Summer 2007

Perceptual Differences in the Conversational Performance of People with Severe Expressive Aphasia Using Three Types of Visual Screen Displays on Speech Generating Devices

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Perceptual Differences in the Conversational Performance of People with Severe Expressive Aphasia Using Three Types of Visual Screen Displays on Speech Generating Devices

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A Thesis
Submitted to the John G. Rangos, Sr.
School of Health Sciences of Duquesne University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

July, 2007

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DUQUESNE UNIVERSITY

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THESIS DEFENSE PASS FORM

Student's Name: Laura C. Figley

Title of Thesis: Perceptual Differences in the Conversational Performance of People with Aphasia Using Three Types of Visual Screen Displays on Speech-Generating Devices

The student successfully defended the thesis on the following date:

Date 7/25/07 Time: 11:00 am Location: 400 Fisher Hall

* *

This thesis is accepted by the Faculty of the Department of Speech-Language Pathology, John G. Rangos, Sr., School of Health Sciences, Duquesne University in partial fulfilment of the requirements for the Master of Speech-Language Pathology, Thesis Option.

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ABSTRACT

A multiple single-subject comparative design experimental study measured the perceptions of three persons with aphasia and their communication partners without aphasia when communicating across three conditions: Condition A—speech generating device (SGD) with No Display; Condition B—SGD with visual scene display (VSD); and Condition C—SGD with traditional grid display (TGD). Quantitative data were collected in the forms of preference choice of display type, a forced-choice ranking of experimental sessions, and 7-pt Likert rating scales. All participants rated the dependent variables of communicative *success, ease, independence,* and naturalness across conditions. Qualitative data were collected in the form of open-ended interviews conducted at the end of each experimental session and at the close of the study. Each participant dyad completed six experimental sessions consisting of a conversational interaction in which the person with aphasia shared a personally relevant story. Quantitative analyses revealed that 2 of 3 persons with aphasia preferred Condition B (VSD) over the other experimental conditions. All three persons with aphasia chose sessions using VSD as their "best" or top-ranked sessions in the forced-choice ranking task. Qualitative analysis revealed that peer communication partners and participants with aphasia had both favorable perceptions and criticism of the VSD.

ACKNOWLEDGEMENTS

First and foremost, thank you to the participants in this investigation, as well as their families, whose lives have been drastically altered by aphasia. These individuals continue to show amazing dedication to the research and clinical endeavors of students to gain more knowledge about this condition.

Thank you, Dr. Garrett for continuing to push me to challenge myself throughout my time here at Duquesne. You anticipated my need to complete this project before I had the confidence to realize it myself. Thank you for your time, patience, and guidance throughout the past year. You have had the greatest impact on my education of any teacher I have ever had, but more importantly, you have already impacted my future; influencing the therapist and person I am striving to become.

To Dr. Fromm and Dr. Chen, thank you for taking time out of your busy lives to serve as committee members. Dr. Chen, thank you for your attention to detail and fresh perspective at the end of this process. Dr. Fromm, thank you for your passion for research and invaluable insight at the very beginning.

To my fellow investigator, Jenn Seale, I cannot imagine undertaking this endeavor without your support, friendship, and at times, commiseration during this process. We made it. Although I can certainly wait awhile, I look forward to working with you in the future.

Katie Huwar, I cannot thank you enough for all your help and kindness. You stepped in at every moment when I needed extra help and was unsure where to turn.

Thank you to Dynavox Systems, LLC for providing the device used in this study, just in time. Thank you to Dr. Beukelman and his team of researchers at the University of Nebraska for inspiring this project, especially to Miechelle McKelvey for your assistance with our many technological woes.

Last but not least, thank you to my family for your unconditional love, patience, and understanding for all I choose to do.

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CHAPTER 1

INTRODUCTION AND REVIEW OF THE LITERATURE

Aphasia is as an acquired, neurogenic communication disorder that may affect any or all modalities of symbolic communication, including speaking, listening, reading, and writing. Aphasia is acquired from damage to the brain, most commonly a left hemisphere cerebral vascular accident, but can also occur after infection, head trauma, growth of a brain tumor, or surgical removal of brain tissue (Chapey & Hallowell, 2001). Types and severity of aphasia can vary according to the site and extent of the lesion. Aphasia can range from mild word finding difficulties to the severe expressive and receptive language impairments seen in global aphasia (Chapey & Hallowell, 2001).

Social Impact of Severe Aphasia

Adults who acquire severe aphasia often experience a reduction in their social networks and social experiences (Lyon, 1992; Simmons-Mackie, 2001). Communication impairments associated with aphasia can negatively affect a person's ability to engage in all aspects of conversation, such as greetings, small talk, information sharing, wrap-up and farewell statements, and storytelling or narration (Hux, Manasse, Weiss, & Beukelman, 2001). Davidson, Worrall, and Hickson (2003) observed that older adults with aphasia interact in fewer social settings with fewer communication partners than their peers without aphasia. Lyon (1992) proposed that the reduction in natural speech, comprehension, and general communication ability associated with aphasia can greatly impact individuals' social

well-being, and in turn, cause them to be unwilling or fearful to participate in communication.

In contrast to the above beliefs that people with aphasia have diminished interaction opportunities and abilities, Holland (1977) showed that persons with severe aphasia are more effective functional communicators than formal assessments reveal. Recent studies that analyzed the collaborative communication processes of persons with aphasia and their routine communication partners in conversational discourse showed that both speakers with no impairment and their partners with aphasia contribute to the formulation of co-constructed meaning (Hengst, 2003; Simmons-Mackie, Kingston, & Schultz, 2004). It has also been observed that persons with aphasia use a number of compensatory strategies, including discourse and interest markers, in both clinical and naturalistic settings to facilitate conversation and social interaction (Simmons-Mackie & Damico, 1995, 1996). In her study on referential communication, Hengst (2003) also observed that communicators with aphasia use a wide variety of verbal and nonverbal resources to convey their messages, including gesture, vocalization, eye gaze, and even drawing and writing.

Within the last few decades, treatment for adults with aphasia has capitalized on the observations that people with severe aphasia have a need and an ability to participate in communication interactions. Specific therapy approaches have extended beyond traditional confrontation naming and word finding approaches to the facilitation of functional, interactive communication in real life situations (Lyon, 1992). Recent treatment approaches for adults with aphasia have included conversation therapy (Simmons-Mackie, 2000), conversational coaching (Hopper, Holland, & Rewega, 2002), group therapy (Elman & Berstein-Ellis, 1999), and partner training in supportive conversation strategies (Kagan,

Black, Duchan, Simmons-Mackie, & Square, 2001; Rayner & Marshall, 2003) to enhance the functional communication abilities of persons with aphasia. These therapy models also acknowledge the collaborative, dynamic, and flexible natures of conversation and the social importance of conversation to adults with aphasia (Simmons-Mackie, 2001).

Despite the advent of conversational therapy approaches, people with significant communication impairments experience difficulties independently sharing novel information. Linebaugh, Kryzer, and Oden (2006) and others have suggested that these impairments directly contribute to an imbalance in the "conversational burden", with the partner assuming much of the responsibility to initiate new topics, ask questions, and guess at the specific semantic content that the person with aphasia might wish to communicate. A number of clinical investigators have attempted to bridge this imbalance by introducing augmentative and alternative communication (AAC) strategies to people with severe aphasia. These approaches range from low-tech strategies in which the communicator with aphasia is highly dependent on the conversation partner, to high-tech voice output devices in which the person with aphasia independently generates messages and uses the device to participate in daily life activities (Garrett & Lasker, 2005).

Severe Aphasia and AAC

Clinically, persons with severe aphasia have appeared to be ideal potential candidates for AAC intervention. However, some evidence exists to the contrary. Jacobs, Drew, Obletree, and Pierce (2004) completed a review of specific literature pertinent to AAC interventions for adults with severe aphasia. They found that while AAC intervention has been highly effective with adults with severe aphasia in controlled treatment settings, these

gains have not been observed to generalize to everyday environments. Jacobs, et al.(2004) recommended that AAC intervention address factors that may potentially limit success outside of the treatment environment.

First, the type of *symbolic representation* for messages may influence the efficiency with which people with severe aphasia retrieve questions and comments in conversations. Second, the selection of interesting *topics* and the *content of the messages* themselves will determine whether a communicator wants to convey messages. Third, the *function* of the conversational messages will influence the communicator's role in an exchange. For example, in some conversations, people wish to obtain information from the partner and do so by asking questions (Light, 1988). At other times, communicators simply wish to share past experiences with peers who have similar values, beliefs, and social experiences (Stuart, 2000). This is particularly true for adults who are older; Stuart (2000) noted that older adults relate to topics in the present by reminiscing and connecting them to events in the past. Finally, there are other *external factors* that influence acceptance of an AAC system by a person with aphasia. These can include partner involvement and instruction, attitudes towards AAC, the ability to generalize use to multiple environments, and features of the device itself (e.g., cost, durability, and convenience).

These four potential influences on a communicator's ability and interest in conversing while using an AAC device will be examined next.

Methods of AAC Message Representation

Conversational messages in AAC can be represented in a variety of ways. These symbolic representations can include text, icons, pictorial symbols, photographs, and actual objects or

remnants, ranging from highly abstract to iconic, respectively (Beukelman & Mirenda, 2005). The method of symbolic representation may affect the efficiency of a person with aphasia to access messages in a timely manner, which in turn may contribute to others' perceptions of communicative competence. A variety of symbolic message representations are discussed below.

Dynamically Constructed Written Word Choices. Garrett and Beukelman (1995) tested the effectiveness of their written-choice strategy in conversations with a 66-year old male with severe expressive and receptive aphasia. The written choice conversation strategy requires a partner to write key-word choices representing answers to the conversational questions. The communicator with aphasia is then able to participate in the conversation by pointing to one of the choices. The rationale behind the written choice strategy is that the individual with aphasia is given an alternative modality to the impaired speech output, and in turn is able to focus on the meaning of the message rather than the way it is delivered (Garrett & Beukelman, 1995).

In their study, proportions of exchanges per topic, proportion of comprehensible and incomprehensible responses, communication modality, and response accuracy were measured across the three conditions: no partner support, thematic written choice support, and non-thematic written choice support. Results revealed that written choice support (both thematic and non-thematic) significantly extended conversational exchanges because of the increased comprehensibility of the communicator's responses. In addition, use of the technique was not found to limit the participant's use of other communication modalities. Most importantly, the written-choice strategy appeared to enhance the quality of interactions

with persons with severe aphasia by increasing cohesiveness and amount of information that the adult with aphasia is able to provide (Garrett & Beukelman, 1995).

Prestored Text Messages. Garrett, Beukelman, and Low-Morrow (1989) developed a multimodality augmentative communication system for a 74-year-old male with Broca's (nonfluent) aphasia. A complex communication needs assessment revealed that the communicator continued to participate in many life activities. He demonstrated a need to communicate a wide variety of messages in many environments, including novel information and more predictable information such as general conversation. The communicator's AAC system was comprised of a low-tech communication notebook containing a word dictionary, alphabet card, a "new information packet" to carry pieces of current information, breakdown resolution clues, and conversational control strategies. The communicator was also encouraged to use natural communication modalities such as residual speech and gestures.

After 7 to 8 months of twice-weekly instruction with the AAC system, the individual with aphasia participated in a clinical interaction task with an unfamiliar communication partner, in which both participants were instructed to converse and "get to know each other". The task was completed before and after implementation of the customized AAC system. Conversational turns were recorded and transcribed to determine the number of communication breakdowns, total number of conversational turns, frequency of turns per sequence, percentage of communication acts, and number and percentage of initiations. Results of the single conversational analysis revealed the individual with aphasia roughly doubled his frequency of communicative turns with use of the AAC system. Conversational initiations also increased from 24% to approximately 50% with use of the notebook. Qualitatively, researchers noted that the individual changed his role from a spectator to a

more equal member of the conversation. The authors also noted that instruction in the use of the system as well as communicating with multiple modalities was key to the success of this intervention.

Remnant and Pictographic Books. Remnant books are communication notebooks that contain tangible objects or scraps collected from personally relevant activities. These remnants can serve as communication aids or topic setters for individuals with limited verbal skills to share information about past events (Beukelman & Mirenda, 2005). Ho, Weiss, Garrett, and Lloyd (2005) studied the effects of three conversational conditions (baseline, pictographic topic symbols, and remnants) on the communication behaviors of two adults with global aphasia. During the baseline phase of the study, participants engaged in a 5-minute, unsupported conversation with their primary speech language pathologist (SLP), who served as a familiar communication partner. The partner was given instruction to comment at least three times, to ask at least three open-ended questions, and to respond to any communication attempts during appropriate opportunities in the conversation. During the intervention phases of the session, the dyads were provided with two, 10-page communication notebooks containing pictographic symbols and remnants, respectively, depicting place of origin, family, recent and past events, hobbies and religion. The conversational partner was instructed to converse in the same way, supplementing conversation by pointing to pictographs and remnants.

Results revealed that when either type of communication notebook was used, both participants significantly increased percentage of initiations, number of repaired communication breakdowns, and incidence of pointing to symbols when compared with the no communication book condition. A higher incidence of pointing among participants and

partners to create shared reference also occurred with use of the remnants as opposed to pictographic symbols. Furthermore, the communication partner, who was naïve to the research questions, rated herself and her communication partners with aphasia to be better communicators when using a communication notebook. She also rated the sessions in which a communication notebook was used as more comfortable and enjoyable than baseline sessions. An informal interview conducted with the communication partner three years later revealed greater validation for the use of remnant books. The SLP who participated in the study reported that she continued to use remnant books to allow persons with aphasia to be successful in conversation in the inpatient rehabilitation facility in which she worked.

Icons. Thorburn, Newhoff, and Rubin (1995) found that persons with aphasia were more easily able to comprehend iconographs, or two-dimensional symbolic elements, than written words or pantomimes. Beck and Fritz (1998) researched the ability for persons with aphasia to learn and use iconic encoding, a technique in which icons are sequenced to create word, phrase, or sentence messages. These iconic sequences, the basis for an augmented symbol system, Minspeak (Baker, 1982, 1986), are meant to resemble naturally occurring semantic associations in the brain. Beck and Fritz used a group of 5 adults with anterior aphasia and 5 with posterior aphasia as well as a group of 10 adults without aphasia to explore the ability of adults with aphasia to learn iconic encoding. They also examined the impact of type of aphasia on learning, and the impact of the level of abstraction and length of sequence on learning of iconic encoding. Results revealed significant main effects for participant group, level of abstraction, and length of sequence, with adults with aphasia recalling fewer symbol associations than the control group, fewer abstract associations than the control group, and fewer two and three symbol combinations. Within the group of

persons with aphasia, persons with high comprehension skills (anterior aphasia) learned significantly more messages than the group with low comprehension skills (posterior aphasia). Overall, persons with aphasia learned more concrete messages than abstract messages, and learned more messages when there were fewer icons in the sequence.

The Beck and Fritz (1998) study revealed that persons with aphasia with relatively intact comprehension skills may be able to learn iconic codes for concrete messages encoded with one or two icons. However, when messages become more abstract, these individuals may not be able to learn sequences with more than one icon. It is also very difficult for individuals with highly impaired comprehension skills to learn concrete or abstract messages encoded in a sequence of more than one icon. Because successful iconic encoding generally involves sequences of at least two or three icons, Beck and Fritz (1998) suggested that persons with aphasia may not fully benefit from the AAC technique of iconic encoding.

Pictorial stimuli. While multiple studies have shown that persons with aphasia can learn to access and combine graphic symbols comprised of line drawings in low-tech communication notebooks (Bellaire, Georges, & Thompson, 1991; Purdy, Duffy, & Coelho, 1994), electronic AAC devices (Murray, 1998), and computer software programs (Koul, Corwin, & Hayes, 2005; McCall, Shelton, Weinrich, & Cox, 2000; Weinrich, McCall, Weber, Thomas, & Thornburg, 1995), there is a lack of substantial evidence to show that persons with aphasia are able to generalize symbol skills to communicate with them in natural environments.

Purdy, Duffy, and Coelho (1994) trained fifteen persons with aphasia to use twenty target symbols in three modalities: verbal, gesture, and communication board. The communication board contained a 4 by 6 inch grid with black and white line drawings.

Participants pointed to pictures following an auditory command. After learning the symbols in all three modalities, the participants were required to use the symbols in a structured conversation and in a referential communication task. Although the participants achieved the highest mean accuracy (91%) on the communication board task, they utilized the communication board and gestural modalities significantly less than the verbal modality during structured conversation and the referential communication task. This suggests that while persons with aphasia were able to learn symbols successfully, they were unable to generalize the knowledge to successfully switch between modalities during conversation.

Multiple symbol types. Lasker and Garrett (2006) developed the Multimodal Communication Screening Task For Persons with Aphasia (MCST-A) to assess how well persons with aphasia are able to communicate wants and needs, tell or retell stories, complete categories, and use spelling to generate messages by combining series of pictorial, graphic, and textual symbols. Clinicians may use the MCST-A to determine whether a person with aphasia is an independent communicator who can spontaneously use symbols and text to generate novel messages, or a partner-dependent communicator who relies on communication partners to generate and provide written or graphic choices that the communicator can point to (Garrett and Lasker (2005). Lasker and Garrett (2006) reported, through descriptive analyses, that the performance of four persons with aphasia on the MCST-A corresponded closely with impairment scores on the Western Aphasia Battery and with observed patterns of communication strategy use.

Photographic topic setters and text. Garrett and Huth (2002) examined the impact of graphic contextual information on the conversational behaviors of a 72 year old male with severe expressive aphasia across three conditions: no graphic context, graphic context, and

graphic context plus instruction. Two types of conversation were used, including discussion of personal events and current news events. During the graphic context conditions, a topic setter consisting of a photo with 6 to 8 printed sentences describing the photo could be accessed by either participant to elaborate on a message or establish topical reference. Two conversational partners were used, although only the second partner participated in the graphic context-plus-instruction phase of the experiment.

No statistical differences were found in conversational duration for either partner between context and no-context conditions, although both discussions for Partner 1 were greater with the use of a graphic topic setter. Personal event discussions were consistently longer than current event discussions across partners and conditions. The number of communicative exchanges significantly increased with the graphic context condition in both topics for Partner 2, and in the current event topic for Partner 1. It was also found that the individual with aphasia initiated, on average, almost twice as often during context and context-plus-instruction conditions than the no-context condition when discussing the current event topic. Overall, Garrett and Huth (2002) found that the presence of graphic contextual information positively influenced the conversational interaction of the person with moderate to severe expressive aphasia and his two communication partners, although the exact impact varied based on the conversational partner and topic type. While this data provides support for the use of graphic topic setters in conversation for persons with moderate to severe expressive aphasia, it also reiterates the importance of partner involvement in the success of communication.

Visual scenes. Visual Scene Display (VSD) is a recent development in AAC representation. Used with both low-tech and high-tech devices, VSDs provide a high level of

visual contextual support for both the communicator with aphasia and his or her communication partners. Essentially, a visual scene is a photograph that displays important ideas, facts, and semantic meanings within an actual event. Visual scenes can be generic or personalized. Because of the highly contextual information contained in a VSD, VSDs allow an AAC device to capture and express personal events. Researchers also hope that VSDs will enhance interaction and allow communication partners to take a greater role in conversational participation because the VSDs provide shared context similar to other methods of representation that use photos.

Currently, research led by Beukelman, Fager, Hux and Carlton (2005) is underway at the University of Nebraska to develop a prototype in conjunction with Dynavox Systems LLC using VSDs specifically for adults with aphasia. The goal of the team is to develop a prototype that uses digital images or scenes to create meaning, allowing adults with aphasia to move easily from scene to scene in conversation, easing the cognitive and linguistic burden that comes with using AAC technologies. Specifically, the prototype uses digital images in conjunction with text to represent meaning that is specific to the life of the person with aphasia. The display also includes cues for communication partners, revealing the topic of the scene, and prompting them to ask questions. Much like a family may look at a photo album together, individuals with aphasia and their communication partners can reference scenes by pointing, touching, and story-telling to co-construct meaning. Adjacent symbols and text messages can be activated to elicit voice output of the device, or to access a deeper level of the theme pictured in the scene.

In a recent presentation, McKelvey, Dietz, Hux, Weissling, and Beukelman (2006) described research in which a visual scene display was personalized for a person with chronic

aphasia who demonstrated word retrieval difficulties, paraphasias, stereotypic phrases, inappropriate turn-taking, and perseveration on the topic of his disability. The individual's interactions with unfamiliar communication partners were documented before and after intervention with the VSD technology. Dependent measures included the individual's instances of "disability talk", instances of utterances relating to navigation or orientation of the device, and percentage of inappropriate question and answer exchanges. The study consisted of a multiple baseline across themes design. Following development of two themes by the individual with aphasia and his AAC facilitator, the individual with aphasia participated in bi-weekly intervention sessions. Results revealed that he generalized intervention principles of Theme 1 to Theme 2 *before* intervention of Theme 2 was given. He also effectively decreased his instances of disability talk and inappropriate turn-taking, as well as his instances of navigation and orientation talk, indicating an increased efficiency and reciprocity in conversation with use of the VSD.

Topic and Message Selection

In addition to methods of symbolic representation, it has been proposed that topic choice in conversation may also affect a person with aphasia's ability to use AAC. Stuart (1997) recommended that AAC intervention for older adults incorporate relevant topics according to gender and age cohort. However, research to support the influence of topic choice by adults with aphasia during AAC use in natural settings is limited.

Fox, Sohlberg, and Fried-Oken (2001) examined the role of conversational topic choice in the ability of persons with aphasia to use symbol-based communication books in conversation with familiar and novel communication partners in a clinical setting and with

familiar partners in both clinical and naturalistic settings. They also examined the perceived satisfaction of conversations of persons with aphasia and their conversational partners across the independent variables of topic choice and nonchoice. While the youngest participant with the most recent onset of aphasia benefited from topic choice in training with the symbol-based communication aid, results showed that none of the participants with aphasia benefited from topic choice in naturalistic settings. Fox, et al. (2001) recommended further research to investigate the role of topic choice when persons with aphasia choose specific vocabulary and symbols for use in a communication aid, and when they use communication aids for specific communicative purposes such as sharing opinions or reminiscing.

Conversational Function

Fox et al. (2001) suggested the importance of conversational function and vocabulary in performance of individuals with aphasia with AAC, in addition to the importance of topic choice and symbolic representation. Frequently, AAC displays for adults focus on wants and needs (Stuart, Lasker, & Beukelman, 2000). Stuart et al. (2000) suggest that interactions between people with aphasia and their conversational partners are enriched if the potential messages can provide opportunities for a variety of conversational roles. For example, some messages can assist people with aphasia to provide advice to loved ones about personal issues. Other messages can be constructed to enhance participation in favorite games, such as card-playing (Fried-Oken & Stuart, 1992). Still others reflect past events through the act of storytelling (Stuart et al., 2000).

Impact of Aphasia on Storytelling. Stuart (2000) examined storytelling patterns of older adults. Research gathered through language samples, field notes, and interviews with

family members revealed that older adults consistently include personal narratives, or stories, in everyday conversation. These stories fulfill the purpose of sharing cultural values, creating a connection to the listener by providing information from another time and place, and providing philosophical knowledge about life and direction for the future. Davidson, Worrall, and Hickson (2003) used naturalistic observation to ascertain that older adults with aphasia participate in significantly fewer instances of storytelling than their peers without aphasia. Communication impairments associated with aphasia prevent older adults from participating in the sharing of their life knowledge through personal narration. Older adults with aphasia also have fewer occasions to be storytellers when they are limited in opportunities to interact and converse with others outside their homes (Hux, Manasse, Weiss, & Beukelman, 2001). In addition, therapy approaches for people with severe aphasia have not always focused on conversation, storytelling, or other functional discourse.

Additional External Factors Affecting AAC Acceptance

Even with an appropriate method of message representation, appealing topics, suitable vocabulary, and messages that are capable of serving the conversation needs of the person with aphasia, success with an AAC device can still vary from user to user. Scherer (1993) describes acceptance of technology as having two types of patterns: optimal, and partial/reluctant; optimal when the user integrates the technology willingly in every communication opportunity, and partial/reluctant when the user utilizes the system in one environment but not in another (e.g., clinic vs. home). Scherer also describes the pattern of non-use, in which a person avoids or abandons use of the system after participating in an intervention for the system.

Many factors influence the acceptance of an AAC system by a person with aphasia and the pattern of use that the individual will adopt. The AAC Acceptance Model (Lasker & Bedrosian, 2000) identifies three categories of factors to predict acceptance of an AAC system by a person with an acquired communication disorder. The first is *milieu,* which deals with all factors relating to communication partners, environments that the AAC system is used in, and funding options and concerns. The second category deals with pertinent features of the actual AAC user, including attitudes and personality characteristics. The third category deals with features of the assistive technology, such as size, durability, ease of use, unique features, and cost.

In addition, an article by Kent-Walsh and McNaughton (2005) highlights the specific importance of the skills of the communication partner in an interaction involving AAC, and the crucial need for partner training of facilitative interaction skills and strategies. Although the skills of both partners influence the success of any communication interaction, when one person is reliant on AAC for communication, the success of the communication lies heavily on the partner of the AAC-communicator.

Perceptions of AAC Use by Persons with Severe Aphasia. It is known that attitudes and perceptions of AAC users are important variables in the process of AAC acceptance and use (Lasker & Bedrosian, 2000). Stuart, Lasker, and Beukelman (2000) also recommend that future research examine the effect of AAC use in conversation on the perceptions of AAC users' communicative competence as well as unfamiliar listeners' perceptions of their competence.

Lasker (1999) employed qualitative methodology to investigate adult peer perceptions of a communicator with aphasia. Thirty adult peers with no or limited experience communicating with a person with severe aphasia observed a communicator with aphasia telling an autobiographical story to a non-disabled communication partner across three communication modes: natural, unaided speech and gestures; pointing to story elements in a low-tech communication notebook; and pressing preprogrammed buttons on a digitized voice-output device. Peers completed 7-point Likert rating scales to rate the dependent variables of communicative competence and storytelling effectiveness of the individual with aphasia, peers' comfort level during the interaction, willingness to participate in a similar interaction, and understanding of the story across the three storytelling modes. Peers also ranked the three storytelling modes in a forced-choice ranking task and participated in a focus-group interview to discuss their choices. Peers ratings for each dependent variable were significantly higher for the AAC digitized speech mode of storytelling. Sixty percent of peers assigned the highest rank possible on the forced-choice rankings to the AAC digitized speech mode; 76.7 % of peers assigned the lowest rank to the mode of natural, unaided speech. In general, peers least preferred natural speech and most preferred the AAC digitized speech for storytelling in the forced-choice rankings.

Themes of understandability, comfort, time, communication versus treatment, familiar versus unfamiliar partners, and authorship of messages emerged from the focus-group interviews. Peers cited their understanding of the story as a main factor in assigning a number 1 rank to the digitized speech mode. They also saw a close relationship between understanding and comfort of the listener, explaining that the inability of the person with aphasia to be understood led to frustration, and ultimately, an uncomfortable interaction.

Peers noted concern that while the digitized speech mode was easier to understand, the person with aphasia was not working to redevelop speech while using the AAC device. They also questioned whether the person with aphasia authored the messages programmed in the device, since a third party recorded them. Finally, peers wondered how their unfamiliarity with the person with aphasia affected their decisions. Some peers suggested that as an unfamiliar communication partner, they would prefer that an adult with aphasia use AAC strategies (low or high tech) in communicating with them, but may prefer natural speech if they were more familiar with that person.

Lasker's study (1999) examined peers' perceptions of an adult with aphasia when he communicated personal stories using three modes of communication, including low and high-tech AAC devices. Results support AAC digitized speech for use with persons with aphasia during storytelling. Most importantly, Lasker's findings support the development of more effective storytelling methods using AAC with unfamiliar communication partners, expanding the person with aphasia's conversational network.

To summarize, there are four major factors that may contribute to the communicative success of a person with aphasia in using an AAC system outside the clinical environment. Studies examining methods of *symbolic representation* suggest that persons with aphasia may benefit from highly contextual methods that create shared references and reduce cognitive demands (Garrett & Huth, 2002; Ho, Weiss, Garrett, & Lloyd, 2005; McKelvey, Dietz, Hux, Weissling, & Beukelman, 2006). Although more evidence is needed to support the roles of *topic choice* and *message selection* in the success of an individual with aphasia using AAC, it has been suggested that the ability for a person with aphasia to choose what he or she will talk about and how to say it positively impacts success (Fox, Sohlberg, & Fried-

Oken, 2001). *Conversational function* is also an important variable. Messages can be constructed for a variety of conversational purposes such as commenting, sharing information, and storytelling to expand and enrich the interactions of persons with aphasia (Stuart, Lasker, & Beukelman, 2000). Finally, *external factors* must also be addressed when considering the success of a person with aphasia with AAC. These factors include specific features of the AAC system, environments that the system is used in, as well as the AAC user and communication partner's attitudes and perceptions regarding the device (Lasker, 1999; Lasker & Bedrosian, 2000).

Perceptual analysis

The current study employed both quantitative and qualitative methodologies to examine perceptions of persons with aphasia (PWAs) and their peer communication partners (PCPs) when engaging in a conversational interaction using three types of screen displays on a high-tech AAC speech generating device. Previous studies have been conducted to systematically examine the variables that influence perceptions of AAC users and their communicative competence, employing rating scales, questionnaires, and semi-structured interviews to collect qualitative data (Bailey, Parette, Jr., Stoner, Angell, & Carroll, 2006; Bedrosian, Hoag, Calculator, & Molineux, 1992; Gorenflo, Gorenflo, & Santer, 1994).

Most recently, seven junior high and high school students with moderate to severe disabilities using low to high-tech devices with digitized speech voice output participated in a study with six of their primary caregivers (Bailey et al., 2006). Semi-structured interviews were conducted with the primary caregivers to investigate the process of AAC device selection and training, family member perceptions and expectations of the AAC device

across settings, stress and time management issues related to AAC use, supports provided by professionals for AAC use, and the perceived benefits and barriers to their child's AAC use. The interviews were then transcribed and analyzed using cross-case analysis in which the responses were organized into emergent themes.

Qualitative methodology employed in this study may add to the current knowledge base by adding new information about the perceptions of peers as well as the AAC users with aphasia regarding AAC; specifically, the three types of screen displays studied in this experiment.

Statement of the Problem

Although there is some preliminary evidence that suggests AAC intervention for persons with severe aphasia is effective, we have limited evidence of its positive effect in the naturalistic environment. Previous review of the literature has shown that persons with severe aphasia can benefit from intervention based on conversational discourse in a controlled treatment setting. However, there are few studies that assess how well persons with aphasia converse with peers using AAC. In particular, only a few investigations look at the combined "package" of AAC contextual representation (i.e., visual scenes), personally relevant topics, and intelligible speech output. There is also limited research examining the perceptions of conversational participants regarding the independence and naturalness of communicators with aphasia when they use AAC in conversation.

Another important element of a successful AAC intervention is the way in which messages are represented. Previously studied methods of representation include written choice (Garrett & Beukleman, 1995), individual iconic symbols (Beck & Fritz, 1998), line

drawing symbols (Purdy, Duffy, & Coelho, 1994), photo albums and remnant books (Ho, Weiss,Garrett, & Lloyd, 2005). An emerging means of representing complex story messages is visual scenes technology (Beukelman, Hux, Weissling, Dietz, & McKelvey, 2006). However, there is no research to date that has examined the perceptions of adults with severe aphasia and their communication partners regarding communicative success, ease of conversation, independence, and naturalness when the adults with severe aphasia participate in conversation by activating messages on a speech generating device using a visual scene display versus a traditional grid display.

Research Questions

In this study, the following research questions will be investigated:

1. How do participants with severe aphasia and peer communication partners (PCPs) without aphasia perceive communicative success, ease of conversation, independence, and naturalness when conversing while the person with aphasia accesses messages from visual scene display on a high-tech speech generating device (SGD) versus a SGD with traditional grid display, versus a SGD with no display?

2. What are the message representation preferences (SGD with no display, SGD with visual scene display, SGD with traditional grid display) of individuals with severe aphasia and their peer communication partners during a conversation involving a story retell.

CHAPTER 2

METHODS

In this multiple single-subject comparative experimental study, quantitative and qualitative data were collected to measure the perceptions of three individuals with aphasia and their communication partners without aphasia when communicating across three conditions: SGD with No Display (A); SGD with Visual Scene Display (B); and SGD with Traditional Grid Display (C).

Participants

Primary Participants

Three adults with severe aphasia secondary to no more than two left hemisphere cerebral vascular accidents (CVAs) were the primary participants in this study. Primary participants were between the ages of 30 and 70 at the time of the study and were at least one year post-onset. Participants were recruited from a pool of existing clients at the Duquesne University Speech-Language-Hearing Clinic. The participants each had a diagnosis of severe to profound expressive aphasia and moderate to severe receptive aphasia based on the judgment of two experienced clinicians who were familiar with the communication profiles of the participants. In addition, participants with aphasia (PWAs) had each taken the *Western Aphasia Battery (WAB,* Kertesz, 1982) within the last year and each received a score no greater than four out of ten on the *Fluency* subtest, a score no less than 20 out of 60 on the *Comprehension Yes/No* subtest, and a score no less than 15 out of 80 on the *Sequential Commands* subtest. See table 2.1 for WAB subtest scores of participants with aphasia.

Table 2.1 *WAB* subtest scores for participants with aphasia.

Subtest	Cut-off Scores	PWA1	PWA2	PWA3
Fluency	≤4/10	4/10	4/10	1/10
Comprehension Yes/No	≥20/60	54/60	60/60	33/60
Sequential Commands	≥15/80	37/80	20/80	25/80
Aphasia Quotient		58.10/100	45.60/100	21.80/100

With regard to sensory skills, participants passed a pure tone hearing screening at 1000 and 2000 Hertz (Hz) presented at 50 decibels (dB) in at least one ear. They each had an identifiable functional visual field for objects and text, and were able to match 4 of 5 words given a field of 3 choices typed in a 20 point font. In addition, participants with aphasia were each pre-morbidly literate at a minimum of a fourth-grade reading level, based on spouse or family member report after reviewing a sample of material written at this grade level.

To screen for nonverbal cognitive abilities, potential participants with aphasia (and peer communication partners – see next section) demonstrated attention and memory skills that were within 1 standard deviation (SD) of the mean for individuals with left hemisphere lesions based on the Symbol Trails and Design Memory subtests from the Cognitive Linguistic Quick Test (CLQT, Helm-Estabrooks, 2001). Cut-off scores equivalent to one standard deviation below the mean for persons with left-hemisphere infarcts and subtest scores for participants with aphasia are listed in the table below:

Table 2.2 *CLQT* subtest scores for participants with aphasia.

Subtest	Cut-off scores for Left CVA	PWA1	PWA2	PWA3
Symbol Trails	1.45 / 10	2/10	6/10	4/10
Design Memory	2.85 / 6	6/6	6/6	3/6

Potential primary participants were excluded on the basis of medical evidence (chart, physician report) of diffuse neurological damage, including a history of more than two focal left CVAs or TIAs with permanent neurological sequelae, history of disease related to substance abuse, dementia, or other neurological disorders.

Informed Consent

A Master's level speech-language pathologist (SLP) from the Duquesne University Speech-Language-Hearing Clinic who had experience with individuals with aphasia but who was not involved in this study informed current clients with severe aphasia (according to written criteria in Appendix A) and potential peer communication partners of the existence of the present research study and the opportunity to participate. Advertisements to participate in the study were also placed in the waiting area of the Duquesne Speech-Language Hearing Clinic (See Appendix B). Clients with aphasia and potential peer communication partners then expressed their interest to the Master's level clinician. The clinician provided names of potential participants to the primary investigator. The clinician also administered the IRB screening task to individuals with aphasia to ensure that they were able to comprehend well enough to understand the requirements of the study prior to signing a consent or assent form. If the participants with aphasia passed this screening with a minimum score of 4 of 5 points, one of the experimenters then contacted the interested clients and provided them with more

detailed information regarding the conditions and requirements of the study. She then invited them to show their willingness to participate by signing a modified consent form (see Appendix C), or assent form if their agent with power of attorney had also been informed about the study and consented to their participation (see Appendix D). Potential peer communication partners were also invited to sign a consent form (see Appendix E). After signing the informed consent form, they were screened to determine if they met the following criteria for participating in the study. All participants were also informed that they might not be eligible for the study after additional testing had been completed, but that their willingness to participate was greatly appreciated regardless of enrollment outcomes.

Secondary (peer) participants.

The secondary participants of this study included three adults between the ages of 21-65 who served as peer communication partners (PCPs) during the three story retell conditions. These individuals were each moderately familiar with the condition of aphasia. Secondary participants (peer communication partners) were recruited from the pool of family members or close friends who have consistently brought an individual with aphasia to therapy at Duquesne University. PCPs each had functional visual acuity with or without glasses and passed the same vision screening administered to primary participants. PCPs were required to pass a pure tone hearing screening in at least one ear at 4000 Hz and 40 dB. Also, no hearing complaints interfering with daily conversation were reported. PCPs also demonstrated speech, language, and cognition abilities within normal limits based on scores from the CLQT (Helm-Estabrooks, 2001*)* (See Table 2.3).

Table 2.3 CLQT scores for peer communication partners.

Subtest	Cut-off scores	PCP1	PCP2	PCP3
Personal Facts	8	8	8	8
Symbol Cancellation	11	12	12	12
Confrontation Naming	10	10	10	10
Clock Drawing	12	13	13	13
Story Retelling	6	9	7	7
Symbol Trails	9	10	9	10
Generative Naming	5	9	9	8
Design Memory	5	6	5	6
Mazes	7	8	7	7
Design Generation	6	13	6	10

PCPs were judged to be literate based on the presence of no more than five incorrect word productions while orally reading *The Grandfather* passage (4th grade reading level). Also, secondary participants demonstrated the ability to correctly answer four of five content questions about the passage. Secondary participants were not gender-matched to the participants with aphasia, but they were age-matched within 15 years of the PWA whom they were partnered with to ensure some shared context regarding life experiences and world knowledge. Each PCP had previously interacted with the individual with aphasia due to mutual social and/or therapy activities. The secondary participant could have been a family member, spouse or significant other of a different person with aphasia in the study or who attended the Duquesne University Speech-Language Hearing Clinic. However, secondary

participants were not family members or significant others of the individual with aphasia who participated in the same experimental dyad.

All participants (primary and secondary) reported English as their primary language. All potential participants in this study were subject to exclusion based on the presence of ongoing medical conditions causing dramatic fluctuations in alertness.

Three first year graduate students in the speech language pathology program at Duquesne University between the ages of 20-30 were trained to implement primary skills screenings.

Description of Participants

Dyad 1. PWA1 was a 34 year-old college-educated male who was three and a half years post-onset of a single left hemisphere CVA at the time of the study. He was diagnosed with moderate-severe expressive aphasia and moderate receptive aphasia characterized by significant communication impairments in the areas of verbal expression and comprehension of sequential commands, confirmed by an Aphasia Quotient (AQ) of 58.10 out of 100 on the *Western Aphasia Battery* (*WAB*) (Kertesz, 1982). In addition to aphasia, PWA1 had vision loss in his right visual field and right hemiparesis as a result of his CVA. PWA1 was married and lived at home with his wife and two children.

His partner was a 21 year-old female and also a first year speech-language pathology graduate student at Duquesne University, who had formerly been a clinician of PWA1. PCP1 had completed a course in aphasia at the time of the study, but had not yet completed AAC course work.

Dyad 2. PWA2 was a 47 year-old male with a high school education, who was three and a half years post-onset of a single left hemisphere CVA at the time of the study. He was

also diagnosed with moderate-severe expressive aphasia and moderate receptive aphasia, confirmed by an AQ of 45.6 out of 100 on the *WAB* (Kertesz, 1982). PWA2 had significant communication impairments in the areas of verbal expression and comprehension of sequential commands; however, he was the most independent communicator with aphasia in the study. PWA2 frequently initiated conversation and augmented his communication with a variety of modalities (e.g. gestures, writing, drawing). PWA2 was also the only PWA who was still employed. He worked seasonally at Professional Pool Services and lived alone.

His partner (PCP2) was a 61 year-old male who was also the father of PWA1. He was moderately familiar with the condition of aphasia through providing care for his son as well as bringing his son to therapy at the Duquesne University Speech-Language-Hearing clinic for the past three years. PCP2 was married and lived at home with his wife.

Dyad 3. PWA3 was a 65 year-old retired, college-educated male who was also three and a half years post-onset of a single left hemisphere CVA. He was diagnosed with profound expressive aphasia and moderate to severe receptive aphasia, as confirmed by an Aphasia Quotient (AQ) of 21.8 on the WAB (Kertesz, 1982). PWA3 had extremely limited verbal expression as well as difficulty comprehending yes/no questions and sequential commands (see Table 2.1). In addition to aphasia, PWA3 had vision loss in his right visual field and right hemiparesis secondary to his CVA. PWA3 was married and lived at home with his wife.

His partner was a 59 year-old college-educated female who was a long-time friend of PWA3's family. PWA3 was the least educated regarding the condition of aphasia. PWA3 was married and lived at home with her husband.

Experimenters

The primary investigator and the primary investigator of a nested study (Seale, 2007) conducted all experimental data collection sessions for Dyad1 and Dyad3. A second-year graduate student in the speech-language pathology program at Duquesne University who was blind to the research questions of the study conducted 3 of 7 experimental sessions for Dyad2.

Research Design

A multiple single-subject comparative condition design was repeated across three participant dyads. Within-dyad and across-dyad differences in the dependent variables were examined when messages were accessed with a speech generating device (SGD) during a story re-tell interaction, and across three conditions (SGD with no display, SGD with visual scene display, and SGD with traditional grid display). The three conditions were replicated two times across three topics in a story re-tell interaction for each dyad; participants with aphasia were given their choice of topic and condition to use in the final session. Conditions were counterbalanced across all participant dyads to control for possible order effects. Within participant dyads, stories were purposefully assigned to conditions to control for a practice effect within stimuli.

Conditions

Each of the study conditions utilized a SGD to present the three different kinds of displays. The SGD used in this study had a computer-like screen that contained symbolically represented messages of communicative value (e.g., line drawing symbols, photographs of eventful and personally relevant scenes). The SGD produced synthesized speech output

when symbolically represented messages were activated. Activation consisted of pressing the symbol representing the message. The SGD used in this study provided the following options for organizing communicative information (see section on Experimental Stimuli and Figures 2.1 and 2.2 for additional description).

Condition A (SGD --NO DISPLAY): The PWA was asked to converse with the PCP, but the SGD used to display messages in other conditions was turned off (*No Display)*. To maintain similarity between conditions, however, the SGD was placed on the table in the visual field of the PWA and the PCP.

Condition B (SGD with a VSD): a measure of the primary participant's communicative performance during a story re-tell interaction when using VSD on a customized augmentative communication system with synthesized speech output.

Condition C (SGD with a TGD): a measure of the primary participant's communicative performance during a story re-tell interaction when using a TGD on a customized augmentative communication system with synthesized speech output.

Independent variable

The *independent variable* in this study was the conditions of story element representation: no SGD, SGD with VSD, and SGD with TGD.

Dependent variables

Both quantitative and qualitative data were collected in this study to provide a broad analysis of the *communicative success, ease of communication, independence*, and

naturalness across the three display conditions for both conversational participants. The *quantitative perceptual dependent variables* included the following three measures:

First, personal *preference* of display type (No Display, VSD, or TGD) was recorded for both PWAs and PCPs. PWAs were asked to choose the display they would most like to use in a future (hypothetical) conversational interaction involving a story re-tell.

Second, PWAs and PCPs ranked their three "best" interactions in a forced-choice ranking task after independently viewing excerpts from all six experimental sessions.

Third, data were collected through 7-point Likert rating scales (see Appendices F and G) administered to participants with aphasia and PCPs. Participants rated the following dependent variables:

1) Perceived communicative *success* of the person with aphasia across conditions. 2) Perceived *ease of communication* across conditions.

3) Perceived *independence* of the person with aphasia across conditions.

4) Perceived *naturalness* of exchanges across conditions.

In addition, *qualitative perceptual data* were collected through semi-structured interviews after each experimental session. Open-ended questions were posed to elicit participants' perceptions about communicative effectiveness, including *success, ease of conversing, independence, naturalness, comfort-level, personal preference,* and *usefulness* of each condition.

Procedures

Experimental Tasks -- Overview

The primary participants with aphasia engaged in a topical small talk conversation (Beukelman & Mirenda, 2005; Garrett & Huth, 2000) involving a retelling of a personal story using no SGD, a SGD with VSD, a SGD with TGD and their personal preference for relaying the story. Specific small talk involving the retelling of a personal narrative was chosen for this study because it represented a functional communication activity that could be supported with visual stimuli, potentially tapped into the episodic memory strengths of persons with aphasia, and was motivating to share in a communicative task. Stories were gathered from spouses and family members, scripted and represented on the SGD displays by the primary investigators, and reviewed/evaluated by the family for accuracy. Two additional sessions, lasting approximately 1 hour each, were held prior to beginning the experiment to present the informed consent information, complete screening and testing requirements and to familiarize participants with the speech generating system to be used in this study.

Experimental Stimuli

Story selection. During the first pre-experimental session, the investigation protocol was explained to participants with aphasia in individual meetings during the consent-giving process. (PCPs received instruction in separate sessions). They also participated in testing. After this, and following official enrollment as a study participant, the investigators asked participants with aphasia and an attending family member to verbally generate 3 personal

stories about a humorous, memorable, or emotional event that occurred within 10 years prior to the stroke. They were encouraged to think about events that had already been represented in photo albums with three or more photos. The family member was asked to describe the main event and details for each story; the experimenter then asked the person with aphasia to elaborate on his opinions, relevant details, feelings, or other anecdotal information verbally or by pointing to experimenter-generated written choices. These stories were transcribed and then codified into individual messages for SGD storage at a later time. Each story was assigned a thematic title. To identify the stories for which photographic representations were needed, the titles were randomly assigned a number. The story that was used in the visual scenes condition then was randomly selected from the pool of 4 stories. The person with aphasia and the attending family member were then asked to locate photographs of the story selected for Condition B (Visual Scenes Condition). These pictures were electronically scanned and stored in a digital file prior to electronic transfer to the SGDs.

Story content criteria. Each story contained at least one stated main idea and one stated detail, as well as at least one inferred main idea and one inferred detail. Stories did not contain more than two main ideas and five details. Vocabulary used to convey each message did exceed the 8th grade reading comprehension level. For example, the *Manual of Aphasia Therapy* provides the following story:

> "*My cousin was lost in the mountains when a blinding snowstorm hit while she was hiking. Her food supplies ran out in two days. Melted snow kept her alive until she was found five days later. She was rescued when a helicopter spotted her red scarf."* (Helm-Estabrooks & Albert, 1991).

This story has a 5th grade reading level, as determined by the spelling and grammar tool in Microsoft Word™. It contains at least two main ideas: one that is stated, "*my cousin was hiking in the mountains"*, and one that is inferred, "*she was lost because of a blinding snowstorm*" (Helm-Estabrooks & Albert, 1991). It also contains two details; one that is stated, *"she ate melted snow to stay alive*" and one that is inferred, "*the helicopter found her"* (Helm-Estabrooks & Albert, 1991).

During the second pre-experimental session, the experimenter asked the person with aphasia and the attending family member to review the experimental stories for accuracy after referring to their experimental representation method: printed on paper for Condition A (no SGD), pictorial display for Condition B (no SGD); and iconic symbol display for Condition C.

Story representation criteria. The VSD contained personalized photographic images consisting of objects, individuals and events in the context they occur. Each story element was represented with a *visual scene* containing 1-3 target story elements (e.g, people, objects, relational actions) with a background, foreground and supplemental text. To convey the story using VSD on a SGD, messages were stored and represented as follows:

> "*My cousin was lost in the mountains* (Picture 1= participant's cousin in the mountains), ~~*when*~~ *a blinding snowstorm hit* (Picture 2= a snowstorm that created poor visibility) ~~*while*~~ *she was hiking* (Picture 3= participant's cousin hiking) . . . . *She was rescued* (Picture 9 = participant's cousin being rescued) ~~*when*~~ *a helicopter spotted her red scarf* (Picture 10= helicopter search) (See Figure 2.1).

	Photograph	Supplemental Text	Stored Message
Picture 1		Cousin in Mountains	"My cousin was lost in the mountains
Picture 10		Helicopter Rescue	"She was rescued when a helicopter spotted her red scarf."

Figure 2.1

In this manner, picture 1 in Figure 2.1 contains five semantic concepts (e.g., my, cousin, in, mountains) that are represented by a picture of the participant's cousin who appears to be lost in the mountains, and the picture is supplemented with text containing key words in the message. The message stored would be the following seven words: "My cousin was lost in the mountains." The text providing supplementary to the picture would be: "cousin in mountains".

A TGD was the other display stimulus used to represent messages symbolically on the SGD. The TGD contained no more than 10-12 Picture Communication Symbols (PCS; Mayer Johnson ^{TM}). Each PCS conveyed a single concept with a discrete line drawing and no background illustration. Symbols were selected from a large corpus of available symbols based on their relatedness to the theme, story, or communicative context. No more than 2-3 semantic concepts pertaining to the story sequence were identifiable by a jury of three investigators per symbolic message representation. Individually stored messages contained

no less than 3 and no more than 10 words. To convey the first sentence in the story above using TGD on a SGD, messages would be stored and symbolically represented as follows:

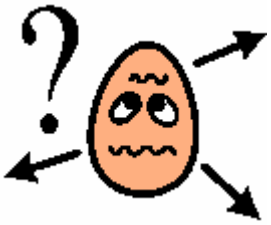
	Symbol	Supplemental Text	Stored Message
Symbol 1		Cousin	"My cousin"
Symbol 2		Lost	"was lost"
Symbol 3		Mountains	"in the mountains"

Figure 2.2

In the example depicted in Figure 2.2, symbol 1 represents 2 semantic concepts (e.g., My, cousin). Each symbol on the SGD with TGD contained no more than 7 words in the stored message. Each concept represented symbolically was then sequenced and combined in appropriate story order to re-tell the story.

Messages representing story elements symbolically on the SGD with either a VSD or TGD were in one of two patterns on the display to avoid echolalic/methodical activation of the messages. These two patterns are displayed below in Figures 2.3 and 2.4.

Message 3 →	Message 4 ↓	Message 9
↑ Message 2	Message 5 ↓	Message 8 ↑
↑ Message 1	Message 6 →	Message 7 ↑

Figure 2.3

Message 1 ↓	Message 6 →	Message 7 ↓
Message 2 ↓	Message 5 ↑	Message 8 ↓
Message 3 →	Message 4 ↑	Message 9

Figure 2.4

Setting, Materials, and Instrumentation

Testing for Dyad1 and Dyad2 took place in a quiet room in the Speech-Language-Hearing Clinic at Duquesne University. Testing for Dyad3 took place in the dining room of PWA3's home. Both testing rooms were equipped with a rectangular table and chairs positioned adjacently to one another. The system used was placed in between the two participants. Both rooms also contained minimal distracters. Each session was videotaped with a Sony camcorder that was fixed and mounted in a position in which both participants' faces could be seen, as well as visual display of the device being used. Videotape data were collected until the conversational interaction was complete, or for a maximum of 10 minutes.

The SGD used in this study was the *Dynavox V* from *DynaVox Systems.* The device had the capability of producing synthesized speech output upon icon activation. Dynavox software provided the capability of using a touch screen to activate communicatively significant messages, and included photographs to facilitate the conversation through shared

visual reference to the topic of conversation. The system was capable of importing photographs, providing the opportunity for personalizing message representation. The system was also capable of providing supplemental text to facilitate recall of the symbolically represented messages under a particular icon.

Number/Length/Scheduling of Sessions

Pre-experimental sessions. Prior to the experimental sessions, two pre-experimental sessions were conducted. In the first preliminary session, participants with aphasia and PCPs were screened and tested to obtain a complete and current communication profile. In the second preliminary session, participants were given an opportunity to familiarize themselves with both of the SGD display types to be used in this study. They also familiarized themselves with the SGD system's basic operation, given experimenter instruction and demonstration. This familiarization session lasted approximately one hour.

Experimental sessions. A total of 6 experimental sessions lasting approximately 30 minutes each were conducted with the conversational participants. A minimum of one session was conducted every 3-7 days.

Post-experimental session. In addition, a final post-experimental session was held at the close of the study in which participants with aphasia met with their PCPs and all participants independently watched and ranked two-minute excerpts of the six experimental sessions, choosing their top three "best" overall interactions. Participants also independently participated in a final interview with the investigator.

Table 2.4 Order of experimental sessions and tasks across participants

	Session						
	1	2	3	4	5	6	7
Participant Dyad 1	A1 Topic 1	B1 Topic 2	C1 Topic 3	A2 Topic 2	C2 Topic 1	B2 Topic 3	Interviews/ Session Ranking
Participant Dyad 2	B1 Topic 2	C1 Topic 3	A1 Topic 1	B2 Topic 3	A2 Topic 2	C2 Topic 1	Interviews/ Session Ranking
Participant Dyad 3	C1 Topic 3	B1 Topic 1	A1 Topic 2	C2 Topic 1	A2 Topic 3	B2 Topic 2	Interviews/ Session Ranking
****Key****	Conditions: A=No Display, B= Visual Scene Display, C= Traditional Grid Display 1= First trial of condition; 2= Second trial of condition						

Pre-experimental instruction and practice. Prior to the condition of retelling a personal narrative with no SGD, the experimenter reviewed key story elements with the PWA using topic setting strategies (e.g., written augmentation, gestures) to ensure the PWA understood the story. Prior to using either the SGD with a VSD or SGD with TGD for re-telling a personal narrative, the experimenter reviewed the story with the PWA by accessing each symbolically represented message stored on the device. The person with aphasia was prompted to activate each message immediately after the message was activated by the experimenter. The person with aphasia was permitted to activate each message no more than 3 times prior to the PCP entering the room.

Before the PCP entered the room, the experimenter explained to the person with aphasia that his or her communication partner would be asking a few questions about the story. The person with aphasia had to try to answer these questions using either his or her natural speech paired with gestures or the symbolically represented messages on the SGD

device. The experimenter also explained that the person with aphasia was responsible for telling the *entire* story to his or her communication partner at some point during the course of the conversation.

The PCP was instructed to use a prompt in the form of an open ended question (e.g., "What's new?") to invite the PWA to initiate the retelling of his or her personal story. The PCP was given three pieces of information written on a cue card that he or she was required to gather from the person with aphasia (using questions) *at some point* during the conversation (e.g., "Find out where Jim went."). The cue card (See Appendix F) also contained a reminder to ask a minimum of 3 yes/no questions, and to respond to any communicative attempt made by the person with aphasia, as if conversing with a peer with no communication impairment.

General experimental sequence. All sessions began with the experimenter and PWA seated in the testing room. The experimenter reviewed a story that was personally relevant to the PWA by using written augmentation and gestures (if Condition A) or by pointing to items on the display (Conditions B and C). The experimenter explained that in a few minutes, someone would enter the room to talk to the person with aphasia. He or she would be interested in hearing about this story. This person might ask some questions about the story, but it was the primary participant's responsibility to tell the *entire* story using the experimental modalities available in that condition.

The PWA was then given a five minute break. The PCP then entered the room and sat down. He or she asked an open ended question to initiate conversation and invite the PWA to begin sharing information (e.g. "What's new?"). They then engaged in the specific small talk conversation, in which the PWA retold his personal story to the PCP, and the PCP

supplemented the conversation with three semi-structured questions. Following the conversation, both participants participated in a brief, open-ended interview (described below).

Interview and rating scales. All participants engaged in brief, 5-10 minute interviews following each experimental session to collect qualitative information about the participants' perceptions regarding communicative *success, ease* of communication, *independence,* and *naturalness.* Interviews were open-ended and participants were asked to comment on their partners' communication and opinions of the specific display type used during the session. If participants were unsure of what to comment about, investigators probed for perceptions based on rating scale variables: ease, success, naturalness, and independence, as well as comfort/confidence level during the interaction.

Interviews began by including input from both primary participants and peer communication partners. Both members of each dyad were encouraged to listen to their partner's comments, and to give their input on whether they agreed or disagreed with their partner's perspective. Investigators then asked both members of each dyad if they had anything else they would like to add to the conversation that they would rather not say in front of their partner. This feature of the interview was used primarily by the peer communication partners when discussing the conversation limitations of the participants with aphasia.

The interview for the participants with aphasia was adapted to include tagged yes/no questions, augmented written input, and experimenter-generated written response choices. PCPs and participants with aphasia were asked to rate the following variables on scales of 1-7: *success*, *ease* of the conversation, *independence* of the communicator with aphasia, and

naturalness of the conversation. Refer to Appendix G for a sample of this rating scale, Appendix H for a PWA response sheet, and Appendix I for a PCP response sheet. At the end of the sixth interview, PWAs selected their *preferred display* (No Display, VSD, or TGD) that they would most like to use in a future (hypothetical) conversation involving the re-telling of a personal story.

Final review and ranking sessions

After all six sessions had been conducted, the participants with aphasia and PCPs met separately with the experimenter and watched two-minute segments randomly extracted from each of their own videotaped conversational sessions. Segments of the same story were grouped together (e.g. "Ranger Training", Condition A with "Ranger Training", Condition B). Participants watched two segments containing the same topic and then independently ranked the segments, assigning them with a number 1 or number 2, with session number 1 containing the better overall interaction (see Appendix J). Participants were permitted to ask questions at any time, and were also able to request additional reviews of the videotaped segments (up to 2 per segment). After all segments had been viewed, the three sessions labeled as "Number 1" were listed on cards for the participant to see. The participant then placed the cards on a clearly labeled continuum from "best" to "worst"(See Appendix K). The terms "best" and "worst" were defined for participants in broad terms only – "best" equaling the most efficient, communicative, informative, and comfortable interactions regardless of display type, and "worst" being defined as the opposite of "best". Due to time constraints, members of Dyad3 viewed segments together; however, all rankings and ratings were completed independently of the other participant.

Participants also engaged in a comprehensive interview during the final session. Before the interview, participants were asked to again rate the variables of *success*, *ease*, *naturalness*, and *independence* on a scale of 1-7, across the three conditions. Participants were also asked to rate how *useful* they perceived each display type to be, on a scale of 1-7. These final ratings were used to guide investigators' questions and facilitate conversation during the final interview. In addition, PCPs selected their *preferred display* (No Display, VSD, or TGD) during this final interview.

Data Analysis and Summarization

Videofilm Transcription and Coding

In a separate research investigation, the primary investigator reviewed and transcribed the first ten minutes of each videotaped experimental story-retell session. Transcribed data was coded using pre-established rules for identifying success (see Seale, 2007). These data were used to inform the qualitative data from the transcribed interviews and ratings obtained in the present study.

Each videotaped interview was also transcribed verbatim and recorded using word processing software. Analysis of the interview data followed general qualitative methodology guidelines outlined by Boyatzis (1998). The primary investigator read through transcripts multiple times and highlighted quotes judged to contain pertinent information. Quotes containing purely social remarks, extraneous information, or redundant information were omitted. Selected quotes were then transcribed onto index cards (one quote per card). Due to the high level of co-construction needed for participants with aphasia during the

interview process, index cards for primary participants were marked with main ideas derived from the transcripts and include citations to specific areas of co-construction on the transcripts.

The primary investigator then sorted the index cards into groups of thematically related information. The following nine categories or themes were then created: success, ease/difficulty of communication, naturalness, comfort level, information content of display, clarity/complexity of display, interest level of display, usefulness of display, and limitations of AAC.

Reliability

To ensure inter-rater reliability of the thematic analysis, a Master's level graduate student in speech-language pathology was given 20% of the quotes (selected randomly) and all names of the selected thematic categories as well as a detailed description of criteria for each theme (see Appendix L). The student then placed the quotes in the categories that he or she felt was most appropriate. The quotes in each category placed by the graduate student were then compared to the quotes placed by the primary investigator. Inter-rater reliability was computed by dividing the number of categorical agreements by the number of agreements plus disagreements. Using this method, 88% inter-rater reliability for the qualitative categories was achieved. Intra-rater reliability was not computed because the primary investigator reviewed thematic categories multiple times, continuing to re-evaluate and analyze themes.

Intra-rater reliability for participants' ratings of success, ease, independence, and naturalness was also computed. Each participant watched a video segment of the first five

minutes of a randomly selected experimental session and re-rated all four independent variables on the 7-point rating scales. Intra-rater reliability for PWAs was 50% when rating agreement was calculated with exact values. However, it was 91.7% when agreement was within one point on the 7-point scale. Intra-rater reliability for PCPs was 33.3% when rating agreement was calculated with exact values. It was 91.7% when within one point on the 7-point scale.

Data Summarization

Raw data from rating scales for the dependent variables: *success, ease of conversing, communicative independence,* and *naturalness* were compared descriptively within each experimental dyad across the conditions. Means, standard deviations, and ranges were then computed for each participant and condition. Ratings were not summed and averaged within the experimental groups (persons with aphasia and PCPs) and conditions due to high standard deviations within and across participants.

Data from the forced-choice ranking by both PCPs and PWAs were also described in terms of the percentage of occurrence of each condition in the matrix of top three choices for each group. Thematically coded qualitative interview data were also summarized descriptively and compared within and between dyads.

CHAPTER 3

RESULTS

The present study examined perceptions of three adults with aphasia and their communication partners without aphasia when communicating across three conditions: SGD with No Display (Condition A); SGD with Visual Scene Display (Condition B); and SGD with Traditional Grid Display (Condition C). First, the display preferences of each participant with aphasia (PWA) and peer communication partner (PCP) are reported. Second, quantitative data obtained from the forced choice session ranking task are presented. Third, the participants' post-session ratings of *ease of communication, success, independence*, and *naturalness* of the person with aphasia when communicating in each condition are summarized. Finally, qualitative data obtained from transcriptions of brief participant interviews after each session and from one comprehensive interview at the end of the study are described categorically, in relationship to themes derived from the data.

Display Preference

Participants selected the AAC display type they preferred the most based on their experience with no display and two dynamic screen displays during the study.

Preferences of Participants with Aphasia

During the interview portion of Session 6, PWAs chose the story they would prefer to retell and the condition (No Display, VSD, TGD) they would use to tell the story. Investigators used gestures and written augmentation with verbal cues to ensure that PWAs understood the task. PWAs made their selection verbally, or by pointing first to one of three possible written choices representing the story title, and then to one of the three choices for

display type. For PWAs, VSD was referred to as "pictures", TGD was referred to as "symbols", and No Display was called "just speech", to maximize participants' comprehension.

Two out of three participants with aphasia (PWA1, PWA2) chose Visual Scene Display as their preferred display for retelling their favorite story. PWA3, the individual with the most severe aphasia as measured by the WAB aphasia quotient (Kertesz, 1982), first chose VSD, then switched his choice to TGD when asked to confirm his initial selection.

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Table 3.1 Display and story preferences of participants with aphasia

Participant	**Story**	**Display Type**
PWA1	"Ranger Training"	VSD
PWA2	"Road Trip"	VSD
PWA3	"Hobbies"	VSD and TGD

Preference of Peer Communication Partners

During the final interview, PCPs recorded their preferred display on a questionnaire (see Appendix I). As seen in Table 3.2, PCP1 chose No Display as her preferred display. PCP2, like his partner, chose VSD. PCP3, also like her partner, chose both VSD and TGD. She told investigators that her partner with aphasia was able to understand the VSD better, but the TGD gave him more information to talk about (see qualitative data on *Clarity/Complexity* and *Information Content of Display* sections of this chapter).

Table 3.2 Display preferences of peer communication partners

Peer Communication Partner	Display Type
PCP1	No Display
PCP2	VSD
PCP3`	VSD and TGD

Forced-Choice Session Ranking Task

During the final interview, PWAs and their PCPs independently watched six, two-minute interactions extracted from each experimental session. Both renditions of each of the three stories were paired; therefore each pairing was comprised of two experimental conditions and one story topic (e.g., Ranger Training--Condition A, Ranger Training – Conditions B). After watching the paired sessions relating to the same story, participants then chose the session they thought represented a better overall interaction (See Appendix J).

Next, after all sessions had been viewed and one session had been selected as the "best" session from each pair, the participants then ranked these three sessions in order from "best" to "worst" (See Appendix K). Participants were then asked to discuss their rationale for their choices in the final interview. These comments are discussed below and were also included as part of the qualitative data.

Final Session Ranking -- Participants With Aphasia

PWA1 ranked AAC over No Display in 2 of 2 possible instances (TGD over No Display in "Wedding" and VSD over No Display in "Ranger Training"). He also chose VSD in 2 of 2 possible chances (VSD over No Display in "Ranger Training", and VSD over TGD in "Cars"). When ranking his top three sessions of six total, PWA1 chose "Ranger Training" with VSD as his "best" or "number 1" choice, VSD with "Cars" as his second choice, and TGD with "Wedding" as his "worst" or third choice (see Table 3.3). When elaborating on reasons for his choices, PWA1 indicated that the "Wedding" story conveyed during the TGD condition was his "worst" session because the topic and the condition were both his least favorite in each category.

PWA2, the participant with aphasia who was most able to produce specific semantic content through natural speech and gestures, chose AAC over No Display in 1 of 2 possible instances (VSD over No Display in "4-Wheeling"). However, he also chose VSD in 2 of 2 possible chances (VSD over No Display in "4-Wheeling", and VSD over TGD in "Road Trip". PWA2 chose TGD in 0 of 2 possible chances. In the second set of pairings ("best" to "worst" ranking of the top three sessions), PWA2 chose VSD with "4-Wheeling" as his "best" session, No Display with "Jamboree" as his second choice, and VSD with "Road Trip" as his third or "worst" choice (see Table 3.3). When asked to elaborate on his choices, PWA2 indicated that "Jamboree" was a more highly preferred topic than "Road Trip", because the Jamboree was an event that he attended at least "5 times", and the Road Trip only occurred once. He did not mention display type as a factor when queried; therefore topic may have been his most salient criterion for this task.

PWA3, the participant with the most severe aphasia quotient and corresponding limitation in ability to produce specific semantic content through natural speech and gestures, chose AAC over No Display in 2 of 2 possible instances (VSD over No Display in "Hobbies, and TGD over No Display in "Graduation". However, PWA3 chose VSD in only 1 of 2 possible instances. He chose TGD over VSD in "Family Vacation", and VSD over No Display in "Hobbies". However, PWA3 did choose VSD with "Hobbies" as his "best" session. He selected TGD with "Family Vacation" as his second choice, and TGD with "Graduation" as his third or "worst" choice (see Table 3.3 below).

Table 3.3 Final forced-choice session rankings -- participants with aphasia

Participant	1st Choice (Best)	2nd Choice	3rd Choice (Worst)
PWA1	VSD "Ranger Training"	VSD "Cars"	TGD "Wedding"
PWA2	VSD "4-Wheeling"	No Display "Jamboree"	VSD "Road Trip"
PWA3	VSD "Hobbies"	TGD "Vacation"	TGD "Graduation"

Summary. Table 3.3 reveals that VSD was ranked first on each PWA's preferred session list when the staged ranking task was completed. VSD appeared in the matrix of top three choices 5 of 9 times (56%). TGD was selected 3 of 9 times (33%), and No Display was selected only once (11%).

Final Ranking—Peer Communication Partners

PCP1, unlike her partner with aphasia, chose AAC over No Display on 1 of 2 possible instances (No Display over VSD in "Ranger Training", and TGD over No Display in "Wedding"). She also selected TGD in 2 of 2 possible instances (TGD over No Display in "Wedding", and TGD over VSD in "Cars", selecting VSD in 0 of 2 opportunities. PCP1

selected No Display with "Ranger Training" as the dyad's "best" interaction, TGD with "Cars" as her second choice, and TGD with "Wedding" as her third choice (see table 3.4).

PCP2 chose No Display over AAC in 2 of 2 possible instances (No Display over TGD in "Jamboree", and No Display over VSD in "4-Wheeling"). He chose VSD in 1 of 2 possible opportunities, when both sessions included AAC (VSD over TGD in "Road Trip"). He chose TGD in 0 of 2 chances. PCP2 selected No Display with "Jamboree" as his and his partner's "best" session, VSD with "Road Trip" as his second choice, and No Display with "4-Wheeling as his third, or "worst" choice. PCP2 cited limitations of AAC for his preference of No Display (see interview data: *AAC Limitations*). He also felt that his partner was more interested and animated with the "Jamboree" topic than "4-Wheeling, which he indicated was a reason for selecting "Jamboree" as his "best" session (see table 3.4).

PCP3, like her partner with aphasia, chose AAC over No Display in 2 of 2 possible opportunities. She also selected VSD in 1 of 2 opportunities (VSD over No Display in "Hobbies"), but chose TGD over VSD for "Family Vacation". However, unlike her partner with aphasia, PCP3 chose TGD with "Graduation" as her number 1 or "best" choice.. She selected TGD with "Family Vacation" as her second choice, and VSD with "Hobbies" as her third or "worst" choice (see table 3.4 below).

Table 3.4 Final forced choice session rankings -- peer communication partners

Participant	1st Choice (Best)	2nd Choice	3rd Choice (Worst)
PCP1	No Display "Ranger Training"	TGD "Cars"	TGD "Wedding"
PCP2	No Display "Jamboree"	VSD "Road Trip"	No Display "4-Wheeling"
PCP3	TGD "Graduation"	TGD "Family Vacation"	VSD "Hobbies"

Summary. Unlike PWAs, who selected VSD as their preferred display 3 of 3 times, PCPs chose VSD as their "best" sessions 0 of 3 times. TGD appeared in the matrix of top three choices for all three peer communication partners four of nine times (44%); No Display appeared three of nine times (33%), and VSD appeared two of nine times (22%). These results directly opposed perceptions of "best" sessions expressed by the PWAs.

Rating Scales

After each experimental session, both PWAs and PCPs completed rating scales regarding the PWA's communicative success, independence, ease, and naturalness of communication on a 7-point scale (See Appendix). Mean ratings and standard deviations were calculated for all variables for each PWA and PCP across conditions. Individual patterns in ratings are discussed below. Mean ratings for PWAs were not collapsed due to disproportionately high standard deviations in PWA3's ratings. Mean ratings for PCPs were not collapsed due to high standard deviations across participants, which were mostly attributed to consistently high ratings across all variables for PCP2.

Success

The variable of success was defined as the degree to which the person with aphasia was perceived to be successful at telling his story or "getting the point across" to his partner.

Primary Participants. PWA1 rated Condition B (VSD) highest for the variable of success. Condition A (No Display) and Condition C (TGD) were rated equally low for success, with a mean rating of 2.0 (see table 3.5).

PWA2, who was able to produce some specific semantic content through natural speech, writing, and gestures, rated success equally high (6) across all three conditions (see

table 3.5). Quantitative data from a related study (see Seale, 2007) shows that PWA2 was indeed successful at conveying his responses across all three conditions.

PWA3 rated the variable of success equally for Condition A (No Display) and Condition B (VSD), 1.5 points higher than the mean rating of success for Condition C (TGD). However, the standard deviation for Conditions A and B were high (see table 3.x).

Peer Communication Partners. PCP 1 rated Condition C (TGD) the highest for success. Condition B (VSD) was rated second at 4.5, and Condition A (No Display) was rated lowest at 3.5, (see table 3.5).

PCP 2, like his partner, rated success considerably high across all three conditions; with a .5 point mean increase in ratings for Condition A (No Display). Mean ratings for conditions with AAC (Conditions B and C) equaled 6 (S.D.=0).

PCP 3, like PCP1, rated Condition C (TGD)the highest for success (6.5, S.D.=0.5) . Condition B (VSD) was a close second at 6 (S.D.=0). Condition A was assigned a mean rating of 3 (S.D.=1) (see table 3.5). Quantitative data from Seale (2007) shows that PWA3 was, in fact, significantly more successful when he was able to augment communication with a dynamic screen device.

Table 3.5 Mean ratings of success across conditions and participants

	Dyad 1		**Dyad 2**		**Dyad 3**	
	PWA1	**PCP1**	**PWA2**	**PCP2**	**PWA3**	**PCP3**
Condition A	2 (S.D.=1)	3.5 (S.D.=0.5)	6 (S.D.=0)	6.5 (S.D.=0.5)	4 (S.D.=2)	3 (S.D.=1)
Condition B	3.5 (S.D.=0.5)	4.5 (S.D.=0.5)	6 (S.D.=0)	6 (S.D.=0)	4 (S.D.=2)	6 (S.D.=0)
Condition C	2 (S.D.=0)	5.5 (S.D.=0.5)	6 (S.D.=0)	6 (S.D.=0)	2.5 (S.D.=0.5)	6.5 (S.D.=0.5)

Ease

The variable of *ease* was defined as the perception of how easy, or effortless, it was for the person with aphasia to communicate his story.

Primary Participants. PWA1 applied a mean rating of 5 for the variable of ease to Condition B (VSD). Condition C (TGD) received a mean rating of 3.0, which was 1 point above the mean rating for Condition A (No Display) (see table 3.6).

The variable of ease for PWA2 revealed minimal differences across conditions. However, mean ratings continued to be high for all three conditions, with Condition C (TGD) given the highest rating at 6.5, Condition B(VSD) coming in second at 5.75, and Condition A (No Display) with the lowest rating of 5.5.

PWA3 assigned Condition A a mean rating of 5, 0.5 points above the mean rating for Condition B, with Condition C (TGD) again being assigned a lower rating of 2.5 (see table 3.6).

Peer Communication Partners. PCP1 rated Condition C (TGD) the highest for ease. Condition B (VSD) was rated second at 4.5, and Condition A (No Display) was rated lowest at 3.0.(see table 3.6).

For PCP2, ease was rated nearly equal across the conditions, with Condition A and B receiving mean ratings of 6.0 and Condition C receiving a mean rating of 5.5 (see table 3.6).

PCP3 assigned conditions with AAC (B and C) the highest rating of 6.5 while Condition A (No Display) had a considerably lower mean rating of 2.0 (see table 3.6).

Table 3.6 Mean ratings of ease across conditions and participants

	Dyad 1		Dyad 2		Dyad 3	
	PWA1	**PCP1**	**PWA2**	**PCP2**	**PWA3**	**PCP3**
Condition A	2 (S.D.=1)	3 (S.D.=1)	5.5 (S.D.=0.5)	6 (S.D.=0)	5 (S.D.=1)	2 (S.D.=1)
Condition B	5 (S.D.=1)	4.5 (S.D.=0.5)	5.75 (S.D.=0.25)	6 (S.D.=0)	4.5 (S.D.=1.5)	6.5 (S.D.=0.5)
Condition C	3 (S.D.=0)	6 (S.D.=0)	6.5 (S.D.=0.5)	5.5 (S.D.=0.5)	2.5 (S.D.=0.5)	6.5 (S.D.=0.5)

Independence

The variable of independence was defined as the degree to which the participant with aphasia was able to communicate his story on his own, without help from his partner.

Participants with Aphasia. Both PWA1 and PWA2 assigned nearly equal mean ratings of independence to each condition; however, PWA2 felt considerably more independent than PWA1. PWA1's mean ratings for independence were as follows: Condition A (No Display), 2 Condition B (VSD) and Condition C (TGD), 2.5. PWA2's mean ratings independence were as follows: Condition A (No Display), 6.5. Condition B (VSD) and Condition C (TGD), 6 (see table 3.7).

PWA3 felt less independent with Condition C (TGD) than the alternate two conditions, giving this condition a rating of 2 for both sessions. He rated Condition B (VSD) at 4.5, slightly higher than Condition A (No Display) at 4. However, standard deviations for these conditions were high, 1.5 and 2, respectively (see table 3.7).

Peer Communication Partners. PCP1 perceived her partner to be most independent with Condition C (TGD), with Condition B (VSD) a close second. She perceived her partner to be least independent in Condition A (No Display) (see table 3.7).

This trend was magnified with PCP3, who rated her partner to be considerably less independent with Condition A (No Display). Quantitative data from Seale (2007) supports PCP3's ratings. Sessions with Condition A for Dyad 3 required much more co-construction and involvement from the PCP than sessions including AAC.

PCP2 rated his partner nearly equally independent for all three conditions, again, very similar to the ratings of his partner (see table 3.7 below).

Table 3.7 Mean ratings of independence across participants and conditions

	Dyad 1		**Dyad 2**		**Dyad 3**	
	PWA1	**PCP1**	**PWA2**	**PCP2**	**PWA3**	**PCP3**
Condition A	2 (S.D.=0)	2.5 (S.D.=0.5)	6.5 (S.D.=0.5)	6.25 (S.D.=0.25)	4 (S.D.=2)	2.5 (S.D.=0.5)
Condition B	2.5 (S.D.=0.5)	3.5 (S.D.=0.5)	6 (S.D.=1)	6 (S.D.=0)	4.5 (S.D.=1.5)	6 (S.D.=1)
Condition C	2.5 (S.D.=0.5)	4 (S.D.=0)	6 (S.D.=1)	6.5 (S.D.=0.5)	2 (S.D.=0)	6.5 (S.D.=0.5)

Naturalness

The variable of naturalness was defined as the degree to which the communication of the person with aphasia was perceived to be natural, normal, or typical, on a scale of 1-7. No consistent pattern for ratings of naturalness were noted across participants.

Primary Participants. PWA1 rated naturalness nearly equally low for all three conditions, with Condition A achieving the highest mean rating by a margin of 0.5 (see table 3.8). Conversely, PWA2 rated naturalness nearly equally high for all three conditions, with Condition B receiving a slightly lower rating by a margin of 0.25 (see table 3.8). Like PWA1, PWA3 rated naturalness relatively low for all three conditions. Condition C (TGD)

was given the lowest mean rating of 1.5 However, standard deviations for Conditions A and B were high (see table 3.8).

Peer Communication Partners. Like her partner, PCP1 rated naturalness low across the three conditions. However, she assigned Condition A (No Display) 1.5 points lower than conditions with AAC (see table 3.8). PCP2 was again consistently close to the ratings of his partner and rated naturalness high across all three conditions. Condition A (No Display) was rated ½ point higher than Condition B (VSD), which was rated ½ point higher than Condition C (TGD) (see table 3.8). Throughout all variables, PCP3 rated conditions with AAC considerably higher than Condition A (No Display). The same was true for the variable of naturalness. PCP3 gave ratings of 6.0 and 5.5 for Condition C (TGD) and Condition B (VSD), respectively, and a rating of 2.5 to Condition A (No Display) (see table 3.8).

Table 3.8 Mean ratings of naturalness across participants and conditions

	Dyad 1		**Dyad 2**		**Dyad 3**	
	PWA1	**PCP1**	**PWA2**	**PCP2**	**PWA3**	**PCP3**
Condition A	2.5 (S.D.=0.5)	1.5 (S.D.=0.5)	6 (S.D.=0)	7 (S.D.=0)	3.5 (S.D.=1.5)	2.5 (S.D.=0.5)
Condition B	2 (S.D.=1)	3 (S.D.=0)	5.75 (S.D.=0.25)	6.5 (S.D.=0.5)	3.5 (S.D.=1.5)	5.5 (S.D.=0.5)
Condition C	2 (S.D.=1)	3 (S.D.=0)	6 (S.D.=0)	6 (S.D.=0)	1.5 (S.D.=0.5)	6 (S.D.=0)

Qualitative Analysis

All participants engaged in brief interviews following the close of each experimental session, as well as a comprehensive interview at the close of the study. The following specific topics were probed: ease of communication, success, naturalness, independence,

comfort/confidence level, and usefulness of display type. Out of the interviews, the following themes emerged: ease of communication, success, naturalness, comfort level, usefulness of display type, clarity/complexity level of display, interest level of display, informative content of display, and AAC limitations. Within these general themes, sub-themes, as well as similarities and differences between participants were also noted. These themes will be described in detail below.

Success

Quotes related to the theme of success were divided into 47 separate comments. Each comment was counted as positive, negative, or neutral, and marked with the condition it corresponded to (No Display, VSD, or TGD). Comments related to VSD were divided as follows: 13 comments positive, 1 comment negative, 2 comments neutral. Comments to TGD were divided as follows: 11 comments positive, 4 comments negative. For No Display, 10 comments were found to be positive, and 4 comments were found to be negative (See Table 3.9).

Table 3.9 Comments across conditions for success

	VSD	**TGD**	**No Display**
Positive	13	12	10
Negative	1	4	4
Neutral	2	0	0

All participants had comments that were interpreted to be related to success. Only a slight decrease was seen in the number of positive comments about Condition A (No Display). Participants made the fewest negative comments about Condition B (VSD). Out of all the participants, Dyad 2 had the most to say about success.

Dyad 2. Both participants in Dyad 2 remarked that PWA2 was equally successful across all three conditions. Data from rating scales support these comments. PCP 2 commented after the investigator asked him to talk about success across conditions: "…defining between them (conditions) was really difficult. Because he's a good communicator, and he has enthusiasm."

Both PWA2 and PCP2 talked about PWA2's ability to add a significant amount of new information to each conversation. While PCP2 cited his partner's ability to use multiple modalities such as writing and gestures to increase success, PWA2 picked up a pen and pantomimed the act of writing to convey that he wrote things down when it was difficult to speak. Both participants mentioned PWA2's ability to communicate additional information across all three conditions. When asked who did more of the work in communicating during Session 1, Condition B (VSD), PWA2 pointed to himself and said, "Well, me!" Through co-construction, PWA2 told investigators that because he was the one telling the story, and had to know which messages on the device to pick, he felt that he did the majority of the work in communicating the story. PCP2 agreed with his partner, telling investigators, "He communicated 80, 90% (with the VSD), because it was all new information to me."

During the final interview, PCP2 commented that he felt that his partner was able to provide more information during sessions using No Display than sessions with TGD. In fact, PCP2 cited that his partner could have used TGD with greater frequency for greater success. For instance, PCP2 states: "I think he could have used it (TGD) more. If he had a point, if he had a goal to tell me a particular thing…he would have went right down the line…he used that to augment and I think he was trying *not* to use it."

PCP2 also talks about an instance when information from the story was abandoned by PWA2 and therefore not received by PCP2 during a session utilizing TGD. "I mean, there's things on there, (pointing to display) 'sisters'. I don't know what all that is. He didn't get to it."

Also unique to PCP2 was the idea that the communicative success of the person with aphasia depends largely on the interest and commitment of his or her communication partner. "As long as the person that's on my end is interested, and patient. That's the key for aphasia, I think. Unfortunately not everyone's that way."

Dyad 1. PWA1, referred to the No Display sessions as "bad", and both AAC sessions as "good", during the final interview. His partner agreed that at times, PWA1 was unable to retrieve key words during his story when communicating with No Display. Both participants in the dyad agreed that PWA1 was more successful when using Condition B (VSD) than with Condition A (No Display). PCP1 tells investigators, "I definitely think he did a lot better (with VSD). Last time it was hard for him just to get out, 'wedding'. And then he would blank and didn't know what to say."

However, PCP1 did comment that during the second session with No Display, her partner was able to achieve success despite not using an AAC device: "I think it was pretty good, for not having the display. He was able to recall…the aspects of the story." Like PCP2, PCP1 was able to cite specific factors that increased her partner's success. One such factor was asking questions. PWA1 agreed that his partner's asking questions helped during the No Display conditions. He also agreed that his ability to write to communicate helped "a little bit."

PWA1 conveyed in the final interview that he felt slightly more successful as well as independent when communicating with Condition C (TGD) than with Condition B (VSD).

Dyad 3. Dyad 3 had the least to tell investigators about the variable of success. PWA3 told investigators by pointing to investigator-generated written choices that he did better with the TGD than with No Display. However, in the same session, he conveyed that he still did not feel successful with the TGD. PWA3 agreed with his communication partner that he "did a good job" telling his stories with AAC devices (type of display was not specified).

Ease/Difficulty of Communication

All participants spoke about the relative ease or difficulty of communication across the three conditions. The theme of ease/difficulty of communication was comprised of 35 comments. Comments were divided as follows, with a noticeably larger number of negative comments attributed to Condition A (No Display).

Table 3.10 Comments for ease/difficulty across conditions

	VSD	TGD	No Display
Positive	6	7	4
Negative	3	3	12
Neutral	0	0	0

All primary participants shared a common subtheme within Ease/Difficulty. All participants with aphasia commented about the difficulty of speech alone when communicating with no SGD.

Speech Is Difficult. All participants with aphasia independently communicated their frustration with speaking. After describing Session 1 as "hard", PWA1 was asked by the

primary investigator, “What made it hard?” To this he replied, “Speech.” PWA3 responded to questions regarding the difficulty of speech with sighs, grimaces, and putting his hand to his head and shaking it, exclaiming “Ah, mah, mah.” While PWA2 told investigators that it was easy to communicate with his partner using No Display, he repeatedly gestured, pulling his hand in front of his mouth in frustration, saying, “I want, but I *can’t.”*

Peer communication partner’s 1 and 3 also conveyed the difficulty that they perceived their partners to feel using speech and gestures alone. PCP1 described Condition A (No Display) as the “most difficult condition”. She also spoke about the specific difficulty initiating that her partner experienced during Condition A: “I think he knew what he wanted to say; he remembered it, but he had a hard time getting it out.” PCP3 described Condition A as difficult for both her and her partner: “When he didn’t have the box, that was difficult. I think it was difficult for both of us.” She also remarked, “It was hard to try to find things that I thought he could communicate to me.”

Only PCP2 did not describe speech as remarkably difficult for his partner. He felt that each condition was equally easy for his partner. His ratings for the variable of ease/difficulty of communication also reflect these comments (see table 3.x).

Ease/Difficulty of Communication with AAC. Participants in Dyad 1 and Dyad 3 each felt that communication was easier during conditions with AAC (B &C). PCP1 felt that the VSD made it easier for her partner to remember the topic; thus, referencing the VSD during conversation eased communication. However, she felt that her partner still had difficulty expanding on the conversation topic, even when using VSD. Both members of Dyad 1 perceived communication to be easiest with the TGD. PCP1 felt that she needed to ask more questions during Condition A (No Display) and Condition B (VSD). She also felt

it was easier for her partner to activate messages with TGD. During the final interview, PWA1 reported that it was slightly easier (one point difference on a 1-7 scale) to communicate using TGD than VSD.

While PCP3 commented during session 4 (Condition C, TGD) that she felt that the session "seemed easier" for her partner, PWA3 independently communicated during both sessions with TGD that the display was not easy to use, pointing to low ratings of ease on the scale (3 and 2 on a 7 pt scale). During session 2 (Condition B, VSD), he communicated that VSD was easier to use than TGD, by pointing to investigator-generated written choices.

Ease for Second Session of Condition A (No Display). Both peer communication partners in Dyad 2 and 3 remarked that the session in which Condition A (No Display) was repeated, ease of communication within the dyad increased. PCP1 reported after Session 5 (Condition A, No Display), "I think it went really well today. The first time he did it without the voicebox, I (grimaces), it was a little bit more difficult for both of us."

PCP2 cited the topic as the reason for increase in perceived ease:

> "And one of the things that made it easier was, I think this was the third time we've had this specific topic, Jamboree in the Hill, so I sort of knew what the answers were and I was trying to get him to say the answers."

Comfort

Comfort level during conversation was a theme that emerged for Dyads 2 and 3 only. However, the dyads had conflicting opinions regarding comfort across conditions. The theme was comprised of 14 comments, divided as follows:

Table 3.11 Comments for comfort across conditions

	VSD	TGD	No Display
Positive	5	3	2
Negative	1	1	2
Neutral	0	0	0

Dyad 3, Increased Comfort with AAC. PCP3 repeatedly reported an increase in her own comfort level as being directly proportional to her partner's comfort level in conversation. She noted that her partner seemed much more comfortable when using AAC (either display) than speech alone (No Display). She described this effect:

"I think I was much more uncomfortable because I so wanted to understand what he was saying, and I just quite couldn't get it, what he was saying, and I felt that he was getting frustrated and uncomfortable because I couldn't understand him. And the display (VSD)…he was very comfortable last week, with…that box. That made him feel much more comfortable…I was much more comfortable last week…when he was using the voice box." PWA3 agreed with his partner that he was more comfortable when using AAC.

Dyad 2, Increased Comfort with No Display. While PWA2 reported being comfortable with both Condition A (No Display) and Condition B (VSD), his partner felt most comfortable during Condition A (No Display), and less comfortable with conditions using AAC (B and C), describing "structure" as the element causing discomfort. "I think the device, whether it's icons or pictures, you can argue which of those are best, but having that is *structured.*…And so (if) you remove the structure you have a more comfortable conversation."

Clarity/Complexity of Display Type

The largest theme that emerged from the qualitative data was the clarity or complexity of the display types. All participants contributed information to this theme. Within this theme, participants contributed quotes regarding the ability of the primary participants as well as their peer communication partners to understand messages programmed on the display, the complexity of the story pattern or sequence, and the clarity/complexity of the actual icons or pictures themselves. Complexity of the TGD display was a common thread across all dyads. The theme was comprised of 42 comments, divided as follows:

Table 3.12 Comments for clarity/complexity across conditions

	VSD	TGD	No Display
Positive	10	6	Na
Negative	6	20	Na
Neutral	0	0	Na

Complexity of TGD display. Peer communication partners across all three dyads reported that the TGD was complex, confusing, and difficult for their partners with aphasia to understand. PCP3, whose partner had the most severe diagnosis of aphasia and the highest aphasia quotient, felt that the TGD was confusing, and less easy for her partner to understand than pictures:

> "I'm not sure they (icons) were all clear, you know, to (PWA3), on what they said. I think there were just some times when he wanted to say something, and (PWA3) would push the icon and it wasn't what he wanted."

Her partner with aphasia also independently reported that he thought that the icons were not easy to understand, and did not always make sense to him, by pointing to a "3" on the rating scale, after investigators asked if he understood the icons, or if they "made sense" to him.

While PCP2 reported having no difficulty understanding his partner's message when using TGD, he noted that his partner was unable to correct mistakes made in conversation when using TGD. PCP2 again cited "structure" as the element of confusion with the TGD: "There's a question that I asked there…I forget what the question was, but he skipped over the answer, because…there was confusion, because he had structure."

PCP1 also reported that her partner was unable to correct mistakes using TGD. She comments, "I don't know if he realized, that he wouldn't go in order, because he didn't go back and fix it." Many of her quotes regarding the complexity of TGD were related to the order or pattern of the story sequence. After session 3, she reported that the sequence of the TGD was easy to follow and "helped the conversation flow". After session 5, she told the primary investigator that the sequence of the TGD was difficult to follow. PWA1 independently communicated that the pattern of the story was difficult for him to follow on both the TGD and the VSD.

Clarity of the VSD. PCP3 perceived VSD to be easier for her partner with aphasia to understand. In her words, pictures seemed "clear" to her partner.

> "During the sessions I think that (PWA3) understood the pictures better than some of the icons. When he would push, or select a picture, he seemed to know what was going to be said."

PWA3 agreed that he understood the pictures on the VSD better than the TGD. In addition, PWA3 told investigators that the messages on the VSD were very clear to her, as well.

PCP2 also used the word "clear" to describe the VSD, in relationship to the complexity of the TGD, specifically the fact that icons can be associated with more than one meaning.

> "I like it (VSD), and I guess I prefer it over icons. Because icons, you can look at an icon and get a lot of different meanings from it. Looking at a beach, with a bunch of people on it, that's clear."

Negatives of VSD. While Dyad's 2 and 3 reported on clarity of the VSD, some disadvantages of the VSD were reported. PCP2 noted the inability of his partner to correct mistakes in conversation with both the VSD and the TGD. PCP3 felt that her partner was able to provide more accurate responses with the TGD than with the VSD, although she noted inaccurate responses to questions in both conditions. PWA1 communicated that it was easier for him to answer specific questions with the TGD.

In the final interview, PWA3 told investigators through a process of co-construction that line drawing symbols, not photographs, helped him remember information to talk about, because there was too much auditory information embedded in the VSD. He did this by retrieving the VSD display after the primary investigator asked him which display helped him remember his story better, giving him the written choices "photographs" and "symbols". He then covered the display with his palm, saying "No. No." Investigators interpreted this to mean that the VSD did not help him to remember his story. He then agreed with the statement: "So photographs *don't* help you remember your stories," by nodding his head. Next, he accessed a message on the VSD and waved his hand at the device until the message was finished playing, as if to say "Hurry up already!" When asked if the photographs "talked too much," PWA3 nodded his head and gestured 'talking' by moving his thumb and palm

together repeatedly to the primary investigator. Although both displays contained the same scripted auditory information, messages on the TGD were shorter, as the information was divided into 10-12 messages. Each photo on the VSD contained more information, sometimes as much as a few sentences.

Another issue that emerged from the interviews was the clarity of the image itself on the displays. Both PWA1 and PWA2, who have visual field cuts, and are unable to see items in their right visual fields, felt that the pictures on the VSD were too small, and that it was sometimes difficult to see details in their photographs. PWA1 felt that the icons were easier to see than the pictures.

PCP2 had difficulty identifying an important detail in one of his partner's photographs, the antlers that make up the historic archway in Jackson Hole, Wyoming, a stopping point on PWA1's "Road Trip". However, he also pointed out the problem of portraying such a unique feature with icons, stating "…what icon could you possibly get? If that's an important point to him, how could you bring that across, using the device?"

Naturalness of Conversation

Naturalness of conversation was a theme that each peer communication partner contributed to; however, PCP1 had the most to say about naturalness. Primary participants 1 and 3 also contributed information. As with the theme of clarity/complexity, the majority of negative comments were attributed to the TGD. No positive comments regarding naturalness were made about the TGD.

Table 3.13 Comments for naturalness across conditions

	VSD	TGD	No Display
Positive	4	0	3
Negative	3	11	0
Neutral	0	0	0

Unnaturalness of TGD. PCP1 described sessions with TGD as "less natural", "less interactive", and "scripted", in comparison to the other two conditions. During sessions with Condition C (TGD), PWA1 would activate several icons from his story without pausing to answer his partner's questions. Instead, he told his partner to "wait" until he was finished activating each and every icon. PCP1 talked about the unnatural feeling of this behavior: "I think it felt a little more unnatural…just because it felt more scripted…he kind of knew he had to go in a certain order. And it wasn't as conversive." Overall, PCP1 indicated that she did not appear to be needed to facilitate the story re-tell when her partner with aphasia used the TGD.

PCP2 also described the sessions with TGD as "less natural" than sessions using the Conditions B (VSD) and A (No Display). He reported, "This (TGD) is more of an academic drill. And less natural. I think. Using icons."

Both members of Dyad 3 commented on the unnatural quality of the TGD. PWA3 pointed to a "3" on the 7 point rating scale, reaffirming his low rating on the rating task. PCP3 felt that her partner with aphasia was "just going order; just pointing one at a time", instead of having an interactive conversation.

Naturalness/Unnaturalness of VSD. Neither participant in Dyad 2 nor Dyad 3 commented specifically about the relative naturalness or unnaturalness of their partners'

communication with VSD. PCP1 felt that sessions with VSD were more natural and "less atypical" than the sessions with TGD. She reported that sessions felt more interactive and contained more "back and forth" communicative transactions. She also reported a more equal balance of communicative roles: "And even with the pictures…we can both contribute to the conversation."

In addition, she reported that her partner was able to use the VSD in conversation as a reminder for what he wanted to say, instead of relying on it as a means to tell his story, and PCP1 perceived this to be a more natural way of communicating.

> "I think that today was a little…more natural, in the fact that it didn't seem like he was using the pictures just to tell the story, but to kind of help him remember…he was trying to say 'jumping out of a plane'; he didn't go straight to the picture, he was trying to say it to himself, and I think it was more there as a reminder…"

However, PCP1 did not perceive the VSD to be completely natural. She noted a problem with the way in which she and her partner frequently "talked" over one another, speaking or activating the device at the same time. She reported, "I think it's just hard with the machine, to know…when it's my turn to ask a question." She also noted that her partner again would go through several icons in a row, without allowing her to speak, describing this event as "mechanical."

Naturalness of No Display. PCP2, providing rationale for ranking Condition A (No Display) over Condition C (TGD) for the story "Jamboree" in the forced-choice ranking task, reported that the session with No Display was "more natural" than the session with TGD. He

also felt that the session with No Display involved his partner with aphasia in different modalities (speech, writing, gestures).

PCP1 reported that she perceived Condition A (No Display) to be the most natural condition, although she felt that it was the most difficult, because it involved asking her partner with aphasia specific questions, which he then answered, and this was the format of conversation she perceived to be most natural.

Interest Level of Display Type

The theme relating to the interest level of PWAs and PCPs across conditions emerged from quotes from each and every PWA and PCP in the study, although this was not a theme that was directly probed for in the interviews. Subthemes that emerged included the interest or level of enjoyment of both PWAs and PCPs during conversations across conditions, the personal aspect of VSD, and statements of preference made throughout interviews (not including final statement of display preference). These subthemes are discussed below. PWAs and PCPs assigned the greatest number of positive comments to the VSD, and the greatest number of negative comments to the TGD (See table 3.x below).

Table 3.14 Comments for interest level of display type across conditions

	VSD	TGD	No Display
Positive	16	3	1
Negative	2	8	0
Neutral	0	0	0

HighInterest/Enjoyment of VSDs for PWAs and PCPs. PWA1 reported that he enjoyed using the VSD to talk to his partner about "Ranger Training" in session 2, exclaiming that it was "good, good." PCP1 also noted his enjoyment, reporting that he was

"more excited and involved" than in his first session (Condition A, No Display). PWA3 also reported enjoyment in telling stories with VSD.

PCP2 reported that sessions with VSD seemed more interesting for both him and his partner with aphasia: "But I liked the pictures better. It seemed to be a more animated, higher energy level, less sterile." He also reported remembering specific details about stories that were told with VSD, and that he felt compelled to ask questions during sessions with VSD. He told the primary investigator, "The display created in me a curiosity, what the pictures were…", and "the pictures I thought were easier for me, because (they) stimulated me to ask questions."

Low Interest/Enjoyment of TGD for PWAs and PCPs. As mentioned above, PCP2 perceived the TGD to have a "sterile" quality. PWA3 felt that her partner was activating icons "in order", in such a way that made her feel her partner was trying to tell her that he was uninterested in the conversation:

"At one point (while using TGD) he seemed to be just going down, and pushing, and going up and just going in order. And it was the second time that we had done this study, and I felt that he was saying 'we've already done this, and I'm just…going to push the buttons.'"

PWA3 also reported low enjoyment with the TGD, pointing this out to investigators by picking up the 1-7 rating scale and pointing to a "3" when asked if he was "having fun".

Personal Element of VSD. PCP2 felt that the VSD was more personal than the TGD, reporting "I think I like pictures, myself…because they're more personal," and "I think this (TGD) is a little more impersonal." PWA1 and PWA3 also felt that the VSD was more

personal, or meaningful to them. They both liked that the VSD allowed them to reminisce about their own memories.

Statements of Display Preference. Throughout the study, participants made comments regarding preference of display type before making their final preference decision (see Preference of Display Type, above). During session 5, PWA1 stated that he preferred No Display to tell the story of his wedding. During session 1, PWA2 stated that he liked VSD. In the next session, he told investigators that he liked both display types, but did not have a preference. In session 6, he stated that he preferred symbols (TGD), but did not provide an explanation for this.

Information Content of Display Type

Although each story was programmed with the exact set of information on both the VSD and the TGD, some participants perceived the level of information on each display to be unequal. PWA1, PWA2, PCP2, and PCP3 felt that more information was stored on the TGD, and that the VSD was limited in the amount of information it contained. The greatest number of positive comments for information content were assigned to the TGD, while the greatest number of negative comments were assigned to the VSD.

Table 3.15 Comments for information content of display type across conditions

	VSD	**TGD**	**No Display**
Positive	2	6	0
Negative	7	1	0
Neutral	0	0	0

Number of Icons/Pictures per Display. Both PWA1 and PCP3 liked that there were more icons on the TGD than pictures on the VSD. They also equated more icons with more information to talk about on the display. PCP3 explains:

> "I was wondering if there could have been, if there had been more pictures…I mean you may have been able to put more things down. He would have been able to say more things, if there had been more. Like under the woodworking one, you know, maybe he could have talked about what he actually made."

However, while her partner with aphasia agreed that he would have liked to say more about his hobbies, he did not like that there were more symbols on the TGD display.

Limitations of VSD. Each participant with aphasia and PCP2 felt that pictures (VSD) limited the person with aphasia to just one topic. PCP2 felt that because the pictures used were not specifically taken for the purpose of programming, they contained less information than the icons, which were selected for the purpose of telling the story.

> "I think with icons you could probably have more information, because pictures are limited…Because the pictures weren't taken to tell the story. The icons, *fit* the story…You can make the icons fit. Pictures are pictures."

Advantages of Information on VSD. While PWA3 agreed with his partner that the VSD limited him to the information programmed, he also told investigators (by pointing to investigator-generated written choices) that the VSD helped him talk about a lot of different things that he otherwise would not have been able to communicate. He also felt that the VSD contained specific information, and chose this as his favorite feature of the VSD.

Usefulness of Display Type

Each participant (PWAs and PCPs) contributed quotes regarding the level of usefulness of each display type. Each dyad had different ideas about usefulness across conditions. PCP2 and PCP3 both recognized the need for a display that can persons with aphasia can use to communicate wants and needs. Refer to the chart below for distribution of positive and negative comments for this theme.

Table 3.16 Comments about display usefulness across conditions

	Condition B VSD	**Condition C TGD**	**Condition A No Display**
Positive	12	8	1
Negative	3	3	1
Neutral	1	1	0

Dyad1. PWA1 felt that both the VSD and the TGD were useful in some situations, but not others. He reported that he liked using VSD to tell his personal stories, but just "some of the time", or in selected situations. He was also concerned about the cost of *Dynavox 5.* His partner, PCP1, felt that both displays helped her partner remember the story topic in conversation:

> "I thought the devices were helpful at times to remind him of what he wanted to talk about, because that's one of the hardest things, I think, with just the speech…is initiating the topic. He needs a lot more probing from his partner, to pull things out. So I think it's nice to have something there, to remind him."

PWA1 agreed the VSD helped him remember the story topic "a little bit", during session 2.

Dyad2. PCP2 recognized the usefulness of AAC (both display types) to communicate specific information, in situations such as going to a store, traveling on an airplane, or going to court, stating, "If it's important for him to give some certain information, it has to be the device, it has to be a plan, an orchestrated thing." Regarding the VSD, he stated, "I think this is a great device. I think it would be …a great thing for anybody to have, to communicate with when they need to communicate, when they're going to the store, or whatever they're doing." When probed to choose the display type that would be best to communicate with when going to a store, he chose VSD, if it was an "ideal" situation where the appropriate pictures were available.

However, he felt that his partner, who was the most independent communicator with speech and gestures alone out of all three primary participants, would communicate best in social situations without any device. He explained regarding his partner, "If he's sitting at the bar with a couple of guys, he don't need a thing…Social situations, a wedding reception, if somebody cares…they'll get the information out of him."

PCP2 also felt that to communicate something complex, no condition alone was quite enough: "The symbols and pictures aren't enough. And neither are the gestures…because, to explain a beach with gestures is really hard, for anybody." In an e-mail to the primary investigator, PCP2 suggested an AAC display that would combine symbols and pictures for maximum communication benefit.

PWA2 perceived both displays to be useful, but felt that the VSD was more useful. He rated TGD a 6 on a scale of 1-7. He rated VSD a 7, but exclaimed "10!" when completing the rating scale during the final interview.

Dyad 3. In terms of usefulness, PCP3 thought that the storytelling activity in this study was "too specific" and not appropriate for everyday communication. Like PCP2, she pointed out the need for a device programmed specifically for communicating everyday wants and needs:

> "It's just too specific, you know. It was a story. It was one story. And if you're communicating with someone, and you're telling that story, it's wonderful. But if you want a glass of water, or…if you want to say, 'I have to go to the bathroom…'"

PCP3 chose VSD over TGD for her partner as the best display for a system to convey daily needs. However, she felt that icons may be easier and more practical to come up with messages for specific needs.

PWA3 told investigators that he liked both pictures and symbols for the purpose of telling his stories, and that his ideal device would contain elements of both displays (TGD and VSD). He also identified several scenarios (by responding with 'yes' or 'no' to investigator-generated written choices) in which he would like to use the VSD, including telling stories, chatting with family and friends, ordering at a restaurant, and going to the grocery store.

AAC Limitations

The final theme that emerged from the qualitative data was specific to just one participant, PCP2. PCP2 had several quotes that regarded limitations of AAC, yet did not seem to fit in any other theme. PCP2 was particularly concerned about the "structure" that he perceived AAC to provide. He felt that this structure limited his partner from using his own resources to initiate, answer questions, and expand upon topics in conversation. For example, he

reports, “I think, intellectually, if he has a machine, you become part of the machine. And the information on the machine is the information you’re gonna give. It’s probably hard to get off that.”

PCP2 also felt that his partner’s communicative success relied heavily on his communication partner. (see discussion in section on *Success, Dyad 2)* In addition, he ranked Condition A (No Display) over Condition B (VSD) in “4-Wheeling”, explaining that he preferred the less structured conversation that he was able to maintain control over:

> “For the first setting, (VSD) he’s probably intellectually, psychologically confined to what he has in front of him, the information he’s going to give me, but if it’s just a free form kind of a conversation he can go in any direction that I may take him.”

CHAPTER 4

DISCUSSION

Summary of Primary Findings

The present study examined the perceptions of three persons with aphasia and their peer communication partners when the persons with aphasia communicated personally relevant stories across three conditions: SGD with No Display (A); SGD with Visual Scene Display (B); and SGD with Traditional Grid Display (C). Quantitative data included participants' selections of a preferred display type following completion of the six experimental conversations across three display conditions; their top three sessions (and associated display conditions) derived from a forced-choice session ranking task; and their ratings of success, ease of communication, independence, and naturalness. Qualitative data were also collected through semi-structured interviews conducted at the end of each experimental session as well as the end of the study. This study is the second in a two-part investigation, the first of which (Seale, 2007) quantitatively measured the frequency and length of communication interactions, changes in communicator role (i.e., initiations and responses), communicative success, and a variety of communicative functions communicated by the participants with aphasia (PWAs) and their peer communication partners (PCPs) across the same three conditions using detailed conversational analysis techniques.

Quantitative Findings

The most salient finding that emerged from this descriptive analysis of augmented conversations between participants with aphasia and their peer conversational partners was

that 2 of 3 PWAs selected VSD as their preferred display condition. The third PWA chose both VSD and TGD as equally preferable over the No Display condition.

Two of three PCPs independently selected the same preferred display as their partners with aphasia. PCP2 preferred VSD, and PCP3 preferred both VSD and TGD. However, PCP1 disagreed with her partner, preferring Condition A (No Display).

The results of the forced-choice session ranking task mirrored the selection of "top preference" by the participants with aphasia. Participants with aphasia chose sessions from Condition B (VSD) as their top-ranked, or "best", session at the conclusion of the forced-choice ranking process. In addition, VSD ranked as one of the three participants' top three choices on five of nine (56 %) trials.

The peer communication partners were less unified in their session rankings than their counterparts with aphasia. Two of three PCPs selected a session with No Display as their top-ranked session. The third PCP selected a session with TGD. Top three choices for each participant were diverse: TGD appeared the most frequently in the matrix of top-three choices for PCPs (5 times out of nine), and VSD appeared the least often (2 times out of nine). These session rankings also directly contradicted two of three partners' stated preferences for an "overall" best display type.

Quantitative data from participants' mean ratings of success, ease of communication, independence, and naturalness revealed greater diversity of perceptions across participants. No significant patterns were evident for any single variable across conditions or participants. However, PCP3, whose partner with aphasia demonstrated the lowest scores on standardized tests, consistently rated conditions with AAC (both TGD and VSD) significantly higher than Condition A (No Display) for all four independent variables. This is consistent with the

findings of Lasker (1999), who found that peers rated communicative variables (e.g. communicative competence and storytelling effectiveness of the individual with aphasia, peers' comfort level during the interaction, willingness to participate in a similar interaction, and understanding of the story across the three storytelling modes) higher when a communicator with aphasia used AAC to tell a story versus using natural modalities alone.

Qualitative findings

Mean ratings alone did not appear to definitively answer any of the research questions for this study. However, when paired with qualitative data as well as the data from preferences and rankings, ratings served to complement the overall findings from this study. Participants with aphasia and peer communication partners not only elaborated on several of the probed qualitative themes, they also added themes, including clarity/complexity of the display, information content, and interest level of the display type.

All participants in Dyads 1 and 3 (PWAs and PCPs) felt that the participants with aphasia were more successful with AAC than when communicating with speech and gestures alone. Informants felt that these two participants with aphasia were less able to communicate specific semantic information with speech and gestures alone, and that both types of AAC displays enhanced their ability to convey details and ideas. In contrast, both members of Dyad 2 thought that PWA2, the most verbally adept and multimodal communicator of the three participants with aphasia, was equally successful across all conditions. These comments supported both PWA2 and PCP2's ratings of their own success, which they rated highly across sessions and conditions. This finding was also supported to some degree by Seale's (2007) quantitative findings on success. Specifically, the mean percentage of

successful exchanges was found to range from 22% (Condition A) to 29% (Condition B), a difference of only 7%. However, Dyad 2's ratings for success did not reflect quantitative data on the amount of partner interpretation required for messages to be successfully conveyed across conditions (Seale, 2007). Her data showed that the condition requiring the greatest amount of partner interpretation was Condition A (No Display) which increased by 20% from Condition B (VSD), for which only 53% of the exchanges involved partner interpretation.

Changes in the PWAs' independence did not emerge as a salient theme from the qualitative data, as expected by the investigator, regardless of AAC providing PWAs with the ability to communicate highly specific information. Statements regarding independence of the communicator were almost exclusively intertwined with other themes, primarily success. Furthermore, peer communication partners did not seem to perceive a "conversational burden" as described by Linebaugh, Kryzer, Oden, and Myers (2006). If a conversational burden was experienced by peer communication partners during interactions, they did not discuss it in terms of their partner's independence when conversing and reminiscing about life stories.

The PWAs in Dyad 1 and Dyad 3, as well as their PCPs, thought it was easier to communicate with AAC than when using speech alone. Both members of Dyad 1 expressed that AAC conditions made communication easier in their final interviews. This was supported by PWA1's selection of VSD as his preferred display. He conveyed two comments that pertained to the difficulty of speech alone, and on three occasions indicated that AAC displays were better than speech. VSD was also the condition in his "best" session in the forced-choice session ranking task, and he rated it the highest for "ease". However,

when pressed to compare AAC displays, he commented once that TGD was easier to use than VSD.

PCP1 also commented that the TGD made communication slightly easier than the VSD, because VSD required her to ask more questions and did not allow the communicator with aphasia to expand on his topic. In support of these comments, PCP1 rated the TGD condition as easier for the person with aphasia than the other conditions. She also rated VSD as being easier than the No Display condition. However, she still preferred the No Display condition and ranked sessions with No Display as "best". This implies that even though this experiment attempted to identify discrete variables that influenced communication performance and preference, clear correlations between factors (e.g., "ease") and preference did not necessarily exist.

PWA3, whose aphasia was more severe than PWA1 or PWA2, communicated three times (by responding to written choice questions) that his conversations with the VSD were easier than with the TGD. This supported PWA3's forced-choice ranking of "best" session occurring in the VSD condition and his initial selection of VSD as his preferred display. He also rated the TGD as being more difficult to use. However, it somewhat contradicted data from his mean ratings of ease, in which No Display was rated highest for ease, and TGD was rated the lowest.. This may imply that he was confused about the rating task, didn't understand the concept of ease, or that his responses on the rating task were not valid. The researcher's hypothesis was that his forced choice rankings, stated preference for a display, and comments were authentic, but that ratings were not consistent enough to be valid reflections of this participant's perceptions of ease, as well as other variables, success, independence, and naturalness.

For Dyad 3, the issue of comfort level during communication was closely related to the difficulty of the condition. PWA3, who had the most severe diagnosis of aphasia, had great difficulty telling his stories in condition A (No Display). PCP3 perceived these sessions to be very uncomfortable for both herself and PWA3, perhaps because she perceived PWA3 to experienced significant difficulty when communicating.

Although the issue of clarity or complexity of the display types was not probed in ratings or interviews, it was one of the stronger themes to emerge from the qualitative data. Each peer communication partner in the study felt that the TGD was more complex than the VSD. Data within this theme revealed that PCPs perceived the TGD to be more confusing and more difficult for their partners with aphasia to understand than the VSD. They also perceived that the pattern or sequence of the stories on the TGD was difficult to follow and difficult for their partners to remember.

However, the VSD was not perceived to be without fault. PCP2 had particular difficulty recognizing details from the photos. Visually, the photographs were small and difficult for the PWAs with visual field cuts to see (PWA1 and PWA3). In addition, PWA3, who had the lowest receptive language score on the WAB of the three participants, disliked that the VSD had more auditory information embedded within each photograph than the TGD. During the experimental storytelling sessions, PWA3 accessed messages on the Dynavox to gain auditory feedback about what each message said, before sharing that message with his partner. Because the symbols on the TGD represented smaller units of semantic information, messages programmed for each symbol were shorter than those programmed for each photo on the VSD.

It is quite possible that the phrase and sentence-length messages on the VSD contained too much auditory information for PWA3 to process at one time.

All three PCPs had negative comments regarding the naturalness of their partners' communication when using the TGD. PCP1 and PCP3 noted a similar effect in which their partners accessed several messages in succession without involving the PCP in the interaction or responding to the PCPs' questions. PCP1 felt that sessions with the VSD seemed somewhat more natural than with the TGD. However, both PCP1 and PCP2 felt that sessions with No Display were the most natural for their partners. These comments mirrored PCP2's mean ratings of naturalness; however, they contradicted mean ratings of naturalness for PCP1, who had rated Condition A (No Display) as the least natural condition, and Condition B (VSD) and C (TGD) as equally and relatively more natural.

The level of interest or enjoyment that each display type evoked was not probed in the interviews or ratings. However, it became a salient issue for participants. PWAs and PCPs reported higher interest and enjoyment levels when conversing with the VSD than with the TGD. PCP2 reported a higher energy level in his partner with aphasia's conversation when the VSD was used to tell stories as well as a greater curiosity within himself to ask questions about the photographs. PCP2 and PWAs 1 and 3 also felt that the VSD was more personal than the TGD. In addition, quantitative data reported by Seale (2007) found that Condition B (VSD) elicited the greatest number of acts creating joint attention in Dyad 1 and Dyad 3. Conversely, PCP2 described the TGD as having a "sterile" quality in comparison to the VSD.

The majority of participants perceived that more information was programmed on each TGD display than on the VSD. This is particularly interesting because each display

type contained scripted stories that were identical across conditions. However, information on the TGD was divided into smaller semantic units, which in turn were represented with 10 to 12 icons. This "busier" visual display contrasted with the more concentrated information on the VSD, which was represented with only 4 to 6 photographs. PWA1 and PCP3 apparently perceived that there was more information programmed on the TGD because of the increased number of symbols on that display.

In addition, each PWA, as well as PCP2, felt that the VSD limited the conversation to the specific information programmed on the display. PCP2 felt that pictures were limited because they had not been photographed specifically for the purpose of telling the story on a dynamic screen AAC device. This was a valid point, as the photographs used on the VSD had been taken by PWAs or their family members several years prior to their CVAs. Therefore, events, persons, and actions were not perfectly captured to augment communication about personal stories.

All participants (both PWAs and PCPs) perceived the dynamic screen displays used in Conditions B and C (VSD and TGD) to be generally useful. Peer communication partners suggested many different uses for both display types. Their comments, however, were primarily related to the communication of different daily needs instead of conversational information. When probed to consider the differences between the two display types, PCP3 thought that the VSD would be best for her partner; however, she and PCP2 thought that the line-drawing symbols on the TGD would be more practical for communicating daily wants and needs. Both PCP2 and PWA3 liked the idea of a device containing both pictures and line-drawing symbols. PCP2 stated that no condition in the study was, by itself, "enough" for his partner with aphasia, and suggested a display that would combine elements of both the

TGD and the VSD. PWA3 selected "Both" from a field of three investigator-generated written choices (containing "Photographs", "Symbols", and "Both") when asked to choose his ideal device display.

For PCP2, the limitations of AAC versus natural speech were a salient theme in the qualitative interviews. Although PCP2 chose the VSD as his preferred display and gave positive feedback regarding aspects of both the TGD and the VSD, he disliked the structured aspect of conversations with VSD. To paraphrase PCP2, he worried that his partner's intellect would be hindered by the device, believing that if his partner was communicating with a machine, he would become "part" of that machine intellectually. In addition, PCP2 reported that his own comfort level was directly related to the amount of structure in the conversation, and therefore said that he found sessions with Condition A (No Display) to be more comfortable than sessions with AAC displays.

Quantitative data from Seale (2007) shows that PCP2 acted differently in sessions with Condition A (No Display) than in sessions with Conditions B (VSD) or C (TGD). For instance, sessions with Conditions B and C had slightly more abandoned communicative exchanges than sessions using Condition A. Quantitative analysis also found PCP2 to be more responsive to his partner's messages when his partner communicated with natural modalities in Condition A versus with conditions utilizing AAC.

Theoretical Implications

This is the first research study of its kind to examine the perceptions of persons with aphasia and their peer communication partners when persons with aphasia conversed using a dynamic screen SGD device with Visual Scene Displays versus a Traditional Grid Display or

No Display (natural speech and gestures alone). Although the sample size of this study was small, the qualitative methodology employed resulted in a rich and detailed picture of the perceptions of persons with aphasia as well as their peers within interactions using VSD, TGD, and No Display. Methodology of the study was comprised of qualitative data from semi-structured interviews, as well as quantitative data from ratings of the independent variables, selection of preference of display type, and a forced-choice ranking tank; however, it was the qualitative data that yielded the most comprehensive information about the preferences of persons with aphasia and their peer communication partners.

Specific descriptions and examples obtained from the qualitative data showed that perceptions and opinions regarding display types were not always black and white. Quantitative data from display preferences, forced-choice ranking, and rating scales paralleled comments from qualitative data in some instances and contradicted them in others. While quantitative data from preferred display, forced-choice ranking and ratings may have provided snapshots of overall display preference, PWAs and PCPs seemed to generate positive and negative comments on the display conditions based on many different aspects of those displays. For example, participants preferred the VSD for its high interest and enjoyment levels during conversation, but preferred the TGD because it allowed the PWA to expand upon the topic. The qualitative data are filled with similar contradictory comparisons; however, these positive and negative comments did not detract from one condition or enhance another, instead they worked as puzzle pieces, fitting together to yield a detailed, comprehensive image of the positive and negative aspects of each display condition.

Lasker (1999) examined adult peer perceptions of a communicator with aphasia who communicated in a storytelling interaction using three modes of communication. Similarly

to the methodology of this study, perceptions were quantified and described using 7-point Likert rating scales, ranking of the three storytelling modes in a forced-choice task, and focus-group interviews. The present study supports the use of qualitative methodology, particularly semi-structured interviews, to gain information about the perceptions of peers to critically evaluate how well persons with aphasia interact in a storytelling interaction across three conditions.

In addition, the present research found that three of the four methods for obtaining data appeared have internal consistency for participants with aphasia: selection of a preferred communication display, forced choice session rankings, and qualitative interviews. However, ratings of specific conversational parameters did not appear to have internal consistency in the cases of PWA1 and PWA3, or sensitivity in the case of PWA2 and PCP2. Ratings may have not been a valid method of measuring people with aphasia's perceptions of communicative success, ease, independence, and naturalness. While PCP3s' higher mean ratings of success, ease, independence, and naturalness for conditions of AAC over the No Display condition seemed to echo Lasker's (1999) peers' higher mean ratings for variables of effectiveness, competence, comfort, and understanding in AAC conditions, the majority of mean ratings in the present study revealed no significant patterns, nor did they consistently support statements of preference or comments in the qualitative data

Similarly, the PWAs' stated display preference for VSD, as well as the data obtained from the forced-choice rankings, seemed to coincide with the PWAs' qualitatively derived remarks more often than data from PWAs' mean ratings. The forced-choice ranking task in which participants selected their three "best" interactions through a process of elimination seemed to be an effective way for persons with aphasia to judge their communicative

performance, perhaps more so than using ratings. This may be because rankings were less open-ended than ratings. Ratings may be based on personal perceptions of what is "normal", and they can be skewed by different communicators' initial or primary perception of normal communication. Furthermore, ratings measured on continuums with endpoints such as *unsuccessful* to *successful*, or *difficult* to *easy* may be altered by how persons with aphasia remember their communication before onset of aphasia.

Fox, Sohlberg, and Fried-Oken (2001) showed that persons with aphasia can be successful at sorting and ranking meaningful information, specifically, conversation topics of low and high interest. The present study provides some support to suggest that persons with aphasia can be successful at ranking their own communicative performance. This methodology may ultimately be more useful in future research on perceptions of communication competence in aphasia.

Another issue to consider is participants' acceptance of AAC. Lasker and Bedrosian (2000) highlighted three key categories of factors influencing the successful acceptance of an AAC system by a person with an acquired communication disorder such as aphasia. These factors include communication partners, environments that the system is used in, funding options and concerns, attitudes and personality of the AAC user, and unique features of the AAC system. It is possible that some of the perceptions and opinions reported in this study were affected by these factors. PWA1, for instance, reported concern about the cost of the SGD device used in the study when questioned about the usefulness of the device. PCP2, who was also PWA1's father, perceived many limitations to AAC, including the common perception among peer communication partners that AAC limits or stifles the speech output of the person with aphasia. Prior to participating in this experiment, he had expressed similar

concerns when discussing AAC as an option for his son (PWA1). This perception that PWAs do not improve speech when using AAC also emerged as a main theme in Lasker's qualitative data (1999). It is recommended that further research investigate whether the use of AAC by a person with aphasia in a similar type of interaction in fact does limit or affect speech output in any way.

Much of the qualitative data from the interviews support the idea that peer communication partners are integral to the construction of meaning, even in conversations where control has been provided to the PWA via AAC (Kent-Walsh and McNaughton, 2005). PCP2 repeatedly commented on the importance of the communication partner to the success of persons with aphasia, in any interaction. Continuing to measure the contribution of a partner to the exchange of meaning within conversations may be an important component of all research involving people with aphasia.

Clinical Implications

In this study, two adults with moderate to severe expressive aphasia and one adult with profound expressive aphasia were able to successfully share personally relevant stories, communicating highly specific semantic information using two different dynamic screen SGD devices (VSD and TGD). This is especially significant for PWA3, a man with global aphasia whose spontaneous speech output was mostly limited to 'yes' and 'no' and who was unable to achieve the same level of success during this task when using natural speech and gestures alone (Seale, 2007) as he was when he used VSD and TGD. When the three participants with aphasia interacted using VSD, PWAs and PCPs reported a greater interest

and enjoyment level, clearer understanding of messages, and a more natural interaction than when they communicated with more traditional methods of representation (TGD).

However, participants did report positive aspects of the TGD, including more accurate responses to specific questions because the generic line-drawing symbols on the TGD allowed the PWA to talk a greater number of things than the VSD. They also felt that images on the TGD were easier for participants with visual field cuts to see. PCP2 suggested that the ideal device may be comprised of more than one display type.

In addition to method of representation, function of communication (e.g. conveying wants and needs, versus storytelling) was also important to PCPs when considering positive and negative aspects of display conditions. For example, PCP3 felt that the TGD may be more practical than the VSD for communicating everyday wants and needs. The findings of this study support the use of VSD for similar storytelling interactions. However, it is important for persons with aphasia to be able to communicate across many types of communicative functions (Stuart, Lasker, & Beukelman, 2000). As suggested by PCP2, an optimal device for persons with aphasia to communicate a variety of different functions may include a multimodal AAC display type combining the elements of the highly contextual VSD with line drawing symbols, possibly in addition to separate text messages.

Finally, as mentioned above, the role of the communication partner in interactions with persons with aphasia should not be underestimated. Partner-training has been implemented for peer communication partners of persons with aphasia to implement supportive conversational strategies and to increase the functional communicative abilities of persons with aphasia (Kagan, Black, Duchan, Simmons-Mackie, & Square, 2001; Rayner & Marshall, 2003). Hanna (2004) found that a peer without aphasia was able to implement

facilitative conversation strategies in an interaction with a person with aphasia after just one two-hour training session. In turn, the depth of interactions between the dyad increased following this training. It is quite possible that partner-training could also be used to facilitate similar interactions involving AAC between peers and persons with aphasia.

Limitations of the Study

Although this study included three adults with aphasia who had very similar medical, linguistic, and communication profiles, they each acted very differently when communicating during the experimental tasks.. PWA2 had a lower WAB (Kertesz, 1982) aphasia quotient than PWA1; however, he was a more comprehensive and independent communicator, using multiple modalities and repeated attempts to deliver and ensure that his message was understood. This illustrates the high degree of variability within the population of persons with aphasia, and the limitations of the current methods of categorizing and describing the dynamic nature of the communication of individuals with aphasia. In this study, variability across the participants may have contributed to high variability in ratings of the dependent variables across the three participants, as well as perceptual differences in regards to the display conditions.

The three peer communication partners were also widely varied in their ages, backgrounds, and individual communication styles, as well as their degrees of familiarity with their partners with aphasia. PCP2 knew his partner only superficially from a handful of greetings in the university clinic waiting room, but did have extensive experience living with a person who had aphasia (PWA1). PCP1 had been a former clinician to her partner with aphasia, while PCP3 was a long-time family friend of her partner. These differences may

have influenced interactions between dyad members. Differences also may have affected PCPs' perceived success, ease, independence, and naturalness of their partners' communication. Due to these factors as well as the small sample size of the study, one should use caution in generalizing the results of this study to the greater population of persons with aphasia, even if their profiles are similar to the primary participants in this study.

In addition to the high variability across participants with aphasia, participants with aphasia, particularly PWA1 and PWA3, experienced some exogenous events that may have introduced variability into their performance. Throughout the course of the study, PWA1 underwent 20 hyperbaric oxygen treatments.. He also reported intermittent use of an antidepressant throughout the seven experimental sessions. In addition, PWA1 underwent oral surgery midway through the study which required him to take a variety of prescription drugs, including Vicoden and Advil as needed, to manage the pain throughout the remainder of the experimental sessions. The primary investigator noted a marked change in PWA1's mood as well as performance during the 5th experimental session. During this session, he uncharacteristically asked for clarification during the explanation of the task, did not use the provided five-minute break to practice telling his story, and did not respond to several of his partner's questions during the interaction. While PWA1's ratings during this session were consistent with ratings during a previous session using the same condition, and ratings were fairly consistent within each condition, medical changes may have not affected PWA1's ratings. However, pain as well as fluctuations in mood may have influenced PWA1's willingness to fully participate in interactions and in qualitative interviews. Furthermore,

these changes may have influenced his partner's perceptions of his communicative performance.

An unexplained variability in mood was noted with PWA3. This participant has had a history of changes in mood in the past. Specifically during session 4, PWA3's wife reported that he had been having a "foggy" day, even before investigators arrived. PWA3's ratings exhibited high variability within conditions, leading to high standard deviations. For example, during the first session using VSD, PWA3 assigned all variables high ratings of 5's and 6's. During the second session using VSD, he gave consistently low ratings of 2's and 3's across variables. It is possible that these fluctuations in ratings may be correlated with PWA3's high variability in disposition.

Each participant with aphasia had difficulty rating their communicative performance across the three experimental conditions, which was another limitation of the study. For example, PWA1 rated all variables on the low end of the rating scale, regardless of the condition, as if to say, "I'm not successful or independent at communicating, it's not easy for me to communicate; my communication isn't natural; *I have aphasia."* Conversely, PWA2 rated all variables on the high end of the rating scale, across all conditions, seemingly pointing out how well he was communicating, *despite* his aphasia. PWA3 had difficulty understanding the rating task when the variables were presented as statements (e.g. "Communicating with just speech is easy."). During the third experimental session, the primary investigator realized this and changed the probes to questions, (e.g. "How easy is it to communicate with just speech?"). Even after this change was made, PWA3's ratings were highly variable. When PWA3's mood was poor, his ratings were proportionately low, regardless of his performance during the experimental session. Subsequently, rating scales

may not be a valid measure of perceptions of communicative performance for persons with aphasia.

Lastly, topic may have affected several aspects of the study. Participants reported that their second sessions using Condition A (No Display) were either easier or more successful than the first sessions with Condition A because they were already familiar with the story. In addition, each time that PWA1 repeated a story, Dyad 1's number of communicative exchanges decreased by roughly 50% (Seale, 2007).

Topic may have also influenced the PWAs' selections of preference and choices in the final ranking task. Participants with aphasia appeared to have difficulty separating their attachment to particular, personally relevant stories when attempting to rank the experimental variable of the display and the resultant interaction quality. For example, both PWA1 and PWA3 selected the session that included their favorite topic as the "best" or "number 1" session. During the final interview PWA2 told investigators that he selected the session with "Jamboree" as his second choice in the final ranking task over the session with "Road Trip", because the Jamboree was an event that happened several times, and the "Road Trip" only occurred once. Also in the final interview, PWA2 chose to rank topic in order from most preferred to least preferred, rather than talking about differences in the display types.

Recommendations for Future Research

1. Consider gathering more personal stories from participants with aphasia, so that stories do not need to be repeated, thus minimizing a practice effect.

2. Employ greater control over the differences across PCPs in age, background, pre-study attitudes of AAC, and conversation style.

3. Consider keeping PCPs blind to the story topic when communicating during Condition A, thus creating a more realistic communication situation, and a greater possibility for change when communicating with AAC.

4. Enlarge and edit photographs to show most salient aspect of the photograph, if technology allows.

5. Utilize a different method of measuring the PWA's perceptions of their communication, as rating scales may not be a valid measure.

6. Repeat the study with more participants and increased numbers of the experimental sessions per condition.

Conclusions

In conclusion, the present study yielded a wealth of information about the perceptions of persons with aphasia and their peer communication partners about the communicative performance of PWAs when they interact using a dynamic screen SGD with visual scenes and traditional grid display. First, we learned that participants with aphasia and their communication partners enjoyed communicating with the visual scene display method of representation for AAC. In fact, two of three PWAs preferred VSD over the other two experimental conditions, and the third preferred it as much as the other AAC condition (TGD). VSD created more interesting, enjoyable, and meaningful interactions among dyads. However, VSD alone was not adequate to fulfill the communicative needs of persons with

aphasia, particularly for communicating personally relevant stories. The TGD was more equipped for communicating specific, details and for expanding upon topics. Finally, although peer communication partners responded positively to both AAC conditions in the qualitative interview task, this subset of peers was not completely comfortable with either condition using AAC, as determined in the display preference and forced-choice session ranking tasks, reaffirming the importance of AAC acceptance for this population.

Research should continue to explore the use of AAC and more specifically, visual scene display, by persons with aphasia. Better techniques and methods of representation can continue to be improved upon, as well. Investigators should also seek out the opinions and perceptions of the AAC users with aphasia, as well as their peer communication partners, as these individuals have a lot to say, and a great deal of information to offer.

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Appendices

Appendix A

PWA and PCP Selection Criteria

Person With Aphasia
Selection Criteria

Potential Participant's Name: _____
Address: _____
Phone Number: _____

The participant must:	Referral Check	Investigator Check
1. Be between the ages of 30-90	_____	_____
2. One year post onset of no more than two Left hemisphere CVA's	_____	_____
3. English as a primary language.	_____	_____
4. Have a diagnosis of moderate to severe expressive aphasia and moderate to severe receptive aphasia as reported by a licensed SLP and confirmed by subtest scores on The Western Aphasia Battery: Fluency and Comprehension	_____	_____
5. Have been able to read and comprehend at the 4th grade level premorbidly.	_____	_____
6. Have no dramatic fluctuations in alertness due to medical conditions	_____	_____
7. Demonstrate functional visual acuity (aided or unaided) as determined by the ability to match 4 of 5 words given a field of three printed words in 20pt font	_____	_____
8. Demonstrate functional hearing (aided or unaided) by the ability to look at a speaker calling his or her name, and by demonstrating a pure tone average of 50 dB HL in at least one ear (aided or unaided) at frequencies of 1000 and 2000 Hz	_____	_____
9. Demonstrate attention and memory skills Within 1 standard deviation below the mean For persons with left hemisphere infarcts on Two subtests of the CLQT.		
Symbol Trails: 1.45/10	_____	_____
Design Memory: 2.85/6	_____	_____
10. Show no evidence or reported history of disease processes associated with dementia or chronic substance abuse	_____	_____

VISION: WORD MATCHING

The participant will be presented with a card containing four single words in 20 pt. font listed vertically. The investigator will then present a small card containing a single target word and will instruct the subject to, "Find this word on your card." She will also demonstrate the task with two pre-screening items by saying "watch me" and then matching the small card to the correct word on the large card.

#1 (target label = client's name):	**successful**	**unsuccessful**
#2 (target label = bird):	**successful**	**unsuccessful**
#3 (target label = funny):	**successful**	**unsuccessful**
#4 (target label = Sunday):	**successful**	**unsuccessful**
#5 (target label = basketball):	**successful**	**unsuccessful**

Total # pairs matched correctly: _____

Criterion 4 out of 5 correct **Subject**
Accepted?_____

Peer Communication Partner Selection Criteria

Potential Participant's Name: _____
Address: _____
Phone Number: _____

The participant must:	Referral Check	Investigator Check
10. Be between the ages of 21-90	_____	_____
11. Have provided direct care to an individual with aphasia for a minimum average of 8 hours per day for 3 days a week for at least one year	_____	_____
12. English as a primary language.	_____	_____
13. Lterate at the 4th grade reading level based on an oral reading of the Grandfather Passage with no more than 5 incorrect word productions	_____	_____
14. COrrectly answer 4 of 5 content questions about the Grandfather Passage	_____	_____
15. Have no dramatic fluctuations in alertness due to medical conditions	_____	_____
16. Demonstrate functional visual acuity (aided or unaided) as determined by the ability to match 4 of 5 words given a field of three printed words in 20pt font	_____	_____
17. Demonstrate functional hearing (aided or unaided) by demonstrating a pure tone average of 40dbHL in at least one ear at 1000, 2000, and 4000 Hz	_____	_____
18. Have no complaints of hearing interfering with daily conversation	_____	_____
19. Demonstrate normal attention and memory skills within 1 standard deviation of the mean on the CLQT	_____	_____
11. Show no evidence or reported history of disease processes associated with dementia or chronic substance abuse	_____	_____
20. Have interacted with at least one of the primary participants through mutual social or therapy activities	_____	_____

VISION: WORD MATCHING

The participant will be presented with a card containing four single words (1" in size, 2" in size as backup) listed vertically. The investigator will then present a small card containing a single target word and will instruct the subject to, "Find this word on your card." She will also demonstrate the task with two pre-screening items by saying "watch me" and then matching the small card to the correct word on the large card.

#1 (target label = client's name):	**successful**	**unsuccessful**
#2 (target label = bird):	**successful**	**unsuccessful**
#3 (target label = funny):	**successful**	**unsuccessful**
#4 (target label = Sunday):	**successful**	**unsuccessful**
#5 (target label = basketball):	**successful**	**unsuccessful**

Total # pairs matched correctly: _____

Criterion 4 out of 5 correct Accepted?_____ **Subject**

Appendix B

Recruitment Brochure

Are You Interested in a Study About a New Computer Software Designed Just for Individuals with Aphasia??

Come Check It Out and Let Us Know What You Think About It!

For More Information Contact:
Annette Baft-Neff, M.S., CCC-SLP (412) 396-4200
Kathryn L. Garrett, Ph.D., CCC-SLP (412) 396-4219
Caterina F. Staltari, M.A., CCC-SLP (412) 396-4047

Appendix C

PWA Consent Form

ADULT PARTICIPANT WITH APHASIA: MODIFIED INFORMED CONSENT/ASSENT FORM

TITLE: Quantitative and Qualitative Differences in Conversational Performance of People with Aphasia Using Three Types of Visual Screen Displays on Speech Generating Devices

FACULTY ADVISOR/PRIMARY INVESTIGATOR:	**Kathryn L. Garrett, Ph.D., CCC-SLP** **Assoc. Professor, Dept. of Speech-Language Pathology** **Duquesne University** **403 Fisher Hall** **Pittsburgh, PA 15282-2231** **(412) 396-4219** **garrettk@duq.edu**
SECONDARY INVESTIGATORS:	**Laura C. Figley, B.S. (412) 973-8884** **figley243@duq.edu** **Jennifer M. Seale, B.S. (412) 638-6862** **seale716@duq.edu** **Resource Room Mailbox** **403 Fisher Hall** **Pittsburgh, PA 15282-2231**
SOURCE OF SUPPORT:	**Duquesne University** **Dept. of Speech-Language Pathology**

*** ***

INVITATION TO PARTICIPATE:

You, _____, are invited to participate in my Master's thesis research study. I want to help you decide whether to participate or not. You can ask me questions at any time.

You are able to participate because you had a stroke more than 1 year ago, causing you to have difficulty speaking. This condition is called aphasia. You are also between the ages of 30 and 90 years.

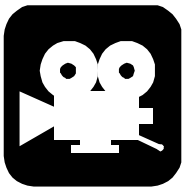
*APHASIA: 1+ years ago

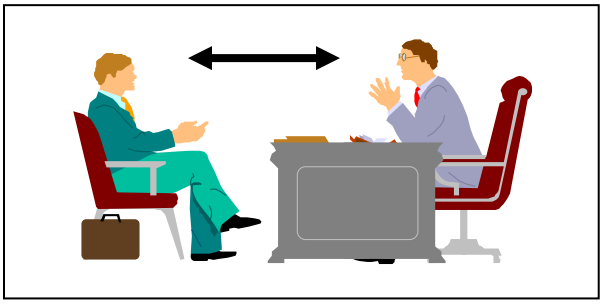
* **Between ages 30 and 90**

WHAT HAPPENS IN THIS STUDY?

In this study, an adult (who understands aphasia) will ask you to tell three of your favorite stories. We will encourage both of you to have a conversation about the story (meaning -- ask questions back and forth). On some days, you will use speech

and gestures to tell the story. Other times, you will a computer to tell your story. On some days, the computer will show your own photos and printed sentences to tell your story. On other days, the computer will show symbols instead of photos. We will videotape you during each session. You will also be asked to give your opinion about each session on a rating scale.





HOW LONG DOES THE STUDY LAST?

We need to meet for approximately **10 hours total**.

• The first two sessions would involve testing, informed consent, and secondary screening.

• The next 7 sessions would be 1/2 hour long. You would have to answer some questions and tell a story to someone you might know from the clinic.

• During the 8th and last session, you will be asked to watch some short video clips of your conversations. You will also be asked to answer questions and talk about the experiment.

- Meet for a MAXIMUM of **10 hours**
- Informed consent/secondary screening — 1- 2 hours
- Testing during regular therapy sessions — 2.5 hours – but no extra sessions

* Week 1	Tuesday	Tell us a story, Questions	1/2 hr
	Friday	Tell us a story, Questions	1/2 hr
* Week 2	Tuesday	Tell us a story, Questions	1/2 hr
	Friday	Tell us a story, Questions	1/2 hr
* Week 3	Tuesday	Tell us a story, Questions	1/2 hr
	Friday	Tell us a story, Questions	1/2 hr
* Week 4	Tuesday	Tell us a story, Questions	1/2 hr
	Friday	Watch a video, Questions	1/2 hr

WHERE DOES THE STUDY TAKE PLACE?

We will meet here at the clinic at DUQUESNE just before you come in for your regular therapy. We can reschedule any session if you are sick or too tired to participate.

RISKS AND BENEFITS:

There are minimal risks associated with this research.
You should not feel tired or be uncomfortable because of this study.

This study will not help you get better – BUT we hope to understand more about aphasia after this study is over.

You will **not** have to pay $$$ to be a part of this study. You will not receive money because you completed participation in this study.

CONFIDENTIALITY:

#1a.

PWA 7

We will use some of your health information (age, description of stroke) but we will protect your privacy at all times. We will not reveal your name to anyone else. Research assistants who gather information from the videotape will see only a **code**, not your name. We will keep the film and data in a **locked file** in the research lab at Duquesne.
We will destroy the videotapes 3 years after we are done with the study. We will destroy the raw data (numbers), and written or

computer-stored health data 5 years after completion of the study. We may publish the results of this study and use limited health information (date of stroke, age, severity of aphasia), however your name will not be used. Any identifying information will be removed.

RIGHT TO WITHDRAW:

I appreciate your participation in this study. However, you can stop at any time. This will not hurt your relationship with the investigators or Duquesne University.

"I QUIT" – OK to say this any time!

SUMMARY OF RESULTS:

You can get a copy of the RESULTS of this study if you want it – and it will **NOT** cost you any $$$$!

VOLUNTARY CONSENT:

I have read the above. I understand what is being requested. I am participating voluntarily. I can QUIT anytime, for any reason. I will get a copy of this consent form to keep. **If I have any questions about participating in this study, I should call the investigators (see page 1) or contact:**

Dr. Paul Richer, Director of the IRB at Duquesne University.
403 Administration Bldg. (412) 396-6326
richer@duq.edu

I signed below to show that I am willing to participate in this research.

X_____

_____
Signature of Participant
Date

In my judgment the participant is voluntarily and knowingly providing:
__ informed consent to participate in this research study
__ informed assent to participate in this study (must also attach agent consent)

X_____
Signature of Primary Investigator/ Date
Faculty Advisor
Kathryn L. Garrett, Ph.D.
Dept. of Speech-Language Pathology
Duquesne University
Phone: 412-396-4219 email: garrettk@duq.edu

X_____
Signature of Secondary Investigator Date
Laura C. Figley, B.S.
Phone: 412-973-8884 email: figley243@duq.edu

X_____

Signature of Secondary Investigator Date

Jennifer M. Seale
Phone: 412-638-6862 email: seale716@duq.edu

Appendix D

Agent Consent Form

AGENT'S INFORMED CONSENT FORM FOR AN ADULT RESEARCH PARTICIPANT WITH APHASIA

TITLE: **Quantitative and Qualitative Differences in Conversational Performance of People with Aphasia Using Three Types of Visual Screen Displays on Speech Generating Devices.**

PRIMARY INVESTIGATOR/ FACULTY ADVISOR:	**Kathryn L. Garrett, Ph.D., CCC-SLP** **Assoc. Professor, Dept. of Speech-Language Pathology** **Duquesne University** **403 Fisher Hall** **Pittsburgh, PA 15282-2231** **(412) 396-4219** **garrettk@duq.edu**
SECONDARY INVESTIGATORS:	**Laura C. Figley, B.S.(412) 973-888** **figley243@duq.edu** **Jennifer M. Seale, B.S. (412) 638-6862** **seale716@duq.edu** **Resource Room Mailbox** **403 Fisher Hall** **Pittsburgh, PA 15282-2231**
SOURCE OF SUPPORT:	**Duquesne University** **Dept. of Speech-Language Pathology**

INVITATION TO PARTICIPATE: Your family member, _____ _____, is invited to participate in our Master's thesis research study. In this study, I will ask your family member to converse with another spouse/family member of another person with aphasia who receives therapy here at Duquesne. The following information should help you make an informed

decision regarding whether or not the person with aphasia (your family member) should participate. You have been asked to review this information because you have power as agent under a power of attorney that gives you authority to act for your family member in this matter. If you have any questions please do not hesitate to ask.

Your family member is a candidate for the study because he/she has difficulty speaking following a stroke. This condition is also known as aphasia. He or she is also a candidate because the stroke was more than 1 year ago, and because he or she is between the ages of 30 and 90. Your family member was invited through recommendation from a speech-language pathologist at the Duquesne University Speech-Language-Hearing Clinic.

PURPOSE OF THE STUDY/STUDY REQUIREMENTS

In this research project, your family member will tell three of his/her favorite stories while conversing with a communication partner who is familiar with the condition of aphasia, typically because he/she is a family member/spouse of another person with aphasia attending the Duquesne University Clinic. During some sessions, the person with aphasia will tell stories without any support, using just residual speech or gestures. During other sessions, the person with aphasia will use a computer with artificial speech output to tell stories and to ask questions during the conversation. The display on the computer will use symbols for some sessions, and personal photos for others. We will ask you to bring in some of your own photos and help us construct three stories that we can program into the computer. Before we use the stories in experimental sessions, we will ask you to review each story for accuracy and your approval.

Your family member will need to meet with the primary investigator for approximately 10 hours total. First, he/she will be asked to participate in testing so we can better understand their skills and challenges. He/she needs to complete an aphasia test, a vision screening test, and a hearing screening.. This testing should take approximately 4 hours, and can be completed across more than one session if your family member tires. Most of the testing may be completed at the Duquesne Speech-Language-Hearing Clinic during regular therapy times.

During the first experimental session, we will allow your family member to view and experiment with each computer display to gain familiarity with the technology. Then, your family member will engage in the conversation about the favorite story. Starting with the second session, the experimenter will ask your family member to recall where messages from the previous story were stored in the computer. Then, he/she will learn to tell a new story using a different computer screen (display). During the 7^{th} session, your family member will pick his/her favorite computer display type and story, and have an additional conversation. During all 7 experimental sessions, your family member will converse with a peer for 10 minutes during each session. The experimenter also will ask your family member a few questions at the end of each session to learn how he/she felt about the interaction and the computer display. Each 1/2 hour session will be video recorded for later analysis.

After all 7 experimental sessions have been conducted, a final (8th) session will take place in which your family member will watch 6, two-minute video clips extracted from each of their prior conversations. He/she will be asked to rank the conversations in order from "best" to "worst", with "best" being the interaction he/she felt was the most successful, most comfortable, and most natural, and "worst" being the opposite. The experimenter also will talk to your family member for approximately ten minutes about his/her perceived performance across the sessions, as well as the computer displays.

The conversations will be conducted at the Duquesne University Speech-Language Hearing Clinic at a mutually agreeable time. The experimental sessions will be scheduled around any other treatment sessions or appointments. The experiment will not interfere with any treatment your family member is already receiving.

Summary of Time requirements

- Meet for a MAXIMUM of **10 hours**
- Informed consent/secondary screening 1- 2 hours
- Testing during regular therapy sessions 2.5 hours – but no extra sessions

* Week 1	Tuesday	Tell us a story, Questions	1/2 hr
	Friday	Tell us a story, Questions	1/2 hr
* Week 2	Tuesday	Tell us a story, Questions	1/2 hr
	Friday	Tell us a story, Questions	1/2 hr
* Week 3	Tuesday	Tell us a story, Questions	1/2 hr
	Friday	Tell us a story, Questions	1/2 hr
* Week 4	Tuesday	Tell us a story, Questions	1/2 hr
	Friday	Watch a video, Questions	1/2 hr

RISKS AND BENEFITS

There are minimal risks associated with this study. Your family member should be in no physical discomfort during the experiment. The sessions will be held during a time of day and in a location that you and your family member judge to be most convenient. This research may also benefit other individuals with aphasia and their families. We will protect your family member's privacy throughout the study.

COMPENSATION AND COSTS
There is no cost to you and your family member for participating in this study. If your family member completes the study, you will not receive any monetary compensation. However, information we gather may add to our understanding of aphasia and potentially benefit others with this disability.

ASSURANCE OF CONFIDENTIALITY
Any information obtained during this study that could identify your family member will be kept strictly confidential. All videotapes and written information will be kept in a locked file cabinet in the investigator's locked office. Your family member will only be identified by a code on the test forms, videotapes, and other research data. We will use some limited health information obtained from your family member's health records in the Duquesne University Speech-Language-Hearing Clinic. Examples include: date of stroke, age, medical description of the stroke, test scores, and therapy history. No identifiers will be used, such as phone number, initials or address. You must sign the additional HIPPA form entitled "Authorization to Release Patient Health Information" so that we can legally access this information.

The information obtained in this study may be published in scientific journals or presented at scientific meetings, but your family member's identify will be kept strictly confidential. If you and your family member wish to do so, you may sign a video release form that will enable us to use the video-film data for teaching purposes and/or for presentations at scientific conferences. This is optional, and you may cancel this agreement at any time. Videotapes will be destroyed after data have been summarized, or after 3 years, whichever comes first. Paper data will be shredded and computer files will be erased after 5 years unless you have signed additional consent forms.

RIGHT TO WITHDRAW
You are free to decide not to allow your family member to participate in this study. You can also withdraw your family member at any time without adversely affecting your relationship with the investigators, Duquesne University, or the Duquesne University Speech-Language Hearing Clinic. Your family member will continue to receive any therapy or other services to which he/she is entitled even if he/she stops participating in this research.

SUMMARY OF RESULTS
No information will be withheld from you or your family member. The results of the study will be reviewed with you if you express an interest in this information. A written summary of this research will be supplied to you and your family member, at no cost, upon request.

VOLUNTARY CONSENT
Your family member's rights as a research participant have been explained to you. If you have any additional questions you may contact the primary investigator (see page 1) or the Chairman of the Duquesne University Institutional Review Board (IRB):

Dr. Paul Richer
Room 403 Administration Bldg.
Duquesne University
(412) 396-6326 richer@duq.edu

YOU ARE VOLUNTARILY MAKING A DECISION REGARDING THE PARTICIPATION OF YOUR FAMILY MEMBER IN THIS RESEARCH STUDY. YOUR SIGNATURE CERTIFIES THAT YOU HAVE DECIDED TO CONSENT TO YOUR FAMILY MEMBER'S PARTICIPATION, HAVING READ AND UNDERSTOOD THE INFORMATION PRESENTED. YOU WILL BE GIVEN A COPY OF THIS CONSENT/ASSENT FORM TO KEEP.

_____

_____ _____

Signature of AGENT **Date**

Thank you for providing a copy of the "Durable Power of Attorney document for our records.

IN MY JUDGMENT THE AGENT IS VOLUNTARILY AND KNOWINGLY GIVING INFORMED CONSENT AND POSSESSES THE LEGAL CAPACITY TO GIVE INFORMED CONSENT FOR _____ _____ TO PARTICIPATE IN THIS RESEARCH STUDY.

_____ _____

Signature of Primary Investigator/Faculty Advisor **Date**
Kathryn L. Garrett, Ph.D., CCC-SLP
(W) 412-396-4219 (H) 412-422-0376

_____ _____

Signature of Co-Investigator **Date**
Laura C. Figley, B.S.
(412) 973-8884

_____ _____

Signature of Co-Investigator **Date**
Jennifer M. Seale
(412)-638-6862

Appendix E

PCP Consent Form

INFORMED CONSENT FORM FOR AN ADULT CONVERSATIONAL PARTNER WITH NO APHASIA

TITLE: **Quantitative and Qualitative Differences in Conversational Performance of People with Aphasia Using Three Types of Visual Screen Displays on Speech Generating Devices.**

PRIMARY INVESTIGATOR/ FACULTY ADVISOR:
Kathryn L. Garrett, Ph.D., CCC-SLP
Assoc. Professor, Dept. of Speech-Language Pathology
Duquesne University
403 Fisher Hall
Pittsburgh, PA 15282-2231
(412) 396-4219
garrettk@duq.edu

CO-INVESTIGATORS:
Laura C. Figley (412) 973-8884
Figley243@duq.edu
Jennifer M. Seale (412)-638-6862
Seale716@duq.edu
Resource Room Mailbox
403 Fisher Hall
Pittsburgh, PA 15282-2231

SOURCE OF SUPPORT:
Duquesne University
Dept. of Speech-Language Pathology

INVITATION TO PARTICIPATE: You, _____ _____, are invited to participate in our Master's thesis research study. In this study, we will ask you to interact with someone who attends therapy at the Duquesne University Speech-Language Hearing Clinic who has a severe language impairment known as aphasia. The following information is provided to help you to make an informed decision regarding whether or not you should participate. If you have any questions please do not hesitate to ask.

You are a candidate for the study because you have no difficulty speaking, have no known neurological deficits, have normal speech, language, reading, and hearing skills, and because you are **between the ages of 40 and 90.** You are also a candidate because you have cared for or spent a significant amount of time with a person with severe aphasia since before his/her stroke.

PURPOSE OF THE STUDY

In this research project, I will ask you to converse with a person with aphasia who is currently receiving therapy at the Duquesne University Speech-Language Hearing Clinic. You may or may not be familiar with this person from your own experience of bringing your family member/spouse to therapy.

You will be asked to participate in testing to better understand your language and thinking abilities. We need you to complete a vision screening test, and a hearing screening test, and the Cognitive Linguistic Quick Test. This should take approximately 1 hour, but no more than 2 hours, at a location of your choice (clinic, your home, friend's home).

During the 7 experimental sessions that follow, you will converse with your communication partner for a maximum of 10 minutes within each ½ hour session. Your partner with aphasia will be using a computer to tell a story that is familiar to him/her. You will be given three items of information that you will need to obtain from the person with aphasia by asking them questions, at some point during the conversation. After each conversation, you will be asked to take part in a brief (5 to 10 minute interview) in which you will be asked questions regarding your perceptions about your partner's performance in the conversation and the computer display used in the session. Each session will be video recorded. After all 7 of the experimental sessions have been conducted, you will be asked to watch 6 two-minute excerpts of your conversations. You will be asked to rank the sessions in order from "best" to "worst", "best " being the being the interaction that you felt was the most successful, most comfortable, and most natural, and "worst" being the opposite. Your total time requirement for this study will be no more than 10 hours.

The conversations will be conducted at a mutually agreeable time, at the Duquesne University Speech-Language-Hearing Clinic. All sessions will be video recorded and analyzed at a later time by the primary investigator or a trained research assistant.

Total Number of Sessions/Time Requirements for Peer Communication Partner

	Testing/ Informed Consent/ -Secondary Screening	**Experimental Sessions**	**Perceptual Data Collection/ Condition Ranking**
Peer Communication Partner (PCP) **Total PCP Time: 10 Hrs. Max**	-Verify selection criteria -Informed Consent -Administer CLQT -Secondary screening _____ **One 1-2 hour meeting to obtain informed consent at Duquesne Univ. and conduct testing.**	-conversation (data collection) -Brief 5-10 min. interview _____ **Seven 10-minute conversations at the Duquesne University Speech-Language Hearing Clinic / max session length = 1/2 hour.**	**-**watch 6 two-minute video excerpts of conversations -rank excerpts -Interview _____ **1 session, 45 min. max**

RISKS AND BENEFITS

There are minimal risks associated with this study. You should be in no physical discomfort during the experiment. The sessions will be held during a time of day that you and the person with aphasia judge to be most convenient. We will protect your privacy throughout the study. This research may benefit the field of speech-language pathology, individuals with aphasia, and their families

COMPENSATION AND COSTS

There is no cost to you for participating in this study. If you complete the study, you will not receive any monetary compensation. However, information we gain from this study may add to our understanding of aphasia and potentially benefit others with this disability.

ASSURANCE OF CONFIDENTIALITY

Any information obtained during this study that could identify you will be kept strictly confidential. All videotapes and written information will be kept in a locked file cabinet in the investigator's locked office. You will only be identified by a code on the interview forms, test forms, videotapes, and other research data. We will not use any of your own health information in this project.

The information obtained in this study may be published in scientific journals or presented at scientific meetings, but your identity will be kept strictly confidential. If you wish to do so, you may sign a video release form that will enable us to use the videotaped interviews for teaching purposes and/or for presentations at scientific

conferences. This is optional, and you may cancel this agreement at any time. Videotapes will be destroyed after data have been summarized, or after 3 years, whichever comes first. Paper data will be shredded and computer files will be erased after 5 years unless you have signed additional consent forms.

RIGHT TO WITHDRAW

You are free to withdraw from this investigation at any time without adversely affecting your relationship with the investigators, Duquesne University, or the Duquesne University Speech-Language Hearing Clinic.

SUMMARY OF RESULTS

No information will be withheld from you. The results of the study will be reviewed with you if you express an interest in this information. A written summary of this research will be supplied to you, at no cost, upon request.

VOLUNTARY CONSENT

Your rights as a research participant have been explained to you. If you have any additional questions you may contact the primary investigator (see page 1) or the Chairman of the Duquesne University Institutional Review Board (IRB):

Dr. Paul Richer
403 Administration Bldg.
Duquesne University
(412) 396-6326 richer@duq.edu

YOU ARE VOLUNTARILY MAKING A DECISION REGARDING YOUR PARTICIPATION IN THIS RESEARCH STUDY. YOUR SIGNATURE CERTIFIES THAT YOU HAVE DECIDED TO PARTICIPATE HAVING READ AND UNDERSTOOD THE INFORMATION PRESENTED. YOU WILL BE GIVEN A COPY OF THIS CONSENT FORM TO KEEP.

X_____ _____

Signature of Adult Participant **Date**

IN MY JUDGMENT THE ABOVE INDIVIDUAL IS VOLUNTARILY AND KNOWINGLY GIVING INFORMED CONSENT AND POSSESSES THE LEGAL CAPACITY TO GIVE INFORMED CONSENT TO PARTICIPATE IN THIS RESEARCH STUDY.

_____ _____

Signature of Primary Investigator/Faculty Advisor **Date**

Kathryn L. Garrett, Ph.D., CCC-SLP
(W) 412-396-4219 (H) 412-422-0376

Signature of Co-Investigator	**Date**

Laura C. Figley, B.S.
(412) 973-8884

Signature of Co-Investigator	**Date**

Jennifer M. Seale
(412)-638-6862

Appendix F

PCP Cue Card

PCP Cue Card

You **must** ask the following questions **at some point** during the conversation.

1.

2.

3.

Please feel free to ask additional questions as they would occur naturally in the conversation.

Do not ask more than two YES/NO questions (questions that can only be answered by a "yes" or a "no".)

This should feel like a natural conversation. Please let your partner know if you do not understand. Attempt to clarify their intended message as needed.

Allow your partner extra time to respond to your questions.

Appendix G

Rating Scale

Rating Scale

	NO!	No	no	50/50	yes	Yes	YES!	
-	1	2	3	4	5	6	7	+
	Strongly Disagree	**Disagree**	**Mildly Disagree**	**Neither Disagree Nor Agree**	**Mildly Agree**	**Agree**	**Strongly Agree**	

Appendix H

PWA Rating Response Sheet

Directions to Administrator: Provide the statement, augmenting with ALL words in bold, gestures, and written text for each participant.

Statements	Responses	Appears Valid?
Practice statement #1: Pittsburgh Steelers are the **best** football team ever. **(#1, "The greatest",** Gestures: #1, pantomime throwing football		
Practice statement #2: Pittsburgh has **beautiful** weather all the time! **("sunny days")** Gestures: fan out fingers (both hands) for "beautiful"		
1. Telling this story was **easy. ("simple", "piece of cake")** Gestures: snap fingers		
2. I was **successful at telling my story. ("I got my point across", "I did my job")** Gestures: arms over head in victory, pat on the back		
3. I communicated my story **independently. ("By myself", Without any help")** Gestures: point to chest with thumb for "myself"		
4. My communication was **natural. ("normal", "typical", "not weird")** Gestures: none		

Appendix I

PCP Rating Response Sheet

PCP Rating Response Sheet

Practice Item #1:
Pittsburgh has the greatest football team.

	NO!	No	no	50/50	yes	Yes	YES!	
-	1	2	3	4	5	6	7	+
	Strongly Disagree	Disagree	Mildly Disagree	Neither Disagree Nor Agree	Mildly Agree	Agree	Strongly Agree	

Practice Item #2:
Pittsburgh has beautiful weather every day of the year.

	NO!	No	no	50/50	yes	Yes	YES!	
-	1	2	3	4	5	6	7	+
	Strongly Disagree	Disagree	Mildly Disagree	Neither Disagree Nor Agree	Mildly Agree	Agree	Strongly Agree	

1. Telling this story was **easy** for my partner with aphasia.

	NO!	No	no	50/50	yes	Yes	YES!	
-	1	2	3	4	5	6	7	+
	Strongly Disagree	Disagree	Mildly Disagree	Neither Disagree Nor Agree	Mildly Agree	Agree	Strongly Agree	

2. My partner was **successful** at telling his/her story.

	NO!	No	no	50/50	yes	Yes	YES!	
-	1	2	3	4	5	6	7	+
	Strongly Disagree	Disagree	Mildly Disagree	Neither Disagree Nor Agree	Mildly Agree	Agree	Strongly Agree	

3. My partner communicated his/her story **independently.**

	NO!	No	no	50/50	yes	Yes	YES!	
-	1	2	3	4	5	6	7	+
	Strongly Disagree	Disagree	Mildly Disagree	Neither Disagree Nor Agree	Mildly Agree	Agree	Strongly Agree	

4. My partner's communication was **natural**.

	NO!	No	no	50/50	yes	Yes	YES!	
-	1	2	3	4	5	6	7	+
	Strongly Disagree	Disagree	Mildly Disagree	Neither Disagree Nor Agree	Mildly Agree	Agree	Strongly Agree	

Comments:

Appendix J

Forced-Choice Session Ranking Grid 1

Forced-Choice Session Ranking Grid
(Dyad 1)

"Wedding"

SPEECH – NO DISPLAY	SYMBOLS

"Jumper Training"

PICTURES	SPEECH-NO DISPLAY

"Cars"

SYMBOLS	PICTURES

Appendix K.

Forced-Choice Session Ranking Grid 2

Forced-Choice Session Ranking Grid

BEST

#1
#2
#3

WORST

Appendix L

Criteria for Qualitative Themes

Criteria for Qualitative Themes

1. **Success**
   - Quotes related to how successful the person with aphasia was in communicating
   - Quotes related to something the PWA or PCP did, or could have done to *increase/decrease* PWA's success
   - Factors (general) related to perceived success of persons with aphasia in communicating

2. **Ease/Difficulty of Communicating**
   - Quotes related to how easy or difficult it was to *communicate* based on the type of display, *not* the complexity or understandability of the *display.*

3. **Naturalness**
   - Quotes related to the naturalness or typicality of conversation across conditions
   - Factors that made conversation seem more natural or unnatural
   - May include turn-taking in conversation, involvement of both conversation partners
   - Perceptions of unnatural or natural behavior of PWA in conversation

4. **Information Content**
   - Quotes related to the *amount* of information contained on a display
   - *Limitations* related to the information contained on the display
   - *Specificity* of content on display
   - Quality/quantity of information that PWA provided based on content of display

5. **Comfort**
   - Quotes related to the comfort level of the PWA or PCP during conversation
   - Factors that created/contributed to a more comfortable or uncomfortable conversation

6. **Clarity/Complexity of Display**
   - Quotes related to the clarity, complexity, or understandability of display type for PCPs or PWAs
   - Descriptions of display as confusing, complicated
   - Descriptions of display as "clear"
   - Descriptions of PWA's *message* across displays ("clear", "hard to understand")
   - Descriptions of visual complexity of display
   - Descriptions of auditory complexity of display
   - Description of complexity of display pattern or sequence

7. **Interest Level of Display**
   - Quotes relating to PWA or PCP interest level or enjoyment level of display
   - Quotes relating to the personal/impersonal aspect of display

8. **Usefulness of Display**
   - Quotes relating to comments/concerns of usefulness of display

- Listing of possible uses/communicative functions for display
- Suggestions for developing a more useful display

9. AAC Limitations

- Quotes relating to specific limitations of AAC (not relating to any of the other themes)