2010

Using visual scene displays to create a shared communication space for a person with aphasia

Karen Hux
University of Nebraska–Lincoln, khux1@unl.edu

Megan Buechter
University of Nebraska–Lincoln

Sarah Wallace
University of Nebraska–Lincoln

Kristy S.E. Weissling
University of Nebraska - Lincoln, kweissling2@unl.edu

Published in *Aphasiology* 24:5 (2010), pp. 643–660; doi: 10.1080/02687030902869299

Submitted September 22, 2008, manuscript accepted 5 March 2009.

Using visual scene displays to create a shared communication space for a person with aphasia

Karen Hux, Megan Buechter, Sarah Wallace, and Kristy Weissling

University of Nebraska–Lincoln, Nebraska, USA

Corresponding author — Karen Hux PhD, 351 Barkley Memorial Center for Special Education and Communication Disorders, University of Nebraska–Lincoln, Lincoln, NE 68583-0738, USA. email khux1@unl.edu

Abstract

Background: Low-tech visual scene displays (VSDs) combine contextually rich pictures and written text to support the communication of people with aphasia. VSDs create a shared communication space in which a person with aphasia and a communication partner co-construct messages.

Aims: The researchers examined the effect of low-tech VSDs on the content and quality of communicative interactions between a person with aphasia and unfamiliar communication partners.

Methods & Procedures: One person with aphasia and nine unfamiliar communication partners engaged in short, one-on-one conversations about a specified topic in one of three conditions: shared-VSDs, non-shared-VSDs, and no-VSDs. Data included discourse analysis scores reflecting the conceptual complexity of utterances, content unit analyses of information communication partners gathered from the interaction, and Likert-scale responses from the person with aphasia about his perception of communicative ease and effectiveness.

Outcomes & Results: Comparisons made across conditions revealed: (a) the most conversational turns occurred in the shared-VSDs condition; (b) communication partners produced utterances with higher conceptual complexity in the shared-VSDs condition; (c) the person with aphasia conveyed the greatest number of content units in the shared- VSDs condition; and (d) the person with aphasia perceived that information transfer, ease of conversational interaction, and partner understanding were best in the shared-VSDs condition.

Conclusions: These findings suggest that low-tech VSDs have an impact on the manner and extent to which a person with aphasia and a communication partner contribute to conversational interactions involving information transfer.

Keywords: Aphasia treatment, Visual scene displays, Augmentative and Alternative Communication, Conversational interaction

People with aphasia routinely experience communication breakdowns due to their impaired ability to meet the linguistic processing demands present during typical conversational interactions. One strategy for minimizing communication breakdowns is for people with aphasia and their communication partners to establish shared communication spaces for message co-construction. Shared communication spaces are locations in which communication partners have joint access to tools and support materials providing platforms for information dissemination (Light & Drager, 2007; Light, Page, Curran, & Pitkin, 2007). Regardless of whether they incorporate no technology (i.e., natural forms of communication such as gestures and body movements), low technology (e.g., paper and pencil for writing or drawing), or high technology (e.g., computerized devices), the key feature is that interactants assume joint responsibility for formulating, expressing, and confirming communicative intents. This notion of message co-construction is consistent with the work of other research groups who have advocated for training conversational partners to support the communication attempts of people with aphasia (e.g., Kagan, 1998; Kagan, Black, Duchan, Simmons-Mackie, & Square, 2001; Lyon et al., 1997; Rayner & Marshall, 2003).

Low-tech visual scene displays (VSDs) using a combination of contextually rich pictures and written text are one way of creating shared communication spaces (Beukelman, Dietz, McKelvey, Hux, & Weissling, in press; Beukelman, Hux, Weissling, Ditez, & McKelvey, 2008). Contextually rich pictures depict situations, places, or experiences in ways that clearly represent relationships and interactions among important people or objects. When paired with written text referencing key people, objects, or events or providing partner-focused questions, these images provide sufficient information to support multiple communicative exchanges (Dietz, McKelvey, & Beukelman, 2006). Furthermore, they take advantage of many of the skills that remain intact for people with chronic aphasia such as memory for life events, visual-perceptual skills, and intellectual functioning (Blake, 2005; Brookshire, 2003; McNeil, 1983; Murray, 1999).

Using low-tech VSDs is a relatively new method of supporting people with chronic aphasia as they engage in communicative interactions with a variety of partners. No research exists exploring the use of low-tech VSDs to establish shared communication spaces when one interactant has aphasia. Hence, the purpose of this preliminary research study was to determine the effect of shared communication spaces established through the use of low-tech VSDs on the content and quality of communicative interactions between a person with aphasia and unfamiliar partners.

Method

Participants

Participants included one individual with aphasia and nine adults without communication challenges.

Participant with aphasia. RL was a 61-year-old right-handed male who sustained a cerebral vascular accident resulting in aphasia 2 years prior to study participation; he sustained a second left hemisphere cerebral vascular accident, further exacerbating his aphasia 17 months prior to study participation. RL was a native American English speaker with a high school education. He reported some vision problems following the cerebral vascular accident, sometimes having to shift materials to the left part of his visual field to compensate for a right field cut. Based on results of an audiology examination, RL had adequate hearing for conversational speech presented in a quiet setting.

RL received speech and language intervention for approximately 5 months following the initial onset of aphasia. At that time he was discharged from treatment, having made substantial progress and being able to communicate functionally with self-initiated implementation of a variety of strategies. Approximately 2 months later, RL experienced a decline in his language performance. Magnetic resonance imaging revealed new areas of brain damage consistent with the occurrence of an additional cerebral vascular accident. Testing using the *Western Aphasia Battery* (Kertesz, 1982) revealed an Aphasia Quotient of 69.8. RL resumed speech and language services and after 4 months achieved an improved Aphasia Quotient score of 76.2; no cognitive testing was performed. At that time he demonstrated moderate anomic aphasia with difficulties primarily in the areas of word finding, reading comprehension, and writing. His subtest scores on the *Western Aphasia Battery* were: Spontaneous speech = 15/20 (Information content – 7/10; Fluency – 8/10); Comprehension = 7.4/10 (Yes/no questions – 58/60; Auditory word recall – 53/60; Sequential commands – 37/80); Repetition = 9.7/10; Naming = 6.0/10 (Object naming – 38/60; Word fluency – 4/20; Sentence completion – 8/10; Responsive speech – 10/10).

Despite continued speech and language intervention, RL's moderate aphasia persisted as a chronic condition. At the time of study participation he relied primarily on natural speech and a low-technology communication book to communicate. RL's communication book primarily included portraits accompanied by key words and phrases relating to specific events. RL used his communication book to resolve communication breakdowns with his spouse and his speech-language pathologist.

Participants without communication challenges. Nine adult speakers of American- English served as communication partner participants. The four males

and five females ranged in age from 33 to 62 years (M = 48; SD = 11.57) and had between 14 and 21 years of education (M = 16.89; SD = 2.32). None reported professional experience related to assessing or treating people with aphasia, none was a student majoring in speech-language pathology or audiology, and none reported current vision, hearing, or communication challenges.

Materials

The VSDs used for the experimental task constituted two pages added to RL's existing communication book. The researchers met with RL prior to study initiation to collect information and photographs needed for generating the experimental VSDs. These VSDs pertained to one topic—RL's antique car acquisition and restoration— selected for use in the experimental task. The displays appear in Figures 1 and 2 and included one contextually rich photograph from RL's personal collection, one contextually rich photograph obtained from the internet, and 18 words or phrases written in 22-point Ariel font. Although the researchers intended to use photographs only from RL's personal collection—as recommended by Beukelman and colleagues (in press)—to create the VSDs, they decided to include one contextually rich photograph not belonging to RL. This was because they believed pictorial representation of the associated content would be important to communication partners' understanding of the information to which RL tended to refer when discussing the topic, and he did not have any such images in his personal collection.

Other materials included 43 questions for use during debriefing interviews that prompted communication partner participants for information RL might have shared during conversations about his antique car. Example prompts were, "What color is the exterior?" and "How did [RL] become so knowledgeable about cars?" Also, the researchers developed questions to ascertain RL's perceptions regarding the ease, amount, and success of information transfer during experimental sessions. The three questions—(a) "How much information did you give the listener about your car?" (b) "How easy or hard was it to tell the listener about your car?" and (c) "How well do you think the listener understood what you talked about?"— were paired with 5-point Likert scales to which RL pointed to indicate his response.

Each session was recorded using two digital video cameras—one for capturing a front view of participants and the other for capturing a view of the shared communication space.

Procedures

Each communication partner interacted with RL for 4.5 minutes in one of three experimental conditions: (a) shared-VSDs, (b) non-shared-VSDs, or (c) no-VSDs. To control for learning effects, conditions were presented in a systematically

alternating sequence across participants such that each condition occurred a total of three times and all three conditions occurred once before repetition of any condition. Sessions occurred over a 3-month period, with at least 1 week separating each session.

In the shared-VSDs condition, RL's communication book was opened to display the two VSDs created to support the experimental task; the book was situated on the table in front of the participants, and both RL and the communication partner could view all pictures and text contained in the VSDs. Both interactants could also use any other pages in the communication book, but neither RL nor any of his communication partners chose to do this during performance of the experimental task.

In the non-shared-VSDs condition the communication book was placed on a book stand in front of RL and was opened to the VSD pages created for the task. This allowed RL to have access to his communication book, but prevented the communication partner from viewing any of the photographs and text included as content. Again, RL had access to all pages in his communication book, but he did not choose to use any pages other than those relating to his antique car. Providing a person with aphasia with VSDs but denying a communication partner access to them is unusual. This strategy served a purpose in the design of the experimental task, because it allowed for systematic control of the shared communication space between the person with aphasia and a communication partner. In most situations this type of restriction would not occur, although possible scenarios—such as speaking on the phone—are not difficult to imagine. Still, the use of this procedure was not intended to simulate typical use of VSDs, communication books, or compensatory strategies and devices in general.

In the no-VSDs condition none of the communication book pages was available to either RL or his communication partner. No restrictions limited use of other communication supports (e.g., writing, drawing, gesturing) in any condition.

Prior to all sessions, one of the researchers provided communication partners with basic information about RL's communication status, the topic to be discussed, and example questions to probe for additional information. In all conditions the communication partner was instructed to discuss RL's antique car and find out as much as possible about the car's history and the process of restoring it. Some of the example questions provided to communication partners pertained to information explicitly stated on RL's VSD pages; others extended beyond that information.

The researcher then introduced RL and the communication partner to one another and allowed them time to exchange greetings and some basic biographical information—such as locations of hometowns and confirmation of preferred names to address one another. RL and the communication partner then interacted for 4.5 minutes. The researchers believed this was sufficient time for RL to convey information about his antique car, yet at the same time would not be such a long period that the participants would exhaust the topic and have to contend with awkward silences.

Following the conversational interaction RL and the communication partner were interviewed separately. RL's interview consisted of completion of Likert scales to indicate his perceptions about the interaction. During the communication partner's interview, the researcher asked for a detailed recitation of all information RL conveyed; then the researcher asked the 43 information prompt questions to elicit additional details the partner might have failed to relate spontaneously. All RL– communication partner conversations and communication partner debriefing interviews were recorded in their entirety for later transcription and analysis.

Data analysis

Collected data included verbatim transcripts of experimental session conversations between RL and each communication partner, verbatim transcripts of debriefing and information prompt sessions between the researcher and each communication partner, and Likert-scale responses from RL.

Discourse analysis. The researchers used the experimental session transcripts to perform discourse analyses using procedures based on Blank and Franklin's (1980) coding of the conceptual complexity of utterances. Blank and Franklin's procedures provided three types of information regarding a conversational interaction: (a) the number of conversational turns, (b) the number of utterances serving as initiations and responses, and (c) the conceptual complexity level achieved by each speaker during the conversational interaction. Blank and Franklin developed the scale of conceptual complexity for use with preschool children in the process of acquiring language competence. Superficially, selection of this type of discourse measure may seem inappropriate for use with utterances produced by people with aphasia and their communication partners; however, the scale offers a means of examining an important aspect of dialogue not addressed through other measures developed for people with aphasia. Specifically, the scale provides a means of measuring conversational participation and the conceptual complexity achieved by interactants. This is important because people with chronic aphasia often have limited or impaired verbal output that is incongruent with their level of cognitive awareness, reasoning, and conceptualization.

To perform the analysis the researchers first divided each experimental session transcript into conversational turns, with a conversational turn being defined as continuous speech by one person followed either by the speech of the other person or a period of silence lasting more than 3 seconds. Then the researchers determined whether an utterance was a speaker-initiation or a speaker-response. Initiations included two forms of utterances—obliges and comments. Obliges are utterances that "summon or demand a response" (Blank & Franklin, 1980, p. 136), whereas comments do not exact a response from a communication partner. An example of an oblige from one of the experimental sessions

was, "So, [what did] how did you get this car?"; an example of a comment was, "Well, it was new [three, six, seven, eight, nine] nine years ago when I bought it." Pragmatically, speaker-responses must occur after obliges; they are optional after comments.

For speaker-response utterances, the researchers simply tallied their frequency of occurrence. Although Blank and Franklin (1980) provide procedures for analyzing the appropriateness of speaker-responses, this analysis was not performed using the current transcripts for two reasons. First, a cursory review of the transcripts revealed no instances in which response appropriateness was an issue. Second, because responses containing novel content were analyzed as initiations as well as responses, no information about conceptual complexity was lost by omitting the response appropriateness analysis.

The researchers analyzed all obliges and comments for conceptual complexity. The scale for coding conceptual complexity includes four levels for categorizing utterances—(a) *matching experience*, (b) *selective analysis of experience*, (c) *reordering experience*, and (d) *reasoning about experience*—with each successive level representing a higher degree of conceptualization. Utterances representative of the *matching experience* level serve to identify global objects, people, and events perceived through basic senses (e.g., sight, hearing, and touch); express basic desires; employ verbal routines; and imitate others. Example *matching experience* utterances RL made during experimental sessions were, "Chevrolet" and "You bet." Language demonstrating *selective analysis of experience* includes utterances focusing on specific components, aspects, or characteristics (e.g., attributes, locations, possession, or functional use) of objects/people/events rather than their global identification; comparisons among entities; or the integration of objects, actions, and events to create a unified perspective. *Selective analysis of experience* utterances made by RL were, "It's a really good car" and "Oh, [I'm] it's down here and it's up there."

The third level of conceptual complexity—language expressing the *reordering of experiences*—corresponds with utterances demonstrating information analysis that extends beyond mere perception. This level includes statements or questions that involve time or the sequencing of concepts, exclusionary criteria or conditional relations, metalinguistics, or generalizations. Examples of RL's utterances representing this level of conceptualization were, "I've had it for about nine years" and "Drive it down the highway, burn out the plugs a little bit and take it home and put it in the garage." The highest level of conceptualization—language that reflects *reasoning about experience*—includes utterances that describe relations among people, objects, and/or events and that depend on problem solving and information integration. Examples include utterances that formulate solutions to problems, justify decisions, identify causes of events, explain the construction of objects, or explain inferences drawn from observations. *Reasoning about experience* utterances from the experimental transcripts included, "I got some old tires on there I gotta get rid of and get newer ones on it" and "And I got

a stroke and can only do so much. I figure it out, what I can do and what I can't do." Further detail and examples of utterances within each level of conceptualization are available in Blank and Franklin's work (1980).

After performing all coding the researchers determined an overall conceptual complexity score for each speaker in each conversation by: (a) tallying the number of times a person produced a speaker-initiated comment or oblige corresponding with one of the four conceptual complexity levels; (b) multiplying each tally by the number 1, 2, 3, or 4 depending on its complexity level; (c) summing the resultant products; and (d) dividing by the total number of coded utterances. This resulted in overall conceptual complexity scores ranging from 1.00 to 4.00. Conversations in which a speaker produced a large number of conceptually complex utterances received higher overall scores than conversations characterized by a large number of conceptually simple utterances. Comparison across conditions only involved visual inspection of the data because of the small number of study participants.

To determine inter-rater reliability regarding performance of the conceptual complexity analysis, two of the researchers independently coded one-third of the experimental session transcripts. First, each researcher determined whether an utterance was an initiation and/or a response. Then, within the initiation category, each researcher determined whether the initiation was a comment or oblige and whether it had a conceptual complexity level of 1, 2, 3, or 4. Utterance-by-utterance comparison across the three samples yielded inter-rater agreement percentages of 80% for identification of initiation and responses, 94% for comment/oblige categorization, and 77% for complexity level assignment. Disagreements in complexity level assignment differed by more than 1 point on less than 5% of utterances.

Content unit analysis. The researchers used transcripts of communication partners' debriefing interviews and information prompt responses as data for performing content unit analyses. Performance of these analyses allowed the researchers to discern the amount of information obtained by communication partner participants, the accuracy of the content they gleaned, and the modality (e.g., speech, accessing VSDs, writing) through which RL communicated information.

The researchers defined a content unit as a single piece of information not previously introduced into the conversation. Yorkston and Beukelman's (1980) work analyzing language samples generated by people with aphasia when providing descriptions of the Cookie Theft picture (*Boston Diagnostic Aphasia Examination*, Goodglass & Kaplan, 1983) served as the basis for this definition. Content units could relate to any type of information such as labels of objects, names of people or locations, temporal markers, attributes, and events. Each unique informational element within an utterance counted as a separate content unit. For example, the utterance, "It was a 1948 Chevy Coupe" constituted three content units (i.e., "1948", "Chevy", and "Coupe").

Content units were coded into four categories depending on information accuracy and communication modality. Categories included: (a) *correct information gleaned from conversation or VSDs*, (b) *conversational or VSD information remembered incorrectly by the communication partner*, (c) *correct information misinterpreted by the communication partner*, and (d) *incorrect information stated by RL*. The researchers determined category assignment for content units by locating the source (e.g., verbalization from RL, examination of a contextual photograph, reading of textual information included in a VSD) from which a communication partner learned the specific information. At times communication partners stated an information source during the debriefing interview or when responding to information prompt questions. At other times the researchers determined the source by reviewing the experimental task transcripts. Transcript review also allowed the researchers to identify instances when RL correctly stated information, but it was misinterpreted or remembered incorrectly by a communication partner.

The researchers determined inter-rater reliability in the identification and classification of content units by having two judges independently code one-third of the debriefing transcripts and information prompt responses. Each judge tallied the number of content units assigned to each of the four accuracy and modality categories. Point-by-point comparison of identification and category assignment revealed inter-rater agreement of 84.84% across the three transcripts.

To determine the number of content units successfully transmitted by RL to a communication partner the researchers tallied all content units classified into the first two of the four categories specified above. The tally of content units in the final two categories constituted the amount of attempted but unsuccessfully transmitted information. This division of successfully and unsuccessfully transmitted content units provided a means of crediting RL when he relayed correct information regardless of a communication partner's recall integrity. Comparison across conditions only involved visual inspection of the data because of the small number of study participants.

Likert-scale responses. Data from each of the three Likert-scale questions to which RL responded ranged in value from 1 to 5, with lower scores indicating little information transfer, difficulty with information expression, or belief that the listener did not understand content. The researchers computed average Likert-scale scores for each of the three statements across conditions. They did not perform parametric or nonparametric statistical analysis because of the small number of participants (i.e., $n = 3$) in each experimental condition.

Results

Representative excerpts from three sample transcripts—one from each of the three experimental conditions—appear in the Appendix.

Discourse analysis

The total number of conversational turns RL and a communication partner generated during performance of the experimental task ranged from 42 to 101 (M = 74.33; SD = 18.21) across the nine sessions. This variability occurred despite the fact that all sessions lasted 4.5 minutes. Figure 3 provides a graphic display of the average number of conversational turns generated in each experimental condition. The most turns occurred in the shared-VSDs condition and the least turns occurred in the no-VSDs condition.

Figure 4 shows the average number of speaker initiations and responses produced by RL and by his communication partners in each experimental condition. Speaker initiations—including both obliges and comments—generated by RL ranged from 19 to 48 (M = 29.22; SD = 10.72) and responses ranged from 16 to 45 (M = 31.22; SD = 9.13). Similar overall ranges occurred for the communication partners both for initiations (range: 19–50; M = 36.67; SD = 9.46) and responses (range: 14–37; M = 24.11; SD = 8.34). When split by experimental condition a consistent pattern emerged in which the highest number of utterances of all types occurred in the shared-VSDs condition and the lowest number occurred in the no-VSDs condition.

RL's overall conceptual complexity scores ranged from 1.81 to 2.53 (M = 2.17; SD = .245) across all experimental sessions. The overall conceptual complexity scores of communication partners ranged from 1.63 to 2.46 (M = 2.06; SD = .278). The mean scores split by experimental condition are displayed graphically in Figure 5. Although minimal differences were apparent across experimental conditions, a pattern of decreasing conceptual complexity scores for RL accompanied increasing conceptual complexity scores for communication partners with the addition of support in the form of shared VSDs.

Content unit analysis

Based on analyses of communication partner debriefing interviews and responses to information prompt questions, RL conveyed between 14 and 34 correct content units across experimental sessions (M = 23.56; SD = 2.58); much smaller numbers of incorrect content units occurred across all sessions, ranging only from 0 to 4 per session (M = 1.33; SD = .58). Averaged across conditions, RL varied substantially in correct content unit transmission, relating the most content in the shared-VSDs condition and smaller but equal amounts of content in the non-shared-VSDs and no- VSDs conditions. The average number of correct and incorrect content units conveyed in each condition is displayed graphically in Figure 6.

Likert-scale responses

RL used 5-point Likert response scales to indicate his perceptions regarding the amount, ease, and success of information transfer during experimental sessions.

Following all experimental sessions, RL indicated neutral to positive feelings regarding his performance and beliefs about his partner's understanding of his communicative intent. Average Likert-scale responses split by experimental condition showed a tendency for RL to associate higher ratings with the shared-VSDs and non-shared-VSDs conditions than the no-VSDs condition for all three questions. Also, RL assigned higher scores regarding "ease of communicating" to the shared-VSDs condition than he did to the non-shared-VSDs and no-VSDs conditions. Mean scores for each of the three perception questions split by experimental condition are displayed graphically in Figure 7.

Discussion

VSDs differ from the traditional communication books developed for people with aphasia in that they present information within a contextual framework that elucidates events and episodes. In traditional communication books, lists of words or phrases are often isolated from the context surrounding particular events. For example, names and portraits of individual people displayed on a page may provide information about the friends and family of a person with aphasia, but they provide little basis for supporting a conversation about those people. Hence, traditional communication books do not explicitly foster establishment of shared communication spaces. In contrast, a basic premise of VSDs is that the combination of contextually rich and personally relevant pictures and words provides even unfamiliar partners with information about important events and relationships in the life of the person with aphasia.

Using VSDs to establish a shared communication space between RL and his communication partners had a visible effect on the manner and extent to which the individuals contributed to conversational interactions. For the person with aphasia, evidence from the current study suggests that the support provided by low-tech VSDs resulted in increased production of initiations and responses and greater relaying of correct content units. These results suggest that VSD access impacted RL's social competence and strategic competence—two of the four communicative competencies identified by Light (1989). Evidence of improved social competence came from RL's higher ratings of communication ease in the shared-VSD condition. Evidence of improved strategic competence when provided with shared VSDs came from RL's increased use of pointing and referencing behaviors regarding visual materials— that is, skills he retained despite his aphasia—rather than relying primarily on linguistically based information transfer as he did in the other conditions. As a side note, once during each of the three no-VSDs condition sessions RL self-initiated the use either of writing numerals or drawing a picture as a communication strategy. However, RL only shared one of his two writing attempts with his communication partner; when he drew a picture, he shared the drawing with his communication partner.

Establishing a shared communication space by providing access to VSDs also resulted in a change in communication partners' behaviors. Specifically, a shift from RL to his communication partners occurred in assumption of the leadership role despite the fact that RL had greater knowledge of the targeted topic. This shift had the effect of increasing both initiations and responses by both the person with aphasia and his communication partners, thus creating interactions in which more conversational turns occurred overall. In addition, it appears to have prompted communication partners to use a higher level of conceptual complexity in their utterances than they did without shared VSD access.

A relation is likely between these changes in communication partner behaviors and the increased transfer of informational content that occurred in the shared-VSD condition. Specifically, awareness of more content may have prompted RL's communication partners to construct more complex utterances. Without access to shared information, communication partners may find they have little to say to a person with aphasia. When this occurs, the burden for conveying communication content falls on the person with aphasia, putting the individual with language challenges in the position of having to do what he/she does worst—that is, formulate contentladen utterances. Although difficulty producing structurally complex utterances clearly interferes with a person's demonstration of linguistic competence, the use of VSDs to create shared communication spaces appears to be an effective compensatory strategy in minimizing the impact of this impairment while simultaneously enhancing strategic and social competence. Specifically, VSDs promote the demonstration of competence by allowing people with aphasia to express what they know rather than only what their impaired language system will allow them to express. This type of facilitation corresponds with Kagan's suggestions that effective communication partners are good at allowing people with aphasia to demonstrate competence (Kagan et al., 2001).

Clinical Implications

Clinicians often strive to document improved linguistic proficiency in a person with aphasia as evidence that a particular intervention strategy is effective. Such an incentive might prompt questions about why access to shared VSDs in the current study did not improve the conceptual complexity of RL's utterances. In fact data analysis revealed the opposite scenario: RL produced utterances with the greatest conceptual complexity in the no-VSDs condition and the least conceptual complexity in the shared-VSDs condition. Understanding why this phenomenon is not a concern requires acknowledgement of the issues addressed in the following paragraphs: (a) the chronic nature of aphasic impairments, (b) the difference between restorative and compensatory intervention strategies, and (c) the importance of distinguishing between communicative competence and linguistic competence.

Many people with aphasia have unmet communication needs both during the acute recovery stage and following extensive rehabilitation efforts. In all but the mildest and most transitory cases, people with aphasia struggle to communicate their intents during the period immediately following aphasia onset. Even after substantial rehabilitation, only about one-third of stroke survivors with aphasia recover sufficiently to have no lingering language impairment; hence, most people who acquire aphasia will struggle daily with language challenges that interfere with routine communication activities (Bakheit, Shaw, Carrington, & Griffiths, 2007; Laska, Hellblom, Murray, Kahan, & Von Arbin, 2001; Pedersen, Vinter, & Olsen, 2004). The fact that this low recovery rate occurs despite extensive rehabilitation efforts highlights the chronic nature of aphasia for most individuals.

Restoration-based intervention approaches appear effective in lessening aphasia severity during acute stage of recovery (Bakheit et al., 2007). However language recovery takes time, and people in the acute stages of recovery need instruction in compensatory strategies that will facilitate their communicative effectiveness before language restoration has occurred. In addition, for people who experience persistent challenges, restoration approaches may result in minimal changes in the functional use of language to meet everyday needs. Hence, a need exists to facilitate compensation for communication challenges rather than solely pursuing attempts to ameliorate them. To do this effectively, clinicians need to teach people with aphasia and the people who interact with them ways to maximize communication strengths and strategies for minimizing communication breakdowns and resolving them when they occur. Using VSDs to create shared communication spaces is one way of promoting this type of compensation.

Among the strengths displayed by many people with aphasia are intact memory for life events, a pool of general knowledge information, normal or near-normal visual- perceptual skills, and adequate cognitive/intellectual functioning (Blake, 2005, Brookshire, 2003; McNeil, 1983; Murray, 1999). Practitioners' success in designing compensatory communication strategies may be greater when they take advantage of these preserved abilities than when they try to develop strategies that substitute words with alternative symbol sets or rebuild basic linguistic processing capabilities. The residual abilities of people with aphasia—even when the aphasia is severe and chronic—allows relatively easy recognition, processing, and recall of familiar people and events (Fox & Fried-Oken, 1996; Garrett & Kimelman, 2000). Logically, compensatory strategies such as VSDs that rely on these residual strengths are the most likely to foster improved communicative interactions, although the strategies are likely to have little impact on the linguistic complexity of utterances produced by people with aphasia.

Future directions

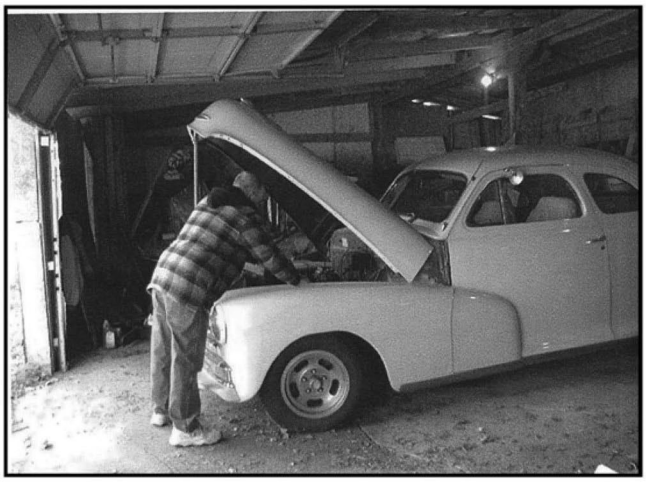
The research presented herein represents a preliminary exploration of the impact VSDs have on creating shared communication spaces between a person with

aphasia and communication partners. The inclusion of only one individual with aphasia and nine communication partners is a limitation and prevented the performance of formal statistical analyses regarding the obtained data. However, decreased stamina, fatigue, and frustration associated with communication breakdowns limit the extent to which many people with aphasia can participate in lengthy or intense research projects, and these issues influenced the researchers' decision to use a repeated measures design and to include only three conversational interactions within each condition. This research design along with selection of a person with chronic aphasia as the study participant served to limit the likelihood that learning effects impacted the research findings. However, the possibility of learning effects influencing results must always be a consideration when a person with aphasia tells a single story to multiple partners over time.

Given the limited data collected in this research about one person with aphasia, replication of research similar to that presented herein is warranted. Tremendous variation among people with aphasia regarding the severity of persistent deficits by itself makes replication a necessity. Quite possibly, using VSDs to create shared communication spaces will result in dramatically different findings when the person with aphasia has more severe speech production deficits than did RL. In particular, such a scenario might foster a situation in which single word production by the person with aphasia increases but little or no impact occurs regarding a communication partner's level of conceptual complexity or production of initiations and responses.

Another area of future research concerns the type of discourse engaged in by a person with aphasia and his/her communication partners. Researchers need to explore whether VSDs are particularly effective in supporting certain types of conversational interactions. For example, in the current study the researchers instructed communication partners to gather as much information from the participant with aphasia as possible about a specific topic; they may have obtained different results had they presented the participants with less direction regarding selection of a discussion topic. Even greater differences would likely have appeared if the researchers had asked participants to engage in conversations aimed at establishing or maintaining social closeness or performing joint tasks rather than transferring information.

The communication supports needed by people with aphasia are plentiful, especially when aphasia persists in the moderate or severe range of impairment. Low-tech VSDs are only one of several strategies that people with aphasia and their communication partners may find helpful when attempting to compensate for impaired symbolic processing abilities. As with most compensations for people with aphasia, reliance on a single strategy or technique is rarely sufficient. Instead, clinicians, people with aphasia, and their caregivers need familiarization with and access to multiple compensatory strategies from which they can choose the most appropriate for a given individual or situation.



- 1948 Chevrolet Coupe
- Bought from Paul, $2500
- Light blue exterior, dark gray interior
- 283 horsepower
- 38,000 miles; 250,000 miles?
- Dick , friend, Bennett, helped fix, $3500

Figure 1. Visual scene display 1.

- Classic car show, Lincoln, NE
- Culver's, 70th St.
- Used to be at Sonic.

Figure 2. Visual scene display 2.

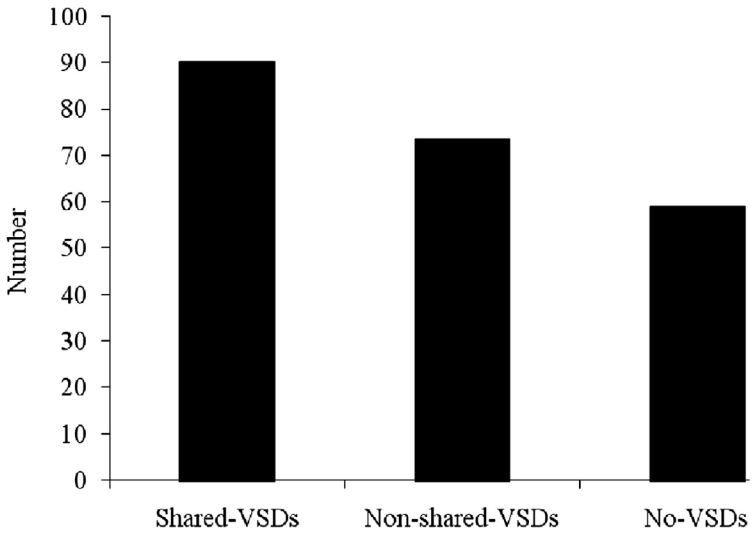


Figure 3. Mean number of conversational turns split by experimental condition.

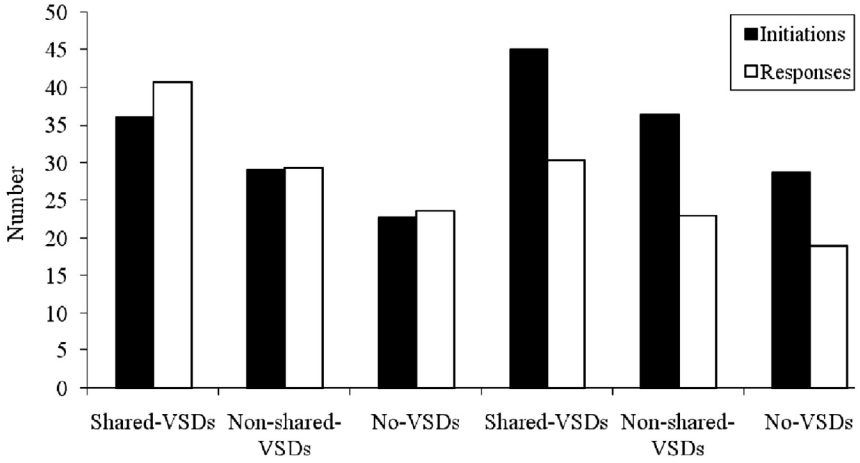


Figure 4. Mean number of initiations and responses generated by RL and communication partners split by experimental condition.

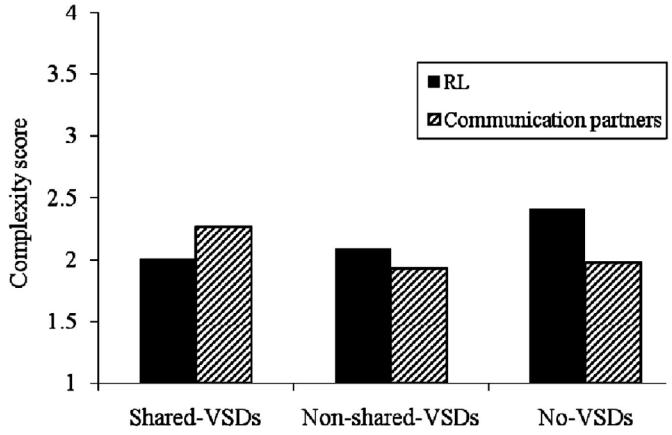


Figure 5. Mean conceptual complexity scores for RL and his communication partners split by experimental condition.

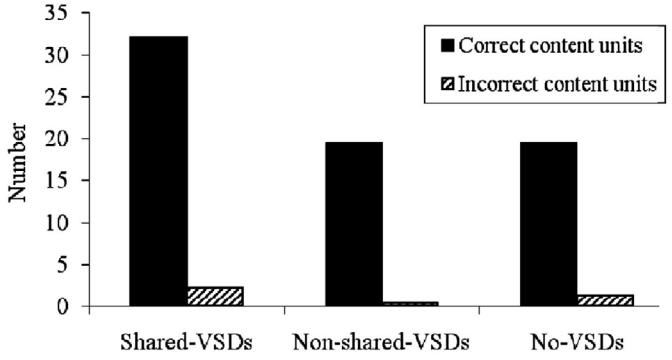


Figure 6. Mean number of correct and incorrect content units conveyed to communication partners split by experimental condition.

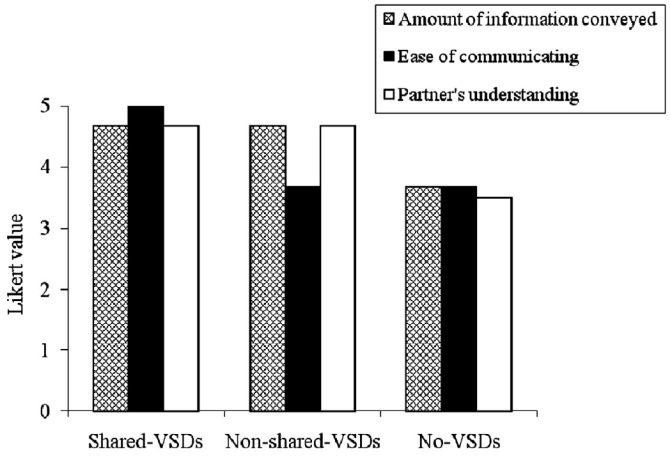


Figure 7. Mean Likert scale responses to perception questions split by experimental condition.

References

Bakheit, A., Shaw, S., Carrington, S., & Griffiths, S. (2007). The rate and extent of improvement with therapy for the different types of aphasia in the first year after stroke. *Clinical Rehabilitation*, *21*, 941–949.

Beukelman, D. R., Dietz, A., McKelvey, M., Hux, K., & Weissling, K. (in press). Visual scene displays: AAC design specifications to reduce the cognitive-linguistic load for people with chronic aphasia. *Disability and Rehabilitation.*

Beukelman, D. R., Hux, K., Weissling, K., Dietz, A., & McKelvey, M. (2005). *AAC for aphasia: A review of Visual Scenes Display Project.* Retrieved January 17, 2008 from: http://www.aac-rerc.com/index. php?option=com_content&task=view&id=130&Itemid=147

Blank, M., & Franklin, E. (1980). Dialogue with preschoolers: A cognitively-based system of assessment. *Applied Psycholinguistics*, *1*, 127–150.

Blake, M. L. (2005). Right hemisphere syndrome. In L. LaPointe (Ed.), *Aphasia and related neurogenic language disorders* (pp. 213–224). New York: Thieme Medical.

Brookshire, R. H. (2003). *Introduction to neurogenic communication disorders* (5th ed.) St. Louis, MO: Mosby.

Dietz, A., McKelvey, M., & Beukelman, D. R. (2006). Visual scene display (VSD): New AAC interfaces for persons with aphasia. *Perspectives on Augmentative and Alternative Communication*, *15*(1), 13–17.

Fox, L. E., & Fried-Oken, M. (1996). AAC aphasiology: Partnership for future research. *Augmentative and Alternative Communication*, *12*, 257–271.

Garrett, K., & Kimelman, M. (2000). Cognitive-linguistic considerations in the application of alternative and communication strategies for aphasia. In D. Beukelman, K. Yorkston, & J. Reichle (Eds.), *Augmentative communication for adults with neurogenic and neuromuscular disabilities* (pp. 339–374). Baltimore: Paul H. Brookes.

Goodglass, H., & Kaplan, E. (1983). *The assessment of aphasia and related disorders* (2nd ed.). Philadelphia: Lea & Febiger.

Kagan, A. (1998). Supported conversation for adults with aphasia: methods and resources for training conversation partners. *Aphasiology*, *12*, 816–830.

Kagan, A., Black, S. E., Duchan, J. F., Simmons-Mackie, N., & Square, P. (2001). Training volunteers as conversational partners using "Supported Conversation for Adults with Aphasia" (SCA): A controlled trial. *Journal of Speech, Language, and Hearing Research*, *44*, 624–638.

Kertesz, A. (1982). *Western Aphasia Battery*. Austin, TX: Pro-Ed.

Laska, A. C., Hellblom, A., Murray, V., Kahan, T., & VonArbin, M. (2001). Aphasia and acute stroke and relation to outcome. *Journal of Internal Medicine*, *249*, 413–422.

Light, J. (1989). Toward a definition of communicative competence for individuals using augmentative and alternative communication systems. *Augmentative and Alternative Communication*, *5*, 137–144.

Light, J. & Drager, K. (2007). AAC technologies for young children with complex communication needs: State of the science and future research directions. *Augmentative and Alternative Communication*, *23*, 204–216.

Light, J., Page, R., Curran, J., & Pitkin, L. (2007). Children's ideas for the design of AAC assistive technologies for young children with complex communication needs. *Augmentative and Alternative Communication*, *23*, 274–287.

Lyon, J. G., Cariski, D., Keisler, L., Rosenbek, J., Levine, R., Kumpla, J., et al. (1997). Communication partners: Enhancing participation in life and communication for adults with aphasia in natural settings. *Aphasiology*, *11*, 693–708.

McNeil, M. (1983). Aphasia: Neurological considerations. *Topics in Language Disorders*, *3*, 1–19.

Murray, L. (1999). Attention and aphasia: Theory, research and clinical implications. *Aphasiology*, *13*, 91–111.

Pedersen, P. M., Vinter, K., & Olsen, T. S. (2004). Aphasia after stroke: Type, severity, and prognosis. *Cerebrovascular Diseases*, *17*, 35–43.

Rayner, H., & Marshall, J. (2003). Training volunteers as conversation partners for people with aphasia. *International Journal of Language and Communication Disorders*, *38*, 149–164.

Yorkston, K. M., & Beukelman, D. R. (1980). An analysis of connected speech samples of aphasia and normal speakers. *Journal of Speech and Hearing Disorders*, *45*, 27–36.

Appendix

Transcript excerpts from a shared-VSDs condition interaction

Partner: Good. Well, tell me about this car.
RL: 1948 Chevy Coupe (Points To Line With Make/Model). I can remember, it's a Coupe.
Partner: Coupe.
RL: It's my old car. It's about, well, I've had it for 15, no, 10, about 10 years that I've owned it.
Partner: Uh-huh.
RL: I had David Cooper* XXX the body work and stuff and all the stuff I done on it. So that's all I done (Pointing To David Cooper's* Name In Book).
Partner: Uh huh. So it is painted then?
RL: Oh yeah.
Partner: I mean, the body is all finished?
RL: Yep (Pointing At Car Picture). The body is all finished. Yeah.
Partner: Oh that's great. And what about mechanically? Did you have to go over the motor or?
RL: No, I touched the motor a little bit.
Partner: Uh huh.
RL: But it's all fine.
Partner: Running and everything. Cool. And what about the interior?
RL: Well, it's—
Partner: Did you have to have it reupholstered or any of that done?
RL: Well, I should have it reupholstered. It needs to be upholstered, but I gotta get off my—
Partner: Uh huh.
RL: —stuff and figure it all out. How I'm doing it.
Partner: Yeah.

Transcript excerpts from a non-shared VSDs condition interaction

RL: I got uh, uh, car around a place in Beaver*. Er, not Beaver*. I used, used to live in Beaver*. I live in, uh, live in uh, oh, gosh darn it. Norwind* is not right either. Hmm. Well, I'll go ahead and change it, I guess. I got a 1948 Chevy.
Partner: Okay? And what color is it?
RL: It's blue.
Partner: Okay.
RL: Oh, dark blue, uh, light blue, light blue, light blue. And it's uh, pretty much mine. I've got it formed, farmed out real good so. And I gotta, oh what have I got? Dark blue, [Incorrect Statement] cars and, uh, two hundred, two hundred eighty three horsepower.
Partner: Okay.
RL: And that kinda gets it up when I go (Hand Motion).
Partner: Gets it going.
RL: Yeah.
Partner: Oh, and where did you buy it?
RL: I bought it new. Oh, I bought it uh 5 years, 6, 7, 8, 9, 9 years ago. And I haven't done nothing to it. I, I've done some stuff to it. I hold, doggonit, what am I doing? Okay, (Sighs). XXX a little bit and start over.

Partner: Do you go anywhere with the car?
RL: Oh yeah. I—
Partner: Where do you usually go with it?
RL: Uh about every, in the summertime, about every two weeks or so, I'll drive it up to, (HAND MOTION) to the corner, back down to Beaver* and stuff so.
Partner: So, it runs. Did you work on it yourself?
RL: Yeah, most of it, I did. But the stuff I, I, David Cooper* done some of the work on it. And he got 283 horsepower, and I've got, uh, hundred, six hundred, fif-, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 11, mmmm, doggonnit. I'm all screwed up. Sorry.

Transcript excerpts from a no-VSDs condition interaction

RL: Uh, well I'm started on my car, which is a 1948 Chevrolet.
Partner: Whoa. Where'd you get it?
RL: I've had it for about 9 years.
Partner: Uh-huh.
RL: I picked it up.
Partner: Where did you find it?
RL: Um, I don't know. I really, uh, don't know.
Partner: Don't know. What color is it? It's a 1949 you said, right?
RL: 48.
Partner: 48.
RL: Chevy.
Partner: What?
RL: Chevy.
Partner: What color is it?
RL: Blue, real blue.
Partner: Is it just all blue? (Makes Hand Motion)
RL: No.
Partner: Or does it have chrome on it?
RL: Oh, it's got chrome a little bit on there, but not very much.
Partner: So it's blue and what else?
RL: Uh, well, I don't know what to say.
Partner: What color interior does it have?
RL: It's a brown, kind of brown. [Incorrect Statement] But it needs to be re-worked.
Partner: Okay. Will you do that work yourself?
RL: Oh yes. Yeah. I've got a 19, I've got '48 Chevy and I got a, and, uh, tell me what it is?
Partner: That's okay.

---

*All people and place names have been changed.