaker of the words needed to discuss a favorite topic.

What is spaced retrieval training?

Spaced retrieval training is a method that helps people learn and retain information by having them repeat the information repeatedly in a certain manner and then having them recall it over increasingly longer periods of time. It has been found effective in older people and in people with dementia or AD. Procedural memory is not affected by AD. In our research, spaced retrieval training consisted of the research assistant (RA) reviewing the key words to be used in our conversations with the participant before the conversations were held. The RA would say to the participant "I'm going to say a word. Repeat it after me." The words came from a group of 16 words selected for that person's AAC device. When the participant had successfully repeated each word immediately after being asked, the research assistant would go through the list again. But this time after saying the word the RA would say "now it's your turn". The introduction of the phrase "Now it's your turn" added time and other content so that retrieval required a little more work. When priming was done with the AAC device present, the participant was also asked to point to each word on it as he or she repeated it.

Our Study

Study 2 involved 11 people with moderate AD. Some of them lived at home and others lived in Alzheimer's Care Units. For each of these people we made a personalized communication board (an AAC device). First, caregivers were interviewed to determine a topic of particular interest to the participant. When we had determined a topic, we selected a group of 16 words that would be useful in discussing that topic; for example "rose" might be a useful word for the topic of flower gardening. The communication board, or AAC device, consisted of a board made of wood and titanium. Attached to the board were 16 symbols. These symbols were of one of three types: labeled pictures, labeled objects (such as a miniature golf club), or simply printed words. Each person was randomly assigned to one of these types of symbols. A board was created for that individual with the words, pictures or objects used to discuss the chosen topic. Family members often provided family pictures and small objects for us to use on the boards. The topics ranged from family to gardening to being a cowboy.

Each participant participated in nine conversations with an RA. All conversations held with a particular participant involved the same RA. These conversations were of three types:

1. Three conversations consisted of the research assistant and the participant just sitting down and discussing the topic chosen for that person.
2. Three of the conversations began with the research assistant going over the words that had been selected for the participants' board with the participant (spaced retrieval training) before having a conversation on that topic. The AAC device was not present.
3. Three conversations began with the research assistant doing spaced retrieval training with the AAC board present, pointing to the board as each word was presented, and having the participant point to that word as they repeated it. This was followed by a conversation on the topic of the board with the AAC board in front of the participant. The participant could refer to the board as desired.

All the conversations were structured in a similar way, beginning with a greeting, then an introduction to the topic, an introduction to the AAC device if it was present, ten standardized questions spaced throughout the conversation, and a closing statement. This was done to lessen the amount of variability between the three types of conversation. Each conversation was videotaped for ten minutes.

When possible, the primary caregiver for a participant was present so they could evaluate the conversation, using a rating form with questions about how successful the conversation was. In the Alzheimer's Care Units, caregivers sometimes weren't available to observe the conversations, so we asked them to view four of the videotapes and rate them at the end of the research.

What did we look at to determine if spaced retrieval training was successful and to determine if the AAC device supported conversation?

Two researchers who were not present for the conversations evaluated the videotaped conversations. For each participant, one collected information on the three conversations with an AAC device present and the other collected information on the remaining six conversations. Who did what alternated from participant to participant. This avoided having a coder biased in evaluating the segments with the AAC device. SALT (Semantic Analysis of Language Transcripts) software was used to code the conversations. We coded the speech of both the participants and the RAs, as well as any physical references to the AAC device (such as pointing to the symbols or touching the device). The conversation of each person was broken into segments, called utterances, as defined by SALT. SALT considers an utterance to be a complete thought, which may also be marked by a pause or a rising or falling tone of voice, such as what happens when asking a question.

For each participant, a list was compiled of all the content words (nouns, verbs, adjectives and adverbs) used in their conversations. This list was divided into Targeted Words (vocabulary which was on their AAC device or was synonymous with it, such as **Ben** and **husband**); Related Words (words which were highly related to the AAC vocabulary, such as **garden** and **tilling**); and Unrelated Words (all other words). We calculated the number of Targeted Words a participant used, the percentage of Targeted Words out of the total words they used, and the percentage of Targeted plus Related Words out of all the words they used. References to the AAC device were also noted because this provided an important indication of the participant's awareness of and use of the device when it was present. The SALT software also compiles many other details about conversations which were useful to characterize the participants' conversations.

In order to use our data we had to establish that the researchers evaluating the videotapes were observing the same things; that is, that they were reliable. To do this, two conversations with each participant (22% of the data) were coded by both research assistants and compared. An 80% overall agreement or higher was required to consider our coding consistent, which we achieved.

What did we find out about the conversations of the participants?

We found that each participant remained remarkably consistent in terms of length of sentences, number of one-word statements, and number of sentences in all of their conversations. They also showed consistency in terms of the number of Targeted Words used within each of the conversation types. However, there was quite a bit of variation between the participants. For example, one individual made many one-word statements, while another made almost none at all.

What did we find out about the conversations of the partners?

The use of a standard script with ten questions specific to each participant was intended to keep the partners' conversations consistent as they moved between the three kinds of conversations. We found that the partner's conversations were remarkably consistent, having almost identical numbers of utterances and questions across the three conditions for any given participant.

What did we learn?

The focus of this study was to investigate how to familiarize participants with an AAC device and to see if the use of the AAC device supported the ability to converse when it was preceded by training. The method we used was spaced retrieval training, or priming. We found that all participants made some reference to the AAC device over the three conversations when it was present. Compared to Study 1, in which participants used the same AAC device, but without the spaced retrieval training, participants used the communication board four times more on average. Clearly, the participants were aware of the AAC device, as demonstrated by their references to it.

In order to see if, with training, the use of the AAC device made a difference in the ability of the participants to converse, we looked at all the content words we had compiled (nouns, verbs, adjectives and adverbs) from their conversations. We found that primed conversations with the AAC device present showed significantly more use of Targeted Words than conversations in the other two conditions (without an AAC device). The priming and presence of the communication board together did improve access to the Targeted words. However, participants did not show a significant increase in the use of Related Words.

This research showed that providing a custom-designed AAC device in combination with spaced retrieval training was effective in terms of helping individuals with AD to access words needed to discuss a favorite topic. Our current research efforts will continue to investigate the use of AAC by persons with AD and other forms of dementia.