Impact of Remnant Versus Pictographic Communication Books on Communicative Interactions for An Individual with Aphasia

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Abstract

Aphasia is a loss of receptive and/or expressive language acquired most often from stroke, but can also be acquired by head trauma, tumors, degenerative diseases or removal of brain tissue. Individuals with severe aphasia often do not return to their baseline communication abilities even after therapy because of the extensive damage that has been caused. An individual that does not return to baseline would be a good candidate for an augmentative and alternative communication (AAC) system in order to help the individual experience successful communicative interactions (Beukelman & Mirenda, 2005).

An AAC system is commonly used to help an individual replace or supplement communication abilities that are impaired due to developmental or acquired deficits. The purpose of this current study examines the effect that two different low-tech AAC systems have on the communication skills of an individual with aphasia. Data were analyzed using visual inspection. The results indicated that using a communication book, specifically a remnant or pictographic book, resulted in an increase in the frequency of occurrences in turn taking. The intervention did not have an effect on topic initiations, no responses, and repairs of communication breakdowns.
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CHAPTER 1

Introduction

Aphasia is a loss of receptive and/or expressive language acquired most often from stroke, but can also be acquired by head trauma, tumors, degenerative diseases or removal of brain tissue. Aphasia can be characterized by either fluent or non-fluent types of communication, often accompanied by verbal and written expression deficits, auditory and reading comprehension deficits and at times, cognitive-linguistic deficits. The type of aphasia an individual acquires is based on the affected location on the left side of the brain. The left side of the brain houses receptive and expressive language abilities. Receptive language abilities include auditory and reading comprehension, whereas expressive language abilities include written and verbal expression (Chapey, 2008). Individuals with severe aphasia often do not return to their baseline communication abilities even after therapy because of the extensive damage that has been caused. An individual who does not return to baseline would be a good candidate for an augmentative and alternative communication system in order to support successful communicative interactions (Beukelman & Mirenda, 2005).

An AAC system is commonly used to help an individual replace or supplement communication abilities that are impaired due to developmental or acquired deficits. According to Beukelman and Mirenda (2005), an AAC system can contain symbols, aids (i.e., communication boards or electronic devices voice output devices), strategies (i.e., ways to relay a message most efficiently and effectively), and techniques (i.e., how the message is sent). These systems can be aided (i.e., real objects, photographs, line drawings) or unaided (i.e., signs, gestures) and can either be low-tech (communication books, wallets, or boards) or high-tech speech generating devices. Many clinicians who work with individuals with aphasia choose to integrate an AAC system into their therapy approaches when intervention to restore linguistic abilities is unsuccessful (Beukelman, Fager, Ball, & Dietz 2007; Fox, Sohlberg, & Fried-Oken 2001). The type of AAC system has to be carefully selected by the intervention team since the amount of choices are seemingly endless.

High-tech AAC devices can be used by individuals with communication impairments, however, the instruction of the device use and management can be
extensive and place a large cognitive load on the individual with aphasia, creating a frustrating environment for the individual (Beukelman & Mirenda, 2005). It is beneficial for speech-language pathologists (SLPs) to have research on many different low-tech AAC systems to be able to implement with their patients because: 1) The spectrum of severities of communication impairments in individuals with aphasia can be extremely wide 2) Some SLPs determine that a low-tech device is most appropriate for their patient based on AAC trials. The purpose of the current study is to examine the effect that two different low-tech AAC systems have on the communication skills of an individual with aphasia.
A few studies have begun to investigate the effectiveness of various low-tech AAC systems on the communication rehabilitation of individuals with aphasia and a few studies examined the use of homemade communication books and graphic symbols during conversations. One such low-tech AAC systems study was by Ho, Weiss, Garrett & Lloyd (2005). They investigated how individuals with global aphasia communicated with partners with and without a communication book, and between a remnant and pictographic book. A remnant book includes photographs or actual objects indicating recent or past events, (e.g., a ticket stub to a baseball game) and a pictographic book uses two-dimensional Picture Communication Symbols (Mayer-Johnson, 2004). The researchers provided two individuals with global aphasia a pictographic book and a remnant book. Each book consisted of 10 pages, with each page containing one symbol (a remnant or pictographic symbol). Under the symbol, a description of what the symbol was or what it represented was provided. The symbols and descriptions were personalized for each participant. For example, one participant had a picture that represented a bag of seeds and underneath the picture was the caption, “I like to grow vegetables and flowers.” The researchers used a combination ABA and alternating single subject treatment design. During baseline, a communication partner interacted with the participant without the communication book. The communication partner was told to ask the participant at least three open-ended questions, to make at least three comments, and to respond to any conversational attempts. During intervention, the conversational partner followed the same procedures as during baseline, except either a remnant or pictographic book was made available. Following the intervention phase, a second baseline phase was implemented. The sequence in which the independent variables were presented was alternated each session to control for treatment effects. The dependent variables were conversational turns, topics, initiations, communication breakdowns, negative affect, no response, and pointing. The data were not statistically analyzed, but rather, visually analyzed. The results of the study indicated that, during baseline, both of the participants’ results were variable. The only stable baselines occurred with topic initiation and
pointing for both participants; the other dependent variables were unstable. During the intervention phase, the frequency of unrepaired communication breakdowns decreased for both participants, the frequency of topic initiation increased for both participants, the frequency of pointing increased for both participants, and the frequency of negative affect decreased for one participant. The second baseline consisted of a withdrawal of the independent variables. Results indicated that the frequency of pointing and unrepaired communication breakdowns returned to pre-treatment levels, whereas the other dependent variable levels were variable. According to the researchers, the remnant communication book appeared to facilitate communication better than the pictographic book, since the remnants served as meaningful communication pieces that facilitated communication between the patients, their family members, and the clinicians. Although the results indicated that the use of the communication books improved the communication interactions between the participant and the conversational partner, these results must be taken with caution. The results were visually analyzed which makes it difficult to determine whether the communication books made any actual statistically significant differences in the communication behaviors of the participants.

Garrett, Beukelman, & Low-Morrow (1989) conducted a single case study involving an individual with Broca’s aphasia. The case study involved the creation and implementation of a low-tech AAC book within the participant’s therapy. The AAC book contained a word dictionary, an alphabet card, and a new information pocket (a pocket for the participant to carry around pieces of current information) and breakdown resolution cards. Along with using the communication book during communication interactions, the participant was encouraged to use verbalizations, gestures, writing, and drawing to help facilitate his communication interactions. The participant did not use any AAC system prior to the initiation of the study. An electronic AAC device (i.e., TouchTalker™) was trialed prior to implementing the low-tech AAC system into therapy. Due to limitations of the TouchTalker™ and the difficulties it caused the participant, its use was discontinued. Instead, the researchers created a low-tech comprehensive AAC book that stored important information that the participant needed in order to interact in his environments. During intervention, the participant used his communication book during various communication tasks. The authors provided a key
for the participant during intervention. The key consisted of three steps including (1) gesture, write, repeat (2) word notebook, alphabet card, and (3) clues, directions. The participant practiced using his comprehensive communication book and the skills he learned during intervention in a natural setting for generalization purposes. Results showed that the participant improved his communication interactions while using his comprehensive, low-tech AAC device. When the communication book was made available, the total number of conversational turns increased, the amount of conversational turns it took to resolve a communication breakdown decreased, the number of turns that provided information nearly doubled and the frequency of conversational initiations by the participant increased.

Garrett & Huth (2002) researched the effects that graphic cards had as conversational topic setters on conversational interactions with one individual with severe aphasia. The researchers used a single subject reversal design. During intervention, the researchers provided a conversational topic setter, which included either world news or events in which the participant was involved. These news items and events were represented by objects such as photos, ticket stubs, and newspaper headlines. Four conditions were implemented during the intervention phase: (1) no support during a communication interaction, (2) contextual support (which included the topic setters), (3) contextual support and instruction (which involved the topic setters and verbal and written instructions on how to converse with the participant’s conversational partner prior to the interaction), and (4) only contextual support. Results showed communication interactions were more successful when a topic setter was available. The duration of the conversation, the number of exchanges and the number of conversational initiations increased. The researchers indicated, “the participant appeared better able to co-construct conversations when pictures or key words associated with graphic topic setters were available to supplement the natural communication signals of a communicator with severe aphasia” (p. 536). The researchers surmised that the conversational partners were provided a clue about the content of the conversation, which helped the partner understand what the individual with aphasia was trying to communicate to him or her.

The Ho et al. (2005) study compared different low-tech AAC systems in individuals with aphasia. However, the individuals with aphasia involved in the study
were in the acute stage of recovery and had a diagnosis of global aphasia; therefore, it is difficult to determine whether the improvements were due to the interventions or due to spontaneous recovery. Furthermore, it may be difficult to generalize the effects of the treatment to other individuals with aphasia since the participants in this study were diagnosed with global aphasia.

Therefore, the aims of the current study were to examine the differential impact of low-tech AAC systems (i.e., pictographic communication book and remnant communication book) on the communicative interactions of an individual with Broca’s aphasia and severe apraxia of speech. Two AAC systems were compared using an alternating treatments design. The researcher developed eight questions to which the participant could respond regarding topics chosen to be of interest to the participant based on a Likert scale.
CHAPTER 3

Methods

Participant

The participant involved in this study was receiving speech and language services from a first year graduate student in a university setting at the time of recruitment. The participant was a 34-year-old, high school educated, monolingual English speaker who was diagnosed with Broca’s aphasia and severe apraxia of speech secondary to sustaining a left-sided cerebrovascular accident in 2011. Hearing and visual acuity were both judged to be functional for 1:1 conversational exchanges. The participant demonstrated unilateral left upper extremity movement within functional limits for participating in tasks during treatment sessions. In addition, the participant was receiving speech and language therapy at an outpatient clinic. The SLP at the outpatient clinic was informed of the study and was asked to not treat or discuss any of the variables being manipulated in the study.

The Western Aphasia Battery Aphasia Quotient (WAB AQ) (Kertesz, 1982) was used to determine overall general language performance. Further specific testing was conducted using the Boston Naming Test (BNT) (Kaplan, Goodglass, & Weintraub, 2001), the Pyramids and Palm Trees Test (PPTT) (Howard & Patterson, 1992), and subtests of the Psycholinguistic Assessments of Language Processing in Aphasia (PALPA) (Kay, Lesser, & Coltheart, 1992). According to the classification scheme used by the WAB (Kertesz, 1982), the participant presented with a Broca’s aphasia. Results of other testing indicated a severe expressive aphasia and severe apraxia of speech with mostly nonverbal methods of communication such as gestures and attempts at verbalization. The participant also used an iPad to aid in her communication attempts. When the participant was unable to provide sufficient information via verbal or gestural communication, the participant used iPad applications such as notes and Proloquo2GoTM applications to type or show pictures to help get the message across.

Setting

The study took place in a 10’ x 7 ¾’ treatment room in a university clinic. Stimuli were placed on a 4.5’ x 2’ table. The researcher sat 2’ across from the participant. All sessions were videotaped using a fixed 1080p/3MP AXIS P1346 network camera with two-way audio, located approximately 7’ feet away from the participant and located in
the corner of the room. The recording system was faced towards the table with the participant being in frontal view. Each session was observed by the researchers’ graduate advisors to establish treatment integrity.

**Research Design**

An alternating treatments single subject design was used for this study. One treatment (i.e., remnant book or pictographic book) was implemented for the first five minutes of each one-hour session. During the subsequent 50 minutes, the participant received speech-language therapy addressing goals that were not associated with the study. During the final five minutes of the session, the other treatment was implemented. The experimental treatments were counter-balanced across sessions to control for order effects. Treatment involved a five-minute interaction involving a topic based on a specific remnant (from the remnant book) or pictographic symbol (from the pictographic book). Several topics were chosen for possible discussions, however, the participant only rated six of the topics a four or a five on a Likert scale. Any topic that was rated lower than a four was defined as uninteresting to the participant and was not used.

**Independent Variables**

The independent variables were a remnant communication book and a pictographic communication book.

**Dependent Variables**

The dependent variables were (1) conversational turn taking, (2) topic initiations (assertions, requests, questions, requests for clarification, requests for repair, answers not responded to, and requests of questions), (3) ability to repair communication breakdowns (reducing, adding, and repeating), and (4) number of no responses.

**Stimuli Development**

Two communication books were developed that included items or symbols representing a specific topic. During baseline, the communication books were not made available. During the intervention phase, the communication books were made available, one at the beginning of the session, and one at the end of the session. The use of the communication books were alternated each session to control for order effects. It was hypothesized that improvements will be made whether using the pictographic or remnant communication books, however, improvements will be greater when given the remnant
communication book. Remnant and pictographic stimuli were used to represent six conversational topics. The topics were chosen based on the participant preference. Preference was determined by the participant ranking topics on a five-point Likert scale. Of the topics provided, the ones used in the study included camping, cooking, football, gardening, restaurants, and fishing because her ratings on the Likert scale (4-5), indicated a strong interest in the topic. The pictographic stimuli were Picture Communication Symbols (Mayer-Johnson, 2004). The remnant stimuli were physical objects collected by the researcher and the participant. Two six-page communication books were constructed using the stimuli. Each page in the communication books contained one stimulus and a short sentence under the symbol (e.g., “I like to go fishing”) to represent the topics.

**Baseline Phase**

The participant and the researcher engaged in a conversation based on the topics chosen for the study. The first five minutes of a one-hour session and the last five minutes of the session were devoted to baseline data collection. The 50 minutes between data collection were devoted to speech-language therapy unrelated to the study. Baseline data collection continued for three days (allowing each topic to be addressed one time). During baseline, the researcher asked eight questions during each session. Questions were predetermined and balanced across topics. An open-ended question, a yes/no question, and wh- questions were asked during each session. See Appendix A for complete list of questions. The remnant communication book and pictographic communication book were not available during baseline sessions.

**Intervention**

The intervention phase was identical to the baseline phase except the books were made available during intervention (one book at the beginning of the session and one book at the end of the session). A communication book was placed on the table in front of the participant. Treatment data were collected for three sessions. Each topic was discussed twice, once with the remnant stimuli and once with the pictographic stimuli. During the treatment phases, the researcher was required to wait 30 seconds before introducing the communication book to the participant to initiate conversation, to make three general comments, and to ask all eight questions about the specific topic being discussed.
Data were analyzed using visual inspection. Visual inspection was performed to determine increases in turn taking, topic initiation, and repairs of communication breakdowns and decreases in the amount of no responses when using a communication book.

**Procedural Reliability**

A graduate student independently completed a four-point checklist while observing 20% of the therapy sessions to validate procedural fidelity. Items included (1) Was a communication book made available to the client? (2) Did the researcher wait 30 seconds before initiating the topic? (3) Did the researcher ask the participant three open-ended questions? (4) Were three general comments made by the clinician? Procedural reliability was calculated based on comparison of the independent observer’s results to the researchers results. The results of procedural reliability were 100%.
CHAPTER 4

Results

The data related to the four independent variables (turn taking, topic initiations, repairing communication breakdowns, and no responses) are displayed in Figures 1-4. The data were visually analyzed to determine: (1) changes in levels across phases (2) changes in trend and/or (3) an overall pattern of nonoverlapping data points across phases (Kazdin, 2011)

Frequency of turn taking

As shown in Figure 1, the participant demonstrated a stable baseline across six sessions. During the intervention phase, the participant demonstrated an increased frequency of turn taking occurrences when both the remnant and pictographic communication books were made available. However, the participant demonstrated a greater frequency of occurrence of turn taking when the remnant communication book was made available versus the pictographic communication book. Although the graph did not meet all of the parameters necessary to conclude a definite increase in the frequency of turn taking, it can be assumed that there was a positive outcome based on the trend and the changes in levels across phases.

![Figure 1. Frequency of occurrences of turn taking](image)

Frequency of topic initiation, breakdown repairs and no responses
As shown in Figure 2, 3, and 4 the participant demonstrated a relatively stable baseline for each dependent variable. There were no noteworthy differences when comparing the baseline and intervention phases for either the remnant or pictographic communication book conditions.

Figure 2. Frequency of occurrences of topic initiation

Figure 3. Frequency of occurrences of communication breakdown repairs
Figure 4. Frequency of occurrences of no responses
CHAPTER 5

Discussion

The limited number of intervention sessions was a function of how many topics were used for discussion during the study. The participant only rated six of the topics a four or a five on a Likert scale. Any topic that was rated lower than a four was defined as uninteresting to the participant and was not used. Two different topics were discussed during each session, which resulted in the intervention phase lasting a total of three sessions. Time was also a factor in the limited amount of sessions. Each topic was discussed once during baseline and once during one round of treatment.

The results indicate that using a communication book, specifically a remnant or pictographic book, resulted in an increase in the frequency of occurrences in turn taking. The results are not surprising given the particular participant involved in the study. The participant was a generally passive communicator due to the severity of her impairments. A possible reason why there was an increase in turn taking while using both a remnant and a pictographic communication book was because the researcher provided wait time between turns. Johnston, Reichle, Feeley, and Jones (2012) explained that, “Adult communication partners follow a script that directs patients to wait for a specified period of time before providing a prompt for communication. The purpose of the wait time is to allow time for the individual to initiate communication” (pg. 15). Since a wait time was provided, that could have been a cue that the participant was expected to take a turn. The frequency of occurrence of turn taking increased when a remnant communication book was made available more so than when a pictographic communication book was made available. A possible reason for this is the remnant symbols were more personal and meaningful to the participant compared to the pictographic symbols, which in turn, caused an increase in communication attempts (Ho, et al 2005).

Topic initiation was always a challenge for the participant, even prior to the initiation of this study. The clinician typically had to begin the conversation, even after a significant wait time. Without the conversational partner having some context about what the participant’s message was, it was often difficult to comprehend what she was trying to convey. Although the communication books helped to set a context for the conversation, the participant appeared unsure of how to utilize the communication book
to initiate conversations. During therapy not related to this study, the participant rarely attempted to repair communication breakdowns when frustrated. This is likely because she had not been taught repair strategies. During the intervention phase of the study, the participant had difficulty using the communication books to repair communication breakdowns. It might be that specific treatment goals that address communication repair strategies are needed.

The frequency of no responses provided by the participant during the study was relatively stable during both the baseline and intervention phases. There was no decrease in the frequency of occurrences from baseline to intervention. It might be that the sessions in which the participant had a higher frequency of no responses was due to the participant determining that she would not be able to successfully utilize the communication book or use any other means of communication to respond to specific questions; therefore, she just simply did not answer. In past therapy, not related to this study, the participant would attempt to use varying modalities of communication, often with no success. After these attempts, the participant would shrug her shoulders to indicate she was unable to answer the question successfully.

These results should be viewed with caution due to (1) the limited number of intervention sessions implemented, (2) the fact that there was only one participant in the study, and (3) the fact that behavioral reliability data were not collected. Future studies should be conducted that include more participants and more intervention sessions. It might be that communication books would be beneficial to patients with other types of aphasia or more or less severe aphasia. Future studies might also explore the possibility that high tech communication devices improve the frequency of turn-taking, topic initiation, repairs for communication breakdowns, and decrease non responding.
Appendix A

Camping
Tell me about camping
Who do you go camping with?
Where do you like to camp?
What is your favorite thing to do when you camp?
Do you make any special foods when you camp?
How often you go camping?
What do you bring with you to camp?

Cooking
Tell me about cooking
What is your favorite food to cook?
Who do you like to cook with?
How often do you cook?
Do you watch cooking shows?
How did you learn to cook?
What is your favorite recipe book to use for cooking?

Football
Tell me about football
Who is your favorite football team?
Have you ever been to a game before?
Who did you go to those games with?
How did you get in to football?
How many football games have you been to?
Who is your favorite football player?

Gardening
Tell me about gardening
What do you like to garden?
Do you have a garden in your backyard?
What are some things that need to be done to prep your garden for the summer?
Who helps you garden?
How many vegetables do you plant in your garden during the summer?
What is your favorite vegetable that you grow in your garden?

Restaurants
Tell me about restaurants
What is your favorite restaurant?
What is your favorite memory from a restaurant?
How often do you go out to eat?
What is your favorite thing to order at a restaurant?
Who do you usually go out to eat with?
Do you like to try new restaurants?

**Fishing**
Tell me about fishing
How often do you go fishing?
Where do you go fishing?
How did you learn to fish?
Do you fish on a boat?
What do you do with the fish after catching them?
What is the biggest fish you ever caught?
References


