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A Comparison of Decontextualized and Contextualized Reading Skills in

Persons with Severe Aphasia

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A Thesis
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School of Health Sciences of Duquesne University
in partial fulfillment of the requirements for the degree of

MASTER OF SPEECH-LANGUAGE PATHOLOGY

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Committee:

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ABSTRACT

A repeated measures comparative design compared the reading comprehension accuracy scores of three participants across two conditions: Condition A – Decontextualized Stimulus Reading Task (DSRT), resembling traditional reading therapy, and Condition B – Contextual Choice Reading Conversation (CCRC) with a communication partner. In the DSRT condition, participants read a sentence-length question prior to selecting one of 3-to-5 printed responses with no supports. In CCRC, partners presented graphic sentence stimuli representing conversational questions and response choices with the following supports: simultaneous auditory input, supplemental drawings or gestures, natural repetitions, consistent topic, and conversational order. Experimental conditions were administered in counterbalanced order across 5 sessions. Responses were scored for accuracy based on factual world knowledge (DSRT) or verification by spouses or family members, for a maximum of 10 points for each session per condition. Raw scores, mean scores, and standard deviations from each condition were compared with descriptive and nonparametric statistics. Results showed significant improvement in reading comprehension accuracy when the CCRC method was applied. Clinically, this suggests that persons with severe aphasia can read well enough to use partner supported conversations that utilize reading comprehension.

ACKNOWLEDGEMENTS

In completing this project, I realized that the contributors to this study parallel each component of a painting.

Initially, our eyes go to a central focal point – *the art*. The intricate strokes invite thought and interpretation while speaking to us silently. Each stroke helps us feel what the artist was feeling, and challenges us to understand a story. The three participants in this study are like the art. They have invited me to listen more intently to each "stroke" and to understand their own stories.

These narratives could not have been heard, however, if not for the talented *painters*! Every good painting starts as a vision that comes to life through the vibrant paints, the clean canvas, and the creative minds of the painters. Brittany Estep and Lori Rein's tireless efforts were the source of much of my experimental data. I provided them with a canvas – a research concept, and the participants offered the paints - their stories and conversations; Brittany and Lori transformed ideas and stories into art.

What often goes unnoticed is the *framework* and display of a painting. To make a painting stand out, we must choose bold matting, and a sturdy frame. Drs. Kathryn Garrett and Davida Fromm formed my thesis committee, and provided me with the proper "matting" for my thesis. They instilled in me a research foundation, background knowledge of complex information, and a desire to know more; this is the background that this project is matted upon. Dr. Garrett also acted as the firm frame surrounding the painting, offering solid guidance without overwhelming the painting. She surrounded this project as a support, but was subtle enough in her guidance that I achieved a true sense of the research procedure as being my own; I have grown as both a scholar and an observer.

Lastly, the part of the art that is never discussed is the support. A good painting deserves a place to be displayed, and would never be seen if not for the nail and the solid support hidden behind the wall that it is secured to. My family and friends are my support; my mom's beaming pride, Stu's anecdotal encouragement, Jess's motivation simply by being "the smart one", and all of the influence from others has been resolute. I would have no place to hang this painting if not for them.

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Chapter 1

INTRODUCTION

Aphasia is an acquired neurological deficit that affects all modalities of communication, including an individual's ability to verbalize and comprehend spoken language as well as to write and comprehend reading (Helm-Estabrooks, 1984). In general, people with severe aphasia lose the ability to communicate efficiently and effectively because their ability to connect linguistic symbols to meaning is impaired (Peach, 2001).

Although events such as epileptic seizures and demyelinating diseases can also cause severe aphasia, left hemisphere cerebrovascular accidents (CVAs) are the most common etiology (Damasio, 2001; Chapey & Hallowell, 2001). CVAs occurring in the left hemisphere near the motor cortex often result in Broca's aphasia, which is characterized by telegraphic, dysfluent speech (Chapey & Hallowell, 2001). Speech and vocalizations may be halting because of breakdowns in motor programming for articulatory movements and may also include phonemic and/or semantic paraphasias (i.e., when words are altered or replaced completely with others that are similar in sound or meaning). Further, individuals with Broca's aphasia are typically cognizant of their errors (Chapey & Hallowell, 2001). Lesions occurring in the temporal lobe usually result in a fluent aphasia syndrome such as Wernicke's aphasia; spoken output following a posterior CVA will likely consist of fluent but unintelligible jargon. Impairments also will be seen in reading, writing, and auditory comprehension (Chapey & Hallowell, 2001).

When the site of damage is so large that it extends throughout both of the aforementioned areas, it often results in global aphasia syndrome, which will be referred to as severe aphasia hence forward to unify existing terminology. The most common site of lesion in severe aphasia is the left middle cerebral artery before the point of branching (Damasio, 2001; Chapey & Hallowell, 2001). This impedes blood flow to nearly the entire left hemisphere of the brain and involves both Broca's and Wernicke's areas, or the pre- and post-Rolandic speech areas (Peach, 2001). Lesions causing severe aphasia can also extend from the cortical surface down to subcortical levels involving the thalamus and basal ganglia (Peach, 2001). Naeser, Alexander, Helm-Estabrooks, Levine, Laughlin, and Geschwind (1982) also found that severe aphasia is often associated with subcortical lesions involving the internal capsule and putamen. Epidemiological data do not indicate, with any certainty, which gender is more likely to be affected by severe aphasia. However, slightly more males than females acquire the disorder (Peach, 2001). There is also no definitive "high risk" age group, though adults make up the majority of the affected population, and increased incidence of aphasia is associated with increased age (Peach, 2001).

Individuals with severe aphasia demonstrate a variety of impairments. The hallmark of severe aphasia is significant communicative impairment in all language modalities: speaking, comprehending, reading, and writing (Peach, In Chapey, 2001). Severe aphasia results in limited speech consisting primarily of stereotyped or stock utterances (Damasio, 2001). Some persons with severe aphasia also have a contralateral visual field cut that reduces visual discrimination between objects in close proximity or eliminates

them from view altogether. Other people who are affected by a large CVA lesion near the left motor cortex will experience right hemiparesis which presents as poor volitional control of muscles in the limbs on the right side of the body (Peach, 2001).

Language Skills in Severe Aphasia

Damasio (1991), Davis (1983), and Kertesz (1979) stated that the most identifiable characteristic of severe aphasia is an almost complete loss of language comprehension accompanied by deficits in expressive abilities. An individual with severe aphasia will usually earn low scores on a standardized aphasia battery (e.g., *Boston Diagnostic Aphasia Examination*, Goodglass & Kaplan, 1972). These individuals may have little to no functional speech usage or auditory comprehension (Helm-Estabrooks, 1984). Problems with spelling and writing might also exist, and traditionally it has been assumed that reading is almost always impaired to the level of chance accuracy (Webb & Love, 1983); that is, a correct answer on a test may or may not be the result of actual comprehension.

Expressively, most of these patients produce primarily stereotypic utterances of repetitive consonant-vowel (CV) structures (e.g., ma-ma-ma-ma). Although semantically nonsensical, the person with severe aphasia may use them to show meaning through prosodic characteristics. Individuals with global aphasia also communicate more frequently with gestures as opposed to the written and drawn communication of a patient with Broca's aphasia and the verbal communication of those with Wernicke's aphasia (Marshall, Freed, & Phillips, 1997; Rao, 1995). Further, Herrmann et al., (1989)

concluded that people with severe aphasia generated nonverbal responses that were primarily comprehensible and adequate with the help of the communication partners' interpretation.

Some reports indicate that there is a significant correlation between impaired cognition and degree of aphasia, particularly for Wernicke's and severe aphasia syndromes. Researchers (Arrigoni & De Renzi, 1964; Peircy & Smith, 1962) have found that non-aphasic, left-brain damaged patients and those with severe aphasia perform similarly with regard to cognition; essentially, their sequencing and visual recognition skills are equal. Gainotti et al. (1986) investigated the cognition of persons with varying severity levels and types of aphasia versus normal controls. Scores differed significantly between normal controls and those persons with aphasia, but there was no link between poor performance and severity. Results indicated that although cognition might be impaired in aphasia, aphasia classification and severity level do not correlate directly with cognitive performance. This finding provides some support for the use of cognitive approaches to improving communication in severe aphasia.

Contextual Benefits

In severe aphasia, general language ability is often very impaired, but some limited aspects of language comprehension may be spared, possibly due to notable right hemisphere contributions to comprehension (Peach, 2001). For example, many authors (Cannito & Vogel, 1998; Nicholas & Brookshire, 1987; Pierce, 1983) have investigated the effect of context (e.g., world knowledge, relevance, pictorial, semantically similar

words, sentential) on the auditory comprehension of people with aphasia. Wallace and Canter (1985) identified areas of preserved competence in people with severe aphasia such as comprehension of famous names and personally relevant information. Pierce and Beekman (1985) similarly showed that some individuals with aphasia, even those with minimal decontextual auditory comprehension, can use context to assist in interpreting auditory information. They investigated the effects of a semantically supportive word on participants' ability to decode sentence meanings. Their study involved 20 people (twelve males and eight females ranging in age from 40-81 years) with fluent or nonfluent aphasia secondary to a left-hemisphere CVA. Subjects listened to auditorily presented sentences and were then shown two pictures, one of which they matched to the sentence they had heard. For some of the sentences, a semantic contextual or pictorial cue was provided first. Though the study did not indicate specific severity levels other than high-comprehension and low-comprehension, their results demonstrated that contextual information (i.e., supportive words, pictorial cues) significantly increased semantic processing in persons with both high and low-comprehension abilities following onset of aphasia. Cannito and Vogel (1998) performed a study with twelve male individuals with aphasia between the ages of 50 and 71 who had severe auditory comprehension impairment. They found no significant difference in auditory comprehension when pictorial presentation occurred before versus after participants listened to sentential stimuli, however they did notice that the greater the impairment in comprehension, the greater the benefit from contextual cues.

These results are in agreement with other studies showing the positive effects of context on auditory comprehension in aphasia across severity levels. However, there is limited data to assess whether persons with severe aphasia may similarly benefit from contextual clues and prompts when comprehending text.

Reading Comprehension in Persons with Aphasia

Mayer and Murray (2002) stated that reading problems are a common impairment in persons with brain damage. Researchers have proposed a variety of explanations for the reading comprehension problems in aphasia. Pierce (1983) stated that for individuals with aphasia, the problem is caused by an inability to apply syntactic rules and concepts to reading comprehension. He suggested that individuals with aphasia might need more tangible structure markers (e.g., synonyms, adjectives) in text to compensate for their impaired reading comprehension. His study tested the likelihood that aphasic adults use surface or structure markers related to a picture to make judgments regarding semantic content of text by pointing to a photograph that pictorially represented printed sentences. The author chose subjects from both high and low comprehension groups. Pierce's (1983) assessment showed a significant overall effect of improved comprehension on sentences with additional markers. Although results did not distinguish between aphasia comprehension subgroups, two primary findings were that all subjects were impaired in their ability to use syntax in semantic decoding. However, given ground markers such as supplemental syntactic cues (e.g. "has" to represent past tense or "being" to imply present tense), adults with aphasia are more likely to comprehend semantic relationships within text than they would be without the structural markers. Therefore, Pierce (1983) deduced

that persons with aphasia are able to use sentential-level, grammatical markers as context to assist in semantic derivation.

Other researchers have suggested that people with aphasia have difficulty with reading and text comprehension as a result of breakdowns in additional pathways, including visual, semantic, or graphemic-phonologic. Beeson and Hillis (2001) analyzed the ability of people with aphasia to comprehend and verbally produce words that were presented to them graphemically (i.e., via printed text). They discussed potential breakdowns at all levels of the reading comprehension process: accessing the graphemic input lexicon, misrepresentations of the graphemic input lexicon, semantic letter-to-sound conversion, and access to the phonological output lexicon. For example, Beeson and Hillis (2001) described the phenomena that occurs when a person with aphasia may not recognize or comprehend a simple word (e.g. apple) presented visually, yet when the individual spells the word aloud, they can then verbally produce the graphemic stimulus. Using clinical examples such as this, they graphically mapped the reading process and its relationship to the semantic system. In their model, phonological, visual, and graphemic representations all serve as cues that help a person with aphasia analyze the meaning of incoming text.

Webb and Love (1983) analyzed the reading deficits of individuals with various types and severities of aphasia, including severe aphasia. The authors administered a series of 12 reading tests assessing recognition, comprehension, and oral reading to their participants. Though the authors did not differentiate between aphasia classifications, they found that all 35 participants in their study demonstrated residual reading deficits

more than one year post-onset. Participants' performance on the comprehension

assessment tasks was very poor (Webb & Love, 1983). The authors subsequently noted

that the results of the reading comprehension tasks were difficult to compare with the

other tests because single word comprehension tasks were not included in the reading

tests. According to their study, the reading difficulty may result from impaired silent

reading skills.

Another group of investigators (Stachowiak, Huber, Poeck, & Kerschensteiner, 1977)

agreed that aphasia is associated with reading comprehension deficits. They examined

three hypotheses in their study: 1) that persons with aphasia may have an impaired ability

to utilize context to comprehend text; 2) contextual comprehension skills appeared to be

diminished because of a basic loss of linguistic abilities relating to the use of syntax and

phonology, rather than a loss of ability to utilize context (Stachowiak et al., 1977); 3)

persons with aphasia *can* utilize verbal and situational information to fill in the gaps for

any linguistic reading deficits. To test their three hypotheses, Stachowiak et al. (1977)

developed a test in which aphasic subjects matched paragraphs to contextually related

pictures. Their results showed that the participants with aphasia scored similar to

controls on this task, thereby affirming the third hypothesis. The authors explained that

the redundancy of the message in the experimental texts, as compared to single words

and simple sentences, provided enough context and cues so that participants with aphasia

could compensate for impairment in linguistically-based text comprehension. This study

provided some of the first objective evidence that contextual cueing is highly beneficial

to persons with aphasia when engaging in reading tasks.

As Stachowiak et al. (1977) implied, single word and sentence level reading tasks lack the contextual benefit that is necessary for persons with aphasia to increase their text comprehension. Nicholas and Brookshire (1987) similarly noted that standardized reading tests that assess reading skills at the word or single sentence level provide minimal context for impaired readers. In contrast, many functional reading tasks, such as reading a newspaper, are composed of more than one sentence and convey information about a single topic. Therefore, standardized reading test scores consisting of isolated words and sentences may not predict functional reading performance in aphasia. They sought to define the difference between comprehension of literal and inferential items from the *Nelson Reading Skills Test (*NRST*;* Hanna, Schell, & Schreiner, 1985), a reading comprehension test standardized for fourth and sixth graders, in people with aphasia. Thirty individuals, half of whom had sustained brain damage, were divided into conventional aphasia classifications (e.g., Broca's aphasia). Subjects read passages containing either inferential information or information directly stated in the passage. Stimuli consisted of multiple sentence passages from the NRST. Errors occurred more frequently for higher-level items that required inference and with the least frequency on literal items. The authors interpreted this to mean that individuals with aphasia read with more ease when textual information is semantically clear versus implied. Though this pattern of increased reading comprehension for literal test items is also found with non-brain-injured participants, Nicholas and Brookshire (1987) pointed out that it is intensified in persons with aphasia. Their conclusion was that aphasic persons *do* have

impaired reading comprehension, however, their ability to apply semantic meaning to text mimics that of readers with unimpaired comprehension.

Nicholas and Brookshire (1987) previously highlighted the need for reading comprehension assessment protocols that better predicted functional reading in aphasia. For example, they suggested that the NRST be analyzed for passage dependency for readers with aphasia. Passage dependency can be defined as the degree to which a person needs to read a passage to correctly answer the questions. To illustrate, most individuals would not need to read a passage about themselves to answer related questions accurately, however, they may need to do so for a less familiar topic. This type of analysis for the NRST represents one means of assessing reading skills of a person with aphasia at a higher and, perhaps, more accurate, level than is currently available.

 Mayer and Murray (2002) developed a treatment approach for acquired reading deficits that addressed cognitive insufficiencies after theorizing that reading difficulties may stem from memory, attention, and visual recognition breakdowns. They compared the effects of two neurologically-based reading treatment paradigms in a single subject with mild aphasia. The first treatment was a modification of an existing paradigm that utilized multiple oral readings of the same passage. The approach was termed MMOR and was chosen because the technique of using repeated readings has been widely used in treating persons with reading difficulty. The second treatment technique, Sequenced Exercises for Working Memory (SEW), was created to address components that were theoretically relevant to reading disorders, namely attention and working memory. The participant

was required to hold the content of the sentence in his working memory while he identified its category and grammaticality. The researchers hypothesized that these tasks required the participant to utilize cognitive processes found in reading. Both treatments had two outcome measures -- rate and comprehension accuracy.

Results of the Mayer and Murray (2002) study showed that both the MMOR and cognitive treatments yielded equally positive gains in reading performance. However, in post-treatment assessments, the researchers found that the subject improved his scores most significantly on higher-level tasks. The results of this study point out the benefits of repetition and memory exercises, and hypothesized that both approaches helped the reader clarify and focus on smaller semantic units (i.e. words and phrases) within a sentence. However, Mayer and Murray (2002) only investigated one individual with mild-to-moderate aphasia. They noted that participants with more severe linguistic or cognitive impairments might not have been addressed in their findings, but that their positive results with a subject who had mild-moderate aphasia suggested that a similar cognitive or repetition technique might also be effective in reading comprehension therapy for persons with severe aphasia. Mayer and Murray (2002) also hypothesized that it is possible to see the same effects for persons with severe aphasia if the repetition and attention to smaller units, as seen in this study, were applied to text by a communication partner or clinician. That is, because the ability to sound a word out independently is frequently impaired in severe aphasia, phonological contribution to semantic analysis would come from the communication partner.

Reading Skills in Severe Aphasia: Lack of Existing Research

Peach (2001) stated that global aphasia is the most commonly occurring aphasia syndrome, yet these individuals are frequently excluded from treatment and/or research studies because of the extensive severity of their linguistic impairments. Towey and Pettit (1980) also observed that researchers tend to exclude the severe aphasia population from studies and intensive therapy programs because of a common belief that severely aphasic persons will not make steady progress. Helm-Estabrooks (1984) agreed that far too often, severely aphasic persons are excluded from studies or therapy plans because of the pre-conceived notion that no benefit can be derived.

Similarly, in an earlier review of the state of aphasia research, Webb and Love (1983) had pointed out that reading problems in aphasia had not been addressed or studied on any notable level. Although some reports on reading treatment have surfaced since then (Mayer & Murray, 2002; Webb, 1987; Marshall, 1998), the fact remains that people with severe aphasia have seldom participated in research studies that target reading (Nicholas & Brookshire, 1987; Peach, 2001; Stachowiak, Huber, Poeck, & Kerchensteiner, 1977; Webb & Love, 1983).

Mayer and Murray (2002) identified four stages of reading skills as the visual analysis that occurs prior to speaking, the non-lexical-phonologic, lexical phonologic, and semantic devices. They further stated that little to no valid research data are available to provide clinicians and caregivers with the information that they need to assess or treat alexia. They also said that the reading treatment programs that *do* exist target reading

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primarily at the single word level. As stated earlier regarding reading assessment, this is

problematic in that a majority of reading, whether for leisure or daily life skills, occurs at

the connected text level; it is this level that current reading comprehension programs do

not address.

Written Choice Conversation Technique

In drawing from the information known about contextual benefits and reading skills with

severe aphasia, Garrett (1993) theorized that the communication of aphasic individuals

could be more successful if they were supported by a series of written response choices,

generated by a partner, for each conversation turn. Garrett and Beukelman (1995)

described a compensatory communication technique known as "Written Choice

Conversation" for people with aphasia who could not communicate verbally. In this

technique, the non speaking person with aphasia chooses a topic from a list written before

or during the interaction. The partner then asks who, what, when, where, or why

questions after relevant choices are generated for the non-speaking person to choose

from. These choices are aimed to be characteristic of answers that the person with

aphasia may have said pre-morbidly. The communication partner provides enough

response choices to ensure that a possible desired response is not excluded. Numeric

scales and maps can also be provided in addition to written word or phrase choices.

Response choices are simultaneously presented via both auditory and graphic modalities;

the partner ensures that the person with aphasia is attending to both types of input. The

communicator with aphasia then answers by pointing and receives a response-contingent

reply from the partner, after which additional topically related questions are asked in the same manner. This process continues and a conversation-like pattern emerges.

Garrett (1993) demonstrated that three individuals with severe aphasia were over 93% accurate when answering conversational questions by pointing to graphic response choices that were also presented auditorily and in a logical conversational order using the written choice technique (Lasker et al., 1997). Interestingly, a recent chapter by Koul and Corwin (2003) stated that people with global aphasia may not have adequate reading comprehension to utilize this technique. Therefore, the issue of whether people with severe aphasia can utilize conversational context and multimodal input to communicate in conversation, despite significant deficits in reading comprehension, requires further investigation.

Statement of the problem

Little is documented in the literature about the residual reading disorder in chronic aphasia other than the fact that it exists (Nicholas & Brookshire, 1987; Webb & Love, 1983; Stachowiak, Huber, Poeck, & Kerchensteiner, 1977). Two studies on supported conversational strategies and other modality input to successfully participate in conversation suggest that individuals with severe aphasia can utilize contextual information that is presented in text (Garrett & Beukelman, 1995; Stachowiak et al., 1977). However, Koul and Corwin (2003) have suggested that people with global aphasia cannot benefit from partner-supported conversational strategies because of minimal reading ability. It is hypothesized that the degree of contextual reading

comprehension and observed in partner-supported conversational techniques (i.e. written choice) exceeds the level of reading comprehension obtained from decontextualized reading tasks such as standardized tests. That is, persons with severe aphasia may be able to demonstrate adequate reading comprehension to benefit from partner-supported reading tasks when contextual cues are employed. It is also hypothesized that standardized reading assessments do not accurately describe or predict the reading skills of severely aphasic individuals if contextual and multimodal supports are provided; a discrepancy possibly exists between decontextual and contextual reading comprehension in severe aphasia.

The present study seeks to assess the difference between decontextualized versus contextual choice reading skills in persons with severe aphasia. Specifically, the following questions were investigated:

1. Is there a difference between the reading comprehension scores obtained from independent readings of traditional, decontextualized reading stimuli (DSRT) and the accuracy scores obtained from contextual, interactively presented text (CCRC) in people with severe aphasia?

2. Can persons with severe or global aphasia exhibit contextual reading comprehension well enough to benefit from a written choice conversation technique that utilizes reading through presentation of written word/phrase response choices?

Chapter 2

METHODS

Participants

The following criteria were met by three participants with severe-to-profound aphasia.

     1. Initial Selection Criteria for Participant Pool

Potential subjects were identified by the investigator from the pool of clients at the

Duquesne University Speech-Language Hearing Clinic. An experienced speech-language

pathologist (SLP) who was not involved in this study discussed the purpose of the study

with potential candidates and a family member. This SLP then referred clients who met

the established criteria for participating in this study (see Appendix A) and who showed

interest in participating to the investigator. Potential subjects included persons who: 1)

were between the ages of 30 and 85; 2) were at least 1 year post-onset of a single, focal

left hemisphere CVA; 3) had an aphasia quotient (AQ) of 30 or below obtained from the

Western Aphasia Battery (WAB) (Kertesz, 1982); 4) had a severe communication

impairment in the areas of verbal expression and comprehension as rated by an SLP; 5)

spoke English as a primary language; 6) had a minimum of a 12thth grade education; 7)

were able to read and comprehend a newspaper pre-morbidly; 8) were awake and

attentive for six or more hours in the home environment per day; 9) had no dramatic

fluctuations in alertness due to medical conditions; 10) demonstrated functional visual

acuity (aided or unaided) as determined by the ability to match printed words in 16pt

font; 11) demonstrated functional hearing (aided or unaided) as determined by the ability

to look at a speaker calling his or her name using normal speaking volume from across a

table (approximately 4 feet) and by demonstrating a pure tone average (PTA) of 35 dB or

better at conversational levels in at least one ear (aided or unaided); 12) showed no evidence or reported history of disease processes associated with dementia or chronic substance abuse. This information was verified by examining the patient's medical records including neurological reports and social histories and later confirming these skills with a secondary screening process (Appendix B). Questions pertaining to alertness level and pre-morbid status were verified via interview with family members and/or the referring SLP. The referring SLP also rated each potential subject in the areas of use of speech for communication, ability to respond to auditorily presented commands, adequacy of gestural communication, and ability to comprehend written text without assistance (refer to Appendix A). Any individual who was rated above a 4 on the 7-point scale for any of these modalities was excluded from consideration as a participant. Three qualified participants from the pool of candidates were ultimately chosen to participate in the study.

2. Acquisition of Informed Consent

Prior to implementation of secondary screening procedures, an SLP who was not affiliated with the study reviewed the consent form. At this time, the potential risks and benefits were defined clearly. This information was presented orally as well as in written form; an adapted large-print form containing simplified language was devised to aid the potential participant's comprehension (Appendix C). Then the investigator met with the prospective participant and his/her power of attorney, if relevant, to answer any questions about the study after. The potential subject and his/her power of attorney were encouraged to ask clarification questions at any time throughout the course of the

explanation. After all questions had been answered, the potential participant was asked to sign a Consent Form. This form was attached to the Explanation of Research (Appendix D) and, when signed, provided permission for the person with aphasia to participate in the study. If the participant with aphasia had a legal power of attorney, he/she signed the consent form on behalf of the person with aphasia. The investigator also asked the power of attorney or attending family member to rate his/her degree of certainty that the individual with aphasia wished to participate in the study. All three participants were judged to have consented willingly to participate in the study.

       3. Secondary Screening Procedures

Following patient referral, record review, and acquisition of informed consent, the person with aphasia was screened to ensure that all criteria for participation were met. The potential subject was required to: 1) visually match words to a target word given a field of 3 choices on 3 of 3 trials; 2) demonstrate an *inability* to respond verbally to at least 4 of 5 wh-type questions; 3) demonstrate the ability to point to the correct answer for 4 of 5 auditorally-presented wh-questions given binary choices as answers; and 4) have a pure-tone average at or better than 35dbHL for 500Hz, 1000kHz, and 2000 kHz in at least 1 ear (aided or unaided), and the ability to look at a speaker when his/her name was called from across a table. Please see Appendix B for more information regarding these screening tasks. Also, the *Western Aphasia Battery (WAB)* (Kertesz, 1982) and the *Reading Comprehension Battery for Aphasia (RCBA)* (LaPointe & Horner, 1979) were administered to the individuals with aphasia to obtain a recent and comprehensive profile of their skills and deficits before beginning the experimental sessions.

Demographic data and test results are presented below for each of the three

participants in Table 2.1.

Table 2.1. Demographic information and test data for participants 01, 02, and 03.

Characteristics	Participant 01 (P01)		Participant 02 (P02)		Participant 03 (P03)	
Gender	Male		Male		Male	
Age	63		84		32	
Occupation	Truck driver, musician		Mechanical Engineer (retired)		Salesman	
Diagnosis	Severe-profound receptive/expressive aphasia with apraxia		Severe aphasia across modalities / fluent aphasia syndrome		Severe aphasia across modalities with apraxia / nonfluent aphasia syndrome – carotid artery dissection	
Etiology	Left hemisphere CVA - hemorrhagic		Left Hemisphere CVA - thrombotic		Left Hemisphere CVA	
Onset Date	1993		2003		2003	
Pre-Morbid Level of Education	GED		College graduate		College Graduate	
Marital Status	Married		Married		Married	
WAB Aphasia Quotient (AQ)	AQ: 1.9		AQ: 9.7		AQ: 26.2	
WAB subtest scores	**Fluency**	0/20	**Fluency**	3/20	**Fluency**	6/20
	Comprehen-sion	3.8/20	**Comprehen-sion**	3.7/20	**Comprehen-sion**	8.4/20
	Repetition	0/10	**Repetition**	0/ 10	**Repetition**	.8/10
	Naming	0/10	**Naming**	0/10	**Naming**	2.1/10
WAB Reading Score	2.7/10		.6/100		1.9/10	
WAB Classification from test manual	Global Aphasia		Global Aphasia		Severe Broca's Aphasia	
RCBA Total Score of 100	32/100		28/100		40/100	

4. Protection of Confidentiality

The confidentiality of the participants was protected using the following methods: 1) the participants were identified by a numeric code rather than by name on the research materials; and 2) the results were stored in a locked file cabinet in the faculty advisor's and Principal Investigator's research laboratory in 413 Fisher Hall. No identifiers, such as address, phone number, or social security number were recorded on the actual test forms, transcripts, videos, or printed data. Three years following presentation or publication of the study results, data will be destroyed unless the participants have signed an additional release form granting extended use of the data. Videotapes will be destroyed immediately upon completion of this research unless the participants (and power of attorney for legal/health issues, if relevant) have signed the additional consent form allowing use of the videotape for teaching or presentation at scientific conferences.

5. Experimental Clinicians

Experimental clinicians were selected to administer the treatment stimuli and standardized tests. These individuals were graduate students from the Duquesne University Speech-Language-Hearing Clinic. The first experimental clinician was assigned to two of the participants with aphasia (P01 and P03) for their clinical practicum at the time the study was taking place. In the case of P02, the investigator served as the experimental clinician. One additional graduate student administered preliminary testing to P02. Both experimental clinicians were trained in proper test administration procedures. Demographics for experimental clinicians and the test administrators are listed below in Table 2.2

Table 2.2 Experimental Clinician Demographics

	P01, P03 Experimental Clinician	P02 Experimental Clinician
Age	23	23
Gender	Female	Female
Year in Speech-Language Therapy program	4 (of 5)	5 (of 5)

Research Design

A repeated measures comparative condition design with a small 'n' was used to compare decontextualized reading comprehension scores (obtained from traditional stimulation-model reading comprehension tasks), and contextualized reading comprehension accuracy (obtained from partner-supported conversation techniques) for the three participants with severe aphasia. Condition A, or the decontextualized stimulus reading tasks (DSRT) and Condition B, or the contextual choice reading conversations (CCRC) with the experimental partner, were administered one time during each experimental session across five sessions. All participants participated in the conditions in a counterbalanced order across the five sessions: *P02*: AB, BA, AB, BA, AB; *P01, P03*: BA, AB, BA, AB, BA. See figure 2.1 for the administration schedule.

Figure 2.1   Schedule of Experimental Testing and Sessions for P01, 02, and 03

P01 & P03:

P02:

Session # :   1   2   3   4   5

◇   -- *WAB*

△   -- *RCBA*

◯   -- *Condition A (DSRT)*

▢   -- *Condition B (CCRC)*
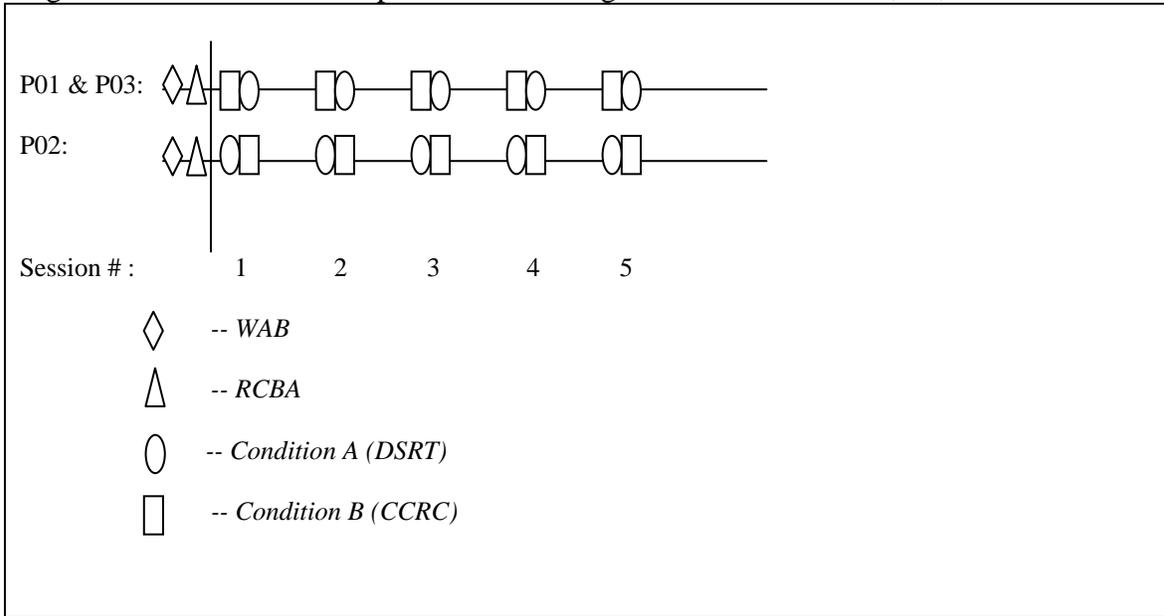
1. Independent Variables

The independent variables of this study were the presentation methods of the reading

materials in each experimental condition. The *decontextualized method*, a traditional

stimulation-type reading comprehension task (DSRT) in which questions and responses

are presented in random order and in text format only, was compared with the

contextualized questions and responses obtained during contextual choice reading

conversation (CCRC). Question prototypes for the DSRT task (Condition A) were

selected from the *Therapy Guide for Language and Speech Disorders* (Kilpatrick, 1977).

Additional questions were then generated based on difficulty level and format of the

questions provided in the book until 10 items had been developed for each of the five

sessions in Condition A. Each question was presented graphically only; the participant

answered by pointing to one of four possible answers that were also presented

graphically.

In Condition B (CCRC), contextual choice conversations were co-constructed between an experimental partner and the participant. Conversations followed the specific protocol outlined in Appendix E. The participant's reading comprehension was assessed by asking him/her to respond to 10 consecutive questions about a single conversational topic. Questions and response choices were presented visually (i.e., text format) as well as auditorally in accordance with the procedures for the original clinical technique, Written Choice Conversation (Garrett & Beukelman, 1995). The partner also provided gestures or additional verbal explanations if necessary to enhance the participant's comprehension of the conversational question. The partner then paused to allow the participant with aphasia adequate time to visually scan and select response choices. If the experimental clinician observed an impulsive response pattern, the participant was instructed to wait and look at all of the choices. The participant responded by pointing to one of three-to-five written word/phrase choices that were generated "on line" by the conversational partner to represent logically possible answers to the conversational question.

The readability of DSRT stimuli and CCRC conversations and response choices were computed to ensure that reading difficulty was equitable across conditions. Results are compared in Table 2.3 below.

Table 2.3 FOG grade level readability for 5 DSRT stimuli sets and 5 CCRC sessions across 3 participants.

	FOG Years of Education – Grade Level Readability					
Condition/ Participant	Session #1	Session#2	Session #3	Session #4	Session #5	**Mean**
DSRT	3.44	3.49	3.90	3.69	3.57	**3.62**
CCRC P01	3.48	2.84	3.52	3.29	3.41	**3.31**
CCRC P02	3.4	3.6	3.68	3.81	3.44	**3.59**
CCRC P03	3.01	3.40	3.53	3.10	4.12	**3.43**

2. Dependent Variables

The dependent variables for this study were the number of accurate answers for the DSRT condition and for the CCRC condition. Answers were scored for accuracy with regard to content. One point was scored for each correct answer in the DSRT condition. One point was scored for each accurate response in the CCRC condition. Each accurate response had to be rated 2 or 3 by the family member on a 3-point scale (3 = highly likely response, 2 = somewhat likely, 1 = not likely) obtained while the conversation was occurring (see Appendix F). For each of the two conditions, the participant responded to 10 choice questions per session, for a total of 20 data points per session and 50 data points per condition at the conclusion of the study. Individual session scores and the mean accuracy score for the five DSRT sessions were compared with the CCRC individual scores and mean accuracy scores for five sessions using descriptive statistics. Data from all three participants were clustered within the two conditions and compared using nonparametric, randomization tests to identify whether differences were statistically significant.

3. Experimental Controls

Possible threats to validity included: 1) external factors that may have enhanced or inhibited a participant's scores from one experimental session to the next; 2) level of familiarity with the contextual choice task; 3) potential for general improvement in the participant with aphasia; or 4) administration/administrator variability. To control for variability of performance on a given day, the experimenter asked the participant's family member to rate the participant's attentiveness and general well being prior to each experimental session (see Appendix G). Experimental clinicians also used their own judgment to determine if a participant was too lethargic to generate scores that were true reports of ability. If any of the daily ratings were below a score of 3 on the 5-point rating scale, or if the individuals indicated that there was an atypical fluctuation in health or cognitive status, the experimental session was rescheduled. This occurred on one occasion for participant 03 prior to his final experimental session.

To ensure that participants' performances on the partner-supported reading tasks remained consistent throughout the experiment, only those participants who had previously demonstrated the ability to answer conversational questions by pointing to written word choices in structured speech language therapy sessions were selected for this investigation.

Additionally, each participant was greater than one year post-onset to significantly reduce the likelihood that any observed differences were due to spontaneous patient recovery. The study was also conducted within a short period of time (approximately 1 month), and

both conditions were administered during each experimental session to ensure that

differences in performance were not artifacts related to duration of the study. However,

participant 03, the youngest participant in the study, did demonstrate continued

improvement in his standardized test scores despite efforts to control for general

improvement. His pre-experimental WAB aphasia quotient was 26.2; scores obtained

from testing conducted two months after the experiment increased to 38.9, which

suggested that his level of impairment continued to improve. However, his scores for

both conditions remained consistent throughout the study (see Chapter 3).

Because the experimental clinician was not consistent across each of the participants, a

training in-service was held to instruct both experimental partners in proper administration

procedures. A checklist was completed for experimental clinicians before they began

administering standardized testing or experimental procedures (see Appendix H).

Experimental Procedures

1. Setting

All experimental sessions took place in a quiet and comfortable room in either the

Duquesne University Speech-Language-Hearing Clinic on the 4th floor of Fisher Hall or

in the participant's own home. The examiner and participant were oriented at a

comfortable distance from each other to establish a relaxed, conversational atmosphere.

The doors of the rooms in the Duquesne University Speech-Language-Hearing Clinic

were closed to ensure client confidentiality and a quiet environment. Also, the speaker to

the observation room was turned off, but headsets were available to family members and/or guardians if they wished to observe the sessions.

2. Experimental Stimuli

a) Decontextualized Sentence Reading Task (DSRT).

In this condition, participants were presented with ten printed decontextualized wh-questions during each of 5 experimental sessions (50 total questions). DSRT stimuli were presented according to the criteria outlined in Appendix I. Experimental clinicians presented participants with the DSRT stimuli one page at a time. They then directed the participant's attention to the first question and instructed the client to silently read the question without assistance. The clinician allowed two minutes for this step of the procedure. When the participant had finished reading the question, his attention was then redirected to the response choices listed below the question by the experimental clinician. Again, the participant was instructed to read the responses independently and was allotted three minutes for this part of the procedure, but typically responded within five seconds. Clinicians did not assist the client in answering the question, nor were they allowed to provide feedback regarding the accuracy of the participant response.

The original syntactic structure and length of these sentence stimuli were obtained from the *Therapy Guide for Language and Speech Disorders* (Kilpatrick, 1977). Additional stimuli were then developed for the DSRT condition based upon this original structure which consisted of short, interrogative wh-questions. None of

the sentence stimuli within a single session were related in topic or semantic content. The text was generated by computer using capital letters of size 20, bold-faced, Arial font. Two stimulus sentences were presented per page. Four bulleted, one-to-four word response choices were listed vertically below the stimulus sentence, one of which was the correct answer to the stimulus question. The responses were printed in the same font and format as the sentence stimuli. Participants were required to communicate their answer by pointing. Average readability of the stimulus sentences and response choices was 3.62 as measured across all 10 stimuli per set for each of five sets. See appendix J for an example of the presentation format for the sentences and appendix I for administration guidelines.

b) Contextual Choice Reading Conversation (CCRC)

Contextual choice (partner-supported) reading conversation tasks followed specific procedural rules as outlined in Appendix E. CCRC written choice conversational stimuli were presented in a natural conversational manner to emulate the original clinical technique described by Garrett and Beukelman (1995). Therefore, the experimental clinicians used a multimodal and interactive presentation mode. At the start of this condition, participants were presented with a list of three topic choices selected by the experimental clinician from a set list of ten so that they could establish the topic for the subsequent set of questions and responses. The experimental clinicians wrote topic choices in large block letters, approximately one inch in height, with a bold colored marker or pen. The topic

choices were presented auditorily as well. Before beginning, the clinician

presented 3-4 choices from a list of general conversation topics, examples of

which are displayed in Appendix J. After the participant selected a conversational

topic by pointing to one of the written choices, the experimental clinician began

the conversation by asking a topically-relevant wh-question. The clinician wrote

1-to-6 key content words related to the question on a piece of white paper while

saying it aloud and then generated three-to-five possible response choices. A

final option, "other" or "something else", was provided where appropriate to

allow the participant to request additional response choices. The responses were

bulleted and listed vertically below the question in the same one-inch, bold, hand-

written block letters that mimicked as closely as possible the computer-printed

visual representation of the DSRT condition. The clinician wrote no more than

two questions and their corresponding response choices written per page. All

question and response stimuli were generated spontaneously by the clinicians

based on their judgments of the following factors: participants' world knowledge,

background, and interests, as well as logicality of answers. Questions and

responses were presented to the participants in a natural sounding conversational

voice while simultaneously pointing to the graphic stimuli. This procedure was

followed in a dyadic exchange between the experimental clinicians and the

participants for a total of 10 conversational turns (i.e. the back-and-forth exchange

consisting of a question and a response). Refer to Appendix L for an example of

a contextual choice reading conversation (CCRC).

When presenting the questions and response choices, clinicians also used simple

drawings and gestures to supplement the participant's auditory comprehension, a

strategy that is inherent in the original Written Choice Conversation technique.

Throughout the conversations, the experimental clinicians also used some

repetition and yes/no clarification questions.   However, the accuracy of yes/no

responses was not calculated. The written stimuli in the CCRC condition were

both contextually related (i.e. stimulus questions pertained to the same

conversational topic) and presented in a multimodal, communicative manner. As

in Condition A, participants responded to Condition B (CCRC) stimuli by

pointing to the desired choice. This method of responding ensured adequate

processing time because participants did not point until *all* options were

presented. Participants were also encouraged to reread the choices before

selecting their answer from the complete response list.

Although CCRC stimuli presentation differed from the decontextual, visual-only

presentation of the DSRT stimuli because of its multimodal interactive manner of

presentation as well as its contextually relevant and topically ordered content, the

investigator sought to compare decontextual and contextual text comprehension

using a clinical technique that is actually used for adults with severe aphasia.

Stripping away contextual elements that were utilized during the condition would

have counteracted the primary purpose of the study. In addition, this investigation

was designed to test the statement by Koul and Corwin (2003) that people with

global aphasia do not possess adequate reading comprehension to benefit from the

Written Choice Conversation Technique.

3. Administration of Experimental Measures

A trained student clinician in her first year of graduate education in speech-language

pathology at the Duquesne University Speech-Language-Hearing Clinic administered the

initial testing and experimental procedures to P01 and P03 because these clients had been

assigned to her for clinical practicum. The primary investigator served as an

experimental clinician for participant 02 secondary to time constraints with his assigned

clinician, who was subsequently unable to participate in the investigation. Both

experimental clinicians participated in an in-service training session to ensure that

experimental measures were administered in a consistent, reliable, and valid manner.

This competency checklist is outlined in Appendix H. Because systematic procedural

checks were conducted by the experimenter and the project advisor, experimental validity

was not judged to be compromised.

4. Length of sessions/study

Conditions A and B were administered 30 minutes prior to or following each weekly

therapy session, spanning five (5) weeks, or in a 30-minute session at the participant's

home when requested by the participant and/or spouse. In this 30-minute time frame, no

more than one DSRT task and one CCRC task were completed. However, to

accommodate for all necessary test administrations that occurred prior to the

experimental procedures (*RCBA* and *WAB*), and to account for extra testing time in the

event of illness or fatigue, the total length of the study extended across seven weeks for each participant.

5. Data Collection

Each session was recorded via videotape and then labeled in a de-identified manner using the numeric codes according to each participant's randomly selected numeral. The video camera was either placed in the corner of the room and set up prior to the beginning of the session to avoid client distraction, or mounted unobtrusively on the wall in the rooms of the Duquesne University Speech-Language-Hearing Clinic.

6. Scoring

Responses to DSRT stimuli were scored on-line (one point/correct answer) by the experimental clinician. Total accuracy was tallied at the top of the response form after each session. At the conclusion of each experimental CCRC task, the subject's responses were reviewed with a family member to determine the accuracy of factual information and the likelihood of opinion responses to obtain accuracy data for condition B. Appendix F was used as a guideline to assist family members in making these determinations.

Analysis

1. Descriptive statistics

Each participant's performance from the DSRT condition was compared with the CCRC conditions using raw scores for individual sessions, mean scores and standard deviations

across five sessions, and graphing. Means and standard deviations for both conditions

were computed across participants (i.e., data from all three participants were pooled) and

then graphed or tabulated for comparison. Readability levels for the DSRT task were

calculated according to the 'FOG Years of Education' (http://athena.english.vt.edu [n.d.],

obtained 2005; Miles, 1990) method of readability analysis to compare with the

readability levels of the word choices in the CCRC task as a post hoc analysis.

2. Inferential statistics

Randomization testing (Hayes, 1996) for dependent means was also used to determine if

significant differences existed between the two experimental conditions. The five

individual session scores for all three participants were pooled across the DSRT and the

CCRC conditions and entered into PERMUSTAT (Hayes, 1996), a software application

that automatically calculates the number of possible random pairings of the variables

from Condition A and Condition B and then determines if it is possible for scores to have

been obtained from the opposite group if results were due to chance.

Reliability

1. Procedural Reliability

To ensure that each score obtained was representative of a participant's typical text

comprehension skills, a rating scale was presented to each client and their family member

before each experimental session. The participant and their spouse or family member

rated the participant's alertness and readiness for testing on a 5-point rating scale

(Appendix G). The endpoints of the scale indicated that it was either an "excellent" day

for testing (5) or a "terrible" day for testing (1). If any of the ratings were below a 3 on the scale, the experimental session was postponed until the participant was feeling more alert and prepared. This occurred on one occasion for Participant 01 and on one occasion for Participant 03.

Training in proper administration procedures and periodic observations by the primary advisor and investigator confirmed that each procedure was uniformly implemented by each experimental clinician. The investigator completed an experimental skills checklist (Appendix H) for each experimental clinician, including herself because she also served as an experimental clinician, before the experimental treatment sessions began. Further, after appropriate rating, each session was videotaped and reviewed by the investigator. Scores from any given session were discarded if one or more listed administration guidelines (Appendices E and I) were not upheld. This occurred on one occasion for P01 and on two occasions for P03; these sessions were repeated.

2. Intrascorer Reliability

The investigator rescored 20% of the reading stimuli from both conditions by reviewing the videotapes after all of the data had been collected. She then reverted to the initial scores for comparison. Reliability was computed using the following formula.

$$\frac{\text{Number of Agreements}}{\text{Number of Agreements + Disagreements}} \quad X \quad 100$$

Agreement between the investigator and the experimental clinician was consistent at 100% for Conditions A and B.

3. Inter-rater Reliability

A graduate student in speech-language pathology determined the reliability of the investigator's scoring of response accuracy by rescoring one randomly selected videotape per condition (DSRT and CCRC). The rater's data were then compared with the investigator's data, and interrater reliability was computed using the preceding formula. To ensure valid interrater agreement, the investigator did not refer to the graduate students' data from each session until secondary scoring had been completed. Inter-rater reliability for DSRT sessions was 100%. Agreement for CCRC stimuli was found to be 90%.

Chapter 3
RESULTS

Results are organized as responses to the original research questions to address reading

difficulty level of the experimental tasks, intra- and interparticipant performance on both

the decontextualized and contextual reading tasks, differences between the two

conditions, and variations in individual participant performance.

How comparable were the text readability levels of the decontextualized and contextualized reading conditions?

Because this study tested the differences between two reading procedures,

decontextualized and contextualized, it was important to ensure that the two experimental

conditions were similar in difficulty level. For this reason, readability levels were

collected. Because participant responses could not be predicted for the CCRC task,

readability of each CCRC administration was calculated following each session. A cut-

off for deviations from the mean DSRT readability level was set at +/- one or more grade

levels; no sessions for any participant deviated from the mean reading level to a degree

significant enough to be discarded. Prior to some sessions, the investigator instructed

experimental clinicians to adapt their administration style of the CCRC tasks by

increasing or decreasing the use of clausal utterances and prepositional phrases to

increase or decrease the readability level after reviewing their first session. The

experimental clinicians maintained comparability of the sessions by using this method.

To determine readability level for both conditions, the investigator used the FOG years

of education" formula (Miles, 1990) and calculated the average number of words for each

sentence in a set (x), and the percentage of difficult words (y) – or those words with greater than three syllables (http://athena.english.vt.edu, [n.d.] obtained 2005). The summation of 'x' and 'y' was multiplied by 0.4, and the resulting amount is noted as the "FOG years of education" grade-level readability. The investigator calculated this figure for each set of ten sentences and their corresponding response choices for both conditions per session, and then tabulated the mean (x) FOG reading grade level and standard deviation (SD) for all five sessions per participant. Table 3.1 highlights average grade level readability for each condition and each participant. For each participant, DSRT stimuli were predetermined and identical for each participant; therefore, data for this condition is the same across participant 01-03 and has been merged in the table.

TABLE 3.1: Mean readability – FOG years of education, standard deviation, and range

		P01	P02	P03	Overall Mean Scores
Decontextual	Mean	3.62			3.62
	SD	.164			.164
	Range	3.44 – 3.90			3.44 - 3.90
Contextual	Mean	3.31	3.62	3.43	3.45
	SD	.247 (outlier 02) .087 w/o 02	.152	.393 (outlier 05) .213 w/o 05	.208 (w/o outliers)
	Range	2.84 – 3.52	3.4 – 3.81	3.01 - 4.12	2.84 – 4.12

*FOG years of education = (x+y) * 0.4*

The data indicated that readability levels, according to the measures used, were similar across conditions and between subjects with some variability noted. Both the DSRT and CCRC readability levels were between the 3rd and 4th grade educational levels according to the FOG index. One potential outlier session was identified for two of three participants (Participants 01 and 03) during the CCRC condition; for participant 02, readability was significantly reduced from the mean (2.84), and for participant 03, it was

greater (4.12). Standard deviation of readability was calculated for these participants

both including and excluding these outlier CCRC sessions. Results reflect consistent

readability at approximately the 3.5 grade level for both conditions.

What was reading comprehension accuracy on decontextualized reading comprehension tasks across participants?

Table 3.2 displays the data for the DSRT task for all three participants. All of the

participants had mean decontextualized reading comprehension scores below 50%. The

investigator calculated a group mean accuracy score of 3.6 of 10 possible points.

Table 3.2 Accuracy Scores on Decontextualized Tasks (DSRT)

		P01	**P02**	**P03**	**Overall**
Decontextual	**Mean**	4.2	4	2.6	3.6
	SD	1.47	1.41	1.02	1.50
	Range	3 - 6	2 - 6	1 - 4	1 - 6

P01: Scores on the DSRT task for participant 01, the individual with profound aphasia,

ranged from 3 to 6 out of 10 possible points. His mean for all 5 sessions was 4.2 of 10

possible points. He did however, demonstrate some variability; standard deviation (SD)

for his DSRT scores was 1.47. Three of the participant's five scores fell within one

standard deviation of the mean. On the two of five opportunities that the data points were

greater than one SD from the mean, participant 01 scored 6 of 10 points, which

contributed to the increased SD. However, it should be noted that during one session in

which a score of 6 of 10 points was obtained, the participant selected the first answer

choice (of 4) on nine of ten total opportunities. To investigate the possibility of chance

'guessing' during this session a qualitative analysis of this participant's response patterns

was conducted. Participant 01 consistently selected a higher number of initial position

responses (choice 1 or 2) across the 5 experimental administrations, selecting the fourth

response choice only 5 times out of 50 total opportunities (10% versus 25% by chance

alone), and the third response option on only 8 instances of 50 (16%). Although

participant 01 may have comprehended some of the stimuli and response choices, data

showed a trend toward a fixed pattern of response. DSRT results confirm that the

participant consistently erred on more than half of the response choices based on

qualitative observations of the videotape data. These observations suggest that the

participant did review each of the items visually and methodically before responding.

P02: Participant 02, the individual with severe fluent aphasia, scored within a range of 2

to 6 correct responses on the DSRT tasks. His mean score was 4 out of 10 possible

points. Standard deviation was 1.41 and encompassed three of participant 02's DSRT

scores within one SD from the mean. During administration of the experimental task, the

participant appeared to comprehend the procedure adequately. Videotape observations

revealed that the client took time to read each question before progressing to the response

choices, but did not reread before selecting an answer. He rarely exceeded eight minutes

of administration time per set, where up to two minutes was allotted for reading each

question and three minutes for answering. Other participants, particularly participant 01,

frequently used up to three minutes to read and answer a question. Participant 02

frequently verbalized during administration of this condition, though verbalizations were

primarily jargon or neologisms with an occasional recognizable word. Like participant

01, this participant's mean score on this task was less than 50%. He did not demonstrate

a preferential response pattern as did participant 01.

P03: The number of correct responses for participant 03, the youngest participant who had nonfluent aphasia and the highest aphasia quotient of all three participants (see Table 3.5), ranged from 1 to 4 on the decontextualized task. This was the lowest average score across the three participants. His mean score was 2.6 of 10 points possible. The SD for this participant was 1.02 and encompassed all of his scores for this condition. During administration, participant 03 easily became frustrated. He chose only the third answer choice on the first DSRT administration, however, after receiving instruction to read each question to the best of his ability, his subsequent response choices for the remaining four sessions became more evenly dispersed with no obvious pattern. The participant circled his own answer choices for this task, as opposed to the other participants in the study who made their selection by pointing and allowing the clinician to circle the response choice. Participant 02 worked steadily at his own pace and progressed through these stimulus sets fairly quickly during each session. Whereas participants 01 and 02 scored above 50% for 1 to 2 of 5 sessions, *all* of participant 03's five DSRT scores were below 50%.

W*hat was reading comprehension accuracy on contextualized reading comprehension tasks (CCRC) across participants?*

See Table 3.3 for overall and individual mean scores and standard deviations. Each participant achieved a mean score of greater than 75% on the contextualized reading comprehension condition. The group mean accuracy score was 9.0 of 10 possible.

Table 3.3: Accuracy Scores on Contextualized Tasks (CCRC)

		P01	**P02**	**P03**	**Overall**
Contextual	**Mean**	7.6	9.4	10.0	9.0
	SD	.49	.49	0	1.10
	Range	7-8	9-10	10	7-10

P01: Participant 01 scored a mean of 7.6 of 10 possible points across the five experimental contextual reading comprehension tasks. All scores fell within the 7 to 8 point range, resulting in a SD of .49. During these tasks, the participant was noted to pay close attention to each response choice; he traced each option multiple times with his finger before deciding on one by pointing to a bulleted option. However, the experimental clinician occasional prompted the participant to 'choose one'. Participant pointing was consistently clear and direct, though on a few occasions he appeared to change his mind when the clinician offered a 'yes/no' clarification question.

P02: Participant 02 scored a mean of 9.4 of 10 possible points. He scored either 9 or 10 points on each of the CCRC conversation exchanges, resulting in an SD of .49. Participant 02 frequently attempted to communicate verbally, via gestures, and by pointing when all of the response choices were correct. He did so by either pointing to each response consecutively or by circling all answers with his finger and nodding to the experimental clinician while verbally approximating "this one". Similarly, the participant typically indicated when none of the response choices were correct by crossing each response out individually and circling response choice "other" with his finger. Participant 02 comprehended humor presented throughout the conversations by laughing and changing his facial expression.

P03: This participant scored 10 points for all of the CCRC tasks (of 10 possible), which resulted in a mean score of 10 and an SD of 0 on the contextualized condition. Note,

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however, that his first two sessions were repeated secondary to administration error and the participant's pattern of responding prior to hearing all of the response choices. Prior to readministration of the sessions, the participant had scores of 8 and 9 on the first two sessions. He was instructed to wait until all options were presented before reviewing them independently, and to then make his selection by pointing to the desired response. Without these instructions, participant 03 showed a tendency to be very impulsive and select answers before the entire set of choices had been presented. He did so by answering verbally yes/no as the clinician wrote and presented auditorally.

Overall, the scores for all three participants showed higher comprehension levels with contextualized stimulus material and far lower variability than in the DSRT condition.

How did the participants differ in relation to response patterns and administration variability?

Participants were similar in that they always scored lower on decontextual reading tasks than on contextual ones. None of the three mean participant scores for DSRT was greater than 50 percent, and in contrast, none of the CCRC mean participant scores was less than 50 percent. However, each participant differed in performance patterns as well. The following describes the differences between the three participants.

Response pattern differences:

P01: This participant responded in a very thorough and consistent manner across all experimental administrations. He carefully read each question, tracing each word before proceeding to the response choices. Participant 01 also traced each response choice deliberately, which resulted in lengthy selection times. After participant 01 had made his

selection, he withdrew his finger from the paper, occasionally nodded, and waited to be directed to the next stimulus item.

P02: This participant was similar to participant 01 because he thoroughly reviewed stimuli before responding. His selection time, however, was briefer than participant 01's. This participant also frequently traced stimulus questions but was typically satisfied with one reading before moving to the responses. He read each response carefully and crossed out items until he identified the correct one; by the second session, participant 02 had established the habit of verbally approximating "this one" as he underlined his chosen response.

P03: This participant's response behavior was quite different from participants 01 and 02. During the first DSRT session participant 03 consistently selected the third response. During subsequent trials of DSRT, participant 03 showed greater concentration when reading the stimulus items, however, participant 03 was not nearly as thorough as the first two participants. He proceeded through each set of 10 items quickly and, during the DSRT condition, circled his own answers as opposed to the pointing method employed by participants 01 and 02. Therefore, there was no possibility of error or misinterpretation on the part of the experimental clinician. In the CCRC condition, participant 03 was also impulsive when responding. He was then instructed to wait until all options were presented before reviewing them independently, and to then make his selection by pointing to the desired response. Without these instructions, participant 03 showed a tendency to be very impulsive and select incorrect answers before the entire set

of choices had been presented. He did so by answering verbally "yes/no" as the clinician

wrote and presented auditorally.

Administration differences:

While administration of procedures was stringently controlled, a few variations occurred

to accommodate the participants. Participants 01 and 03 participated in the experiment at

the Duquesne University Speech-Language-Hearing Clinic with their assigned graduate

student clinician; Participant 02 received experimental sessions from the investigator in

his home environment secondary to scheduling difficulties. In addition, the scheduling of

experimental sessions was different for each participant because of practical issues

related to transportation and clinician scheduling. Participant 01 received sessions

immediately prior to group therapy sessions. Participant 03 received sessions

immediately following one-hour individual sessions. Lastly, participant 02 received

sessions completely independent of accompanying therapy sessions. The experiment was

conducted in his home and took place in the afternoon after he had completed his other

daily appointments and/or activities. Despite these differences, all scores showed an

increase when contextual information and multiple modality input was used to aid

reading comprehension.

How did participants' performances on standardized language and reading comprehension tests compare with their reading comprehension performance on experimental conditions?

Performances for each participant across two standardized tests and two experimental

conditions are listed in table 3.4.

Table 3.4 Comparison of standardized test scores and experimental scores

	WAB AQ	WAB Reading subtest score	RCBA Total score	Mean DSRT	Mean CCRC
P01	1.9/100	6/100	28/100	4.2/10	7.6/10
P02	9.7/100	27/100	32/100	4/10	9.4/10
P03	26.2/100	19/100	40/100	2.6/10	10/10

All of the participants' subtest scores on the WAB (Kertesz, 1982) qualified them as

having severe aphasia, either severe Broca's syndrome (P03) or Global syndrome (P01,

P02). All participants' scores on the WAB (Kertesz, 1982) reading subtest were below

50 percent. Further, table 3.4 displays one score as low as 6 of 100. Interestingly, this

participant (01) scored the highest mean DSRT score. Another test addressing reading

comprehension, the *Reading Comprehension Battery for Aphasia (RCBA)* (LaPointe &

Horner, 1979) required participants to read information at the word, sentence, and

paragraph level. Some items contained pictures and or 'functional information' such as a

checkbook balance sheet or a page from a phone book. Scores were below 50% on this

100-item test, demonstrating that the participants' comprehension of a variety of written,

decontextual test formats (e.g., single words, sentences, functional graphic information,

paragraph) was minimal. These scores were similar to those achieved during

decontextualized condition A; that is, no mean score was higher than 50 percent on

DSRT administrations.

In summary, scores on decontextualized tasks appeared to be somewhat consistent with

the participants' performance on standardized language and reading tests. This contrasts

with their relatively competent performance when reading, listening to, and answering

contextual questions.

Do persons with severe aphasia perform significantly better on contextualized reading tasks than on decontextualized reading tasks?

All scores on CCRC (contextualized) tasks were notably higher than those on DSRT

(decontextualized) tasks, as demonstrated in Table 3.5.

Table 3.5 Differences between DSRT and CCRC Mean Scores for each Participant

	P01	P02	P03	Mean
Mean Contextual	7.6	9.4	10	9
Mean Decontextual	4.2	4	2.6	3.6
Difference	3.4	5.5	7.4	5.4

Each participant's mean CCRC scores were greater than their mean DSRT scores as

averaged across 5 sessions. Table 3.5 displays the mean scores for each condition, the

differences between them for each participant, and for the group of participants for both

decontextual (A) and contextual (B) reading comprehension tasks. Participant 03 showed

the greatest gain from the contextual condition. However, even participant 01, who

showed the least amount of change from decontextual to contextual reading performance

demonstrated no overlap between the highest DSRT score and the lowest CCRC score.

His individual session scores differed by greater than three points on average.

To determine whether differences found between decontextual and contextual reading

comprehension tasks were significant, each session score (across 3 participants) was

entered into *PERMUSTAT* (Hayes, 1996) to conduct randomization testing for dependent

means using a 1-tailed test. Results of Condition B (CCRC) scores were found to be

significantly higher than Condition A scores at $p < .01$ (exact $p = .00003$).

Chapter 4

DISCUSSION

Summary of Findings

The purpose of this investigation was to expand what is known about the reading comprehension benefits derived from context and multimodal inputs when persons with severe aphasia read text. Two set of experimental reading stimuli were developed: 1) decontextual stimuli obtained from aphasia reading exercises, and 2) contextual stimuli derived from conversational questions and responses administered in a multimodal manner. The two sets of textual stimuli were administered to three participants across five experimental sessions to obtain data regarding reading comprehension accuracy and to answer the following questions:

1) Is there a difference between the comprehension scores obtained from independent readings of traditional decontextualized tasks (DSRT) and the accuracy scores obtained from contextual reading tasks (CCRC)?

2) Can persons with severe or global aphasia exhibit contextual reading comprehension well enough to benefit from a written choice conversation technique that utilizes reading through presentation of written word/phrase response choices?

The primary finding of this study was that there is an observable and significant difference between comprehension scores obtained from decontextual versus contextual reading tasks. Mean accuracy on CCRC tasks were consistently higher than those of DSRT tasks for each participant.

Use of contextual information

There may be several possible explanations for the enhancement of reading

comprehension when text was presented in a contextual manner to people with severe

aphasia.

First, *world knowledge,* a type of contextual influence, contributes to a person's

comprehension of auditory information in text (Pierce and Beekman, 1985). Before each

CCRC session began, the experimental clinician and the participant co-established a topic

for communication. For example, participant 01 selected music as a topic for

conversation. The experimental clinician then presented a set of 3 to 5 choices and the

participant selected one that he wished to discuss. In doing so, the participant self-

selected stimuli that he was more familiar with. It is likely that participants selected

topics that interested them and that they had some background in. In turn, they were

more likely to have a stored, usable set of knowledge related to this topic, and the

participants may therefore have had increased their chances of comprehending

subsequent textual information than if a random sentence had been placed before them.

Motivation is another key factor that may have contributed to participants' success during

the CCRC tasks. Wallace and Canter (1985) proposed that personally relevant

information is often easier for a person with aphasia to communicate because it embraces

a large part of their daily life. Participant 02 frequently wanted to talk about traveling; he

sometimes discussed where he would like to go and what he would do there, or talked

about where he had traveled to in the past. This may have been a motivating topic for this individual because he may have wanted to share his adventures with someone unfamiliar with the stories. This individual demonstrated severe Wernicke's aphasia, and his excitement about the topic was evident when the frequency of his jargon speech increased. The contextual written choice technique helped him tell his stories. Peach (2001) stated that personally relevant or familiar information is sometimes spared in aphasia secondary to right-hemisphere mediation. The participants' performances on CCRC tasks in the current study may have improved because the topic choices were familiar, relevant, and motivated them to remain engaged and attentive to the associated textual stimuli.

The *multimodal approach* to the contextual task may also have aided the participants' reading comprehension accuracy. Beeson and Hillis (2001) mapped out a potential pathway for comprehension of graphemic information. Their diagram includes phonological, visual, and graphemic input modes that may be necessary to completely comprehend a stimulus. The stimuli in the experimental condition for the current study were spoken aloud while they were being written; gestures and pictures were also utilized, where appropriate, to stimulate comprehension of the general topic or semantic content in each item. All of this input may have supplemented the participants' visual recognition of text, which parallels Beeson and Hillis's (2001) suggestion to aid semantic comprehension with phonological and pictorial input for people with aphasia.

Another related contributor to the success of the CCRC condition might have been the *repetitions* that are inherent to the technique. Because the written choice conversation technique resembles natural conversation, occasional repetitions or modifications of the auditory presentation were seen as a repair technique used for misunderstood messages. Researchers (Schuell, Jenkins, Jimenez-Pabon, 1964) note that on recognition tasks, as many as 20 repetitions of a stimulus might be necessary before comprehension is achieved, or before a response is elicited. While the verbal repetitions during the CCRC tasks in the current study were not nearly as numerous, experimental clinicians did sometimes repeat or alter the auditory input, which may have subsequently enhanced the participants' comprehension of the printed reading material. Scores from CCRC sessions that revealed more than three repetitions of a stimulus during videotape review were omitted. An additional experimental session was then administered with instructions for less verbal repetition. Participants were also required to wait until the entire question and response set was presented before making their selection. This stipulation demanded that the participants looked at and reviewed the text before choosing their response.

Success on CCRC tasks was maintained even throughout outlier sessions; two of these were observed. The outlier to the greater side (grade level 4.12) of the acceptable range (3rd grade) was obtained during CCRC administration whereas the outlier to the lesser side (grade level 2.84) was obtained during a DSRT task. The fact that the readability level of one CCRC conversation for participant 03 exceeded mean readability levels (mean = 3.45) by a noticeable degree further supports the case behind the advantages of contextual augmentation of reading stimuli.

Theoretical Implications

This study used a conversational therapy approach that utilizes reading as a core element. Techniques like the one in the current study have been shown to work for persons with aphasia in previous studies (Garrett & Beukelman, 1995; Garrett, 1993). In the current study however, the conversational reading technique was contrasted with a decontextual approach and reading comprehension scores were compared to obtain a clear idea of the difference between reading comprehension among two different therapy techniques.

The results of this study directly contradict the claims by Koul and Corwin (2003) that people with global aphasia cannot benefit from partner-supported conversational strategies because of minimal reading ability. This study has outlined three participants, all with severe aphasia, who demonstrated poor results on standardized and informal decontextualized reading tasks (see Table 3.4) but who showed good reading when supplied with contextual and multimodal input. The study controlled for difficulty of the reading tasks by utilizing readability formulas, thus eliminating simplicity of text as a causal factor for improved scores. Experimental clinicians were instructed not to use excessive auditory cues, and in fact, sessions that the investigator judged to be too rich in verbal cues were discarded and re-administered. Therefore, although the possibility exists that reading comprehension improved in the CCRC condition because of supplementary verbal cues and information, it is likely that this was only a partial explanation for increased reading scores in the contextual condition.

Pierce's (1983) idea that persons with aphasia are able to use surrounding contextual information to comprehend semantic meaning is strengthened by these findings. However this study extends Pierce's (1983) concept of context as additional syntactic markers embedded in text. The conversational technique utilized in this study includes context derived from topical relatedness of the stimuli, the simultaneous presentation of the stimuli in both auditory and written modes, and the partners' intermittent use of gestures, pictures, and supplemental auditory information. The use of a conversational partner and the shared topic awareness allowed for the surrounding contextual information to be generated. Therefore, the amount of contextual information was much greater than that found in text alone, and in turn, the amount of semantic meaning drawn from the presentation also increased.

This study also refutes the common practice of excluding people with aphasia from research studies and treatment programs because of their severity (Towey & Pettit, 1980; Helm-Estabrooks, 1984), and suggests that they might actually be able to demonstrate the same results as other individuals with less severe aphasia diagnoses.

Clinical Implications

Persons with severe and/or global aphasia commonly experience impaired reading comprehension (Mayer & Murray, 2002). Through the current study, we have learned that persons with global aphasia and severe aphasia presenting in other forms (Broca's and Wernicke's type classifications) can compensate for a severe reading impairment to functionally participate in a conversation that utilized graphic supports. With a trained partner and written choice methods, the participants in this study showed that reading

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comprehension increases, on average 5.4 points (of 10), or 54% in contextual conditions (see average accuracy scores in Table 3.4).

This study addresses Mayer and Murray's (2002) petition to further research in the area of reading treatment for people with aphasia. It provides clinicians and caregivers with a way to compensate for severe reading impairments secondary to aphasia. While techniques used in the CCRC approach will not 'cure' a reading impairment, it provides a method for circumventing linguistic deficits and simultaneously bridging communication between a person with severe aphasia and their communication partners. Caregivers can use contextual choice conversations to communicate with nonverbal individuals, even if reading is impaired.

These results were fairly consistent between two different clinicians who had received only minimal training in the contextual conversation technique. With only one formal training session, and a few follow-up 'reminder discussions' prior to experimental sessions, the graduate student aptly and successfully administered the contextual choice reading conversations. The method is not difficult to learn for individuals with training in the area of speech-language-pathology and, specifically, treatment of aphasia.

Limitations of the Study

The results of this research showed significant differences between the two experimental conditions; contextual reading accuracy was significantly better than decontextual

reading for three individuals with severe aphasia. However, there were some limitations

that were difficult to avoid.

1) Because research must be controlled from every angle, it was difficult to obtain
   more participants who met the study criteria. Given the small scale of this study,
   one should use caution in applying the results to all individuals with aphasia.

2) Another limitation, which likely stems from basic conversational tendencies and
   inherent repair strategies of successful communicators, was the amount of
   repetition in the clinician's presentation. Individuals naturally repeat themselves
   when they are not understood; this communication strategy sometimes serves to
   repair partially understood messages. When the experimental clinicians sensed
   that they were not fully understood or when the participant requested clarification,
   their natural tendency was to provide additional spoken explanations versus
   encouraging the participants to silently read the stimuli. Two sessions were
   discarded and readministered following videotape review because too many
   verbal cues were used by the experimental clinician, which subsequently
   decreased the necessity of the PWA to actually read the stimuli. Although strides
   were taken to maintain a low level of verbal cue repetition (see CCRC guidelines
   in Appendix E), some repetition was unavoidable. Repetition of stimuli may have
   inflated the accuracy of participants' CCRC responses and therefore should be
   controlled in future replications of this study.

3) Also of note, family members completed rating forms to verify the accuracy of
   CCRC responses after or during each experimental session (Appendix F). On
   some occasions, answers to questions relied more on opinion than fact (e.g.

"What about your dream car - If you could have any car in the world, what would

it be?"). In these cases it was difficult for the spouse or family member to judge

the likelihood of the response given by the PWA; some interpretation or analysis

was then required, potentially altering the results depending on how

knowledgeable the spouse or family member was of the PWA's opinion regarding

certain conversational topics. The spouse/family member rater may also have

affected the data by scoring some response choices as more likely to occur

because of inadvertent hopes or expectations for their family member's success

with the CCRC technique.

Directions for Future Research

The following are suggestions for courses of future research:

1) Replicate the study with a greater number of participants

2) Implement a change in procedure, or control more stringently, for verbal
   repetition of stimulus cues.

3) Limit conversation to factual questions for which the correct answers are
   always known, while maintaining the personal relevancy and topic
   motivation of conversations

4) Apply a similar experimental procedure to reading passages of personal
   interest to the participant to analyze the effects of this method on a higher
   quantity reading demand; paragraph-length reading passages will increase
   reading demands.

5)   Conduct a study in which similar contextual cues are implemented, independent of each other, to textual stimuli resembling the DSRT stimuli used in the current study. This would offer a breakdown of which level of context results in the greatest benefit.

Conclusions

Despite the negative assumptions about reading comprehension skills and usefulness of reading approaches for persons with severe aphasia derived from prior research, the results of this study show quite the opposite. The individuals who participated in the experimental procedures showed that contextual cues in the form of gestures, drawings, supporting words, and topical relevance to printed text significantly augmented the reading comprehension of persons with severe aphasia. With this information, researchers can begin to include these individuals with severe aphasia in more treatment studies to expand the knowledge base surrounding the capabilities of severely impaired individuals.

While in retrospect, there may have been some factors that limited the preciseness of the data found in this study, the results speak for themselves. The three men who participated challenge researchers and clinicians alike to question what is "known" and to continue developing strategies to enhance the successful communication that our professional field strives for.

REFERENCES

Arrigoni, G., & De Renzi, E. (1964). Constructional apraxia and hemispheric locus of lesion. *Cortex*, *1*, 170-197.

Beeson, P.M. & Hillis, A.E. (2001). Comprehension and production of written words. In R. Chapey (Ed.), Language Intervention Strategies in Aphasia and Related Neurogenic Communication Disorders. (pp. 572-595). Brooklyn, NY: Lippincott Williams & Wilkins.

Cannito, M.P. & Vogel, D. (1998, November). *Contextualized sentence comprehension in aphasia: Effect of visual stimulation.* Poster session presented at the annual ASHA Convension, Boston, Mass.

Chapey, R. & Hallowell, B. (2001). Introduction to language intervention strategies in adult aphasia. In R. Chapey (Ed.), Language Intervention Strategies in Aphasia and Related Neurogenic Communication Disorders. (pp. 3-17). Brooklyn, NY: Lippincott Williams & Wilkins.

Damasio, H. (2001). Neural basis of language disorders. In R. Chapey (Ed.), Language Intervention Strategies in Aphasia and Related Neurogenic Communication Disorders. (pp. 18-36). Brooklyn, NY: Lippincott Williams & Wilkins.

FOG Index [n.d.] Obtained 7/4/2005 from http://athena.english.vt.edu/~hagedorn/TechnicalWriting.

Gainotti, G., D'Erme, P., Villa, G., & Galtagirone, C. (1986). Forcal brain lesions and intelligence: A study with a new version of Raven's colored matrices. *Journal of Clinical and Experimental Neuropsychology, 8,* 37-50.

Garrett, K.L. (1993). Changes in the conversational participation of individuals with severe aphasia given three types of partner support. Unpublished doctoral dissertation. University of Nebraska-Lincoln.

Garrett, K.L., & Beukelman, D. (1995). Changes in the interaction patterns of an individual with severe aphasia given three types of partner support. *Clinical Aphasiology, 23,* 523-536.

Goodglass, H., & Kaplan, E. (1972). *Boston Diagnostic Aphasia Examination.* New York: Lippincott, Williams & Wilkins.

Hayes, A. (1996). PERMUSTAT: Randomization tests for the Macintosh. *Behavior Research Methods, Instruments, and Computers: A Journal of the Psychonomic Society, Inc., 28,* 473-475.

Hanna, K.M. (2004). *Effectiveness of staged partner training on conversational interactions involving a person with severe aphasia.* Unpublished master's thesis, Duquesne University, Pittsburgh, PA.

Helm-Estabrooks, N. (1984). Severe aphasia. In A. Holland (Ed.), Language Disorders in Adults. (pp. 159-176). San Diego: College Hill Press.

Herrmann, M., Koch, U., Johannsen-Horbach, H., & Wallesch, C.W. (1989). Communicative skills in chronic and severe nonfluent aphasia. *Brain and Language,* **37**, 339-352.

Kertesz, A. (1982). *Western Aphasia Battery*. The Psychological Corporation.

Kilpatrick (1977)

Koul, R. & Corwin, M. (2003). Efficacy of AAC intervention in individuals with chronic severe aphasia. In R.W. Schlosser (Ed.), The Efficacy of Augmentative and Alternative Communication. (pp. 449-470). Boston: Academic Press.

LaPointe, L.J. & Horner, J. (1998). *Reading Comprehension Battery for Aphasia – 2nd Ed.* Austin: Pro-Ed.

Lasker, J., Hux, K., Garrett, K.L., Moncrief, E.M., & Eischeid, T.J. (1997). Variations on the Written Choice communication strategy for individuals with severe aphasia. *Augmentative and Alternative Communication, 13,* 108-116.

Marshall, R.C., Freed, D.B., & Phillips, D.S. (1997). Communication efficiency in severe aphasia. *Aphasiology. 11*(4/5), 373-385.

Mayer, J.F. & Murray, L.L. (2002). Approaches to the treatment of alexia in chronic aphasia. *Aphasiology,* **16**, 727-743.

Miles, T.H. Critical thinking and writing for science and technology. Harcourt Brace Jovanovich, 1990, 280-284.

Murray, L.L. & Chapey, R. (2001). Assessment of language disorders in adults. In R. Chapey (Ed.), Language Intervention Strategies in Aphasia and Related Neurogenic Communication Disorders. (pp. 55-127). Brooklyn, NY: Lippincott Williams & Wilkins.

Naeser, M.A., Alexander, M.P., Helm-Estabrooks, N., Levine, H.L., Laughlin, S.A., & Geschwind, N. (1982). Aphasia with predominantly subcortical lesion sites. *Arch. Neurol., 39,* 214.

Nicholas, L.E. and Brookshire, R.H. (1987). Error analysis and passage dependency of test items from a standardized test of multiple-sentence reading comprehension

for aphasic and non-brain-damaged adults. *Journal of Speech and Hearing,* **52**, 358-366.

Peach, R. K. (2001). Clinical intervention for global aphasia. In R. Chapey (Ed.), Language Intervention Strategies in Aphasia and Related Neurogenic Communication Disorders. (pp. 572-595). Brooklyn, NY: Lippincott Williams & Wilkins.

Pierce, R.S. (1983). Decoding syntax during reading in aphasia. *Journal of Communication Disorders,* **16**, 181-188.

Pierce, R.S. & Beekman, L.A. (1985) Effects of linguistic and extralinguistic context on semantic and syntactic processing in aphasia. *Journal of Speech and Hearing,* **28**, 250-254.

Piercy, M., & Smith, V.O.G. (1962). Right-hemisphere dominance for certain non-verbal intellectual skills. *Brain, 85,* 775-790.

Rao, P.R. (1995). Drawing and gesture as communication options in a person with severe aphasia. *Topics in Stroke Rehabilitation, 2,* 49-56.

Schuell, H., Jenkins, J.J., & Jimenez-Pabon, E. (1964). *Aphasia in adults.* New York: Harper & Row.

Stachowiak, F.J., Huber, W., Poeck, K., & Kerschensteiner, M. (1977). Text comprehension in Aphasia. *Brain and Language,* **4**, 177-195.

Towey, M.P. & Pettit, J.M. (1980). Improving communication competence in global aphasia. *Proceedings of the Clinical Aphasiology Conference*. Minneapolis: BRK Publishers.

Marshall, R.C. (1998). Clinical Forum-An introduction to supported conversation for adults with aphasia: Perspectives, problems and possibilities. *Aphasiology,* **12**, 811-864.

Wallace, G.L., & Canter, G.J. (1985). Effect of personally relevant language materials on the performance of severely aphasic individuals. *Journal of Speech and Hearing Disorders,* **50**, 385-390.

Webb, W.G. (1987). Treatment of acquired reading disorders. *Topics in Language Disorders.* **8(1)**, 51-60.

Webb, W.G. & Love, R.J. (1983). Reading problems in chronic aphasia. *Journal of Speech and Hearing Disorders,* **48**, 164-171.

APPENDICES

Appendix A
Subject Selection Criteria for Referral Sources

Dear (colleague),

Thank you for assisting me in my masters research. I am looking for subjects who have been diagnosed with global aphasia for a study concerning contextual vs. decontextual reading comprehension. If you know of any individuals with the following characteristics, please contact me at (412) 915-2924. I will contact potential study participants and discuss the research project with them and their family members

----

Potential Participant's Name: _____
Address: _____
Spouse/Contact Person: _____
Phone Number: _____

The participant must:	Referral Check	Investigator Check
1. Be between the ages of 40-85	_____	_____
2. Be at least 1 year post-onset of a single, focal left hemisphere CVA	_____	_____
3. Be classified as nonfluent	_____	_____
4. Have a diagnosis of severe-to-profound aphasia as reported by a licensed speech-language pathologist and confirmed by an aphasia quotient (AQ) of 20 or below obtained from the Western Aphasia Battery	_____	_____
5. Have a severe communication impairment in the areas of verbal expression and comprehension, as well as lexical expression and reception	_____	_____
6. Have spoken English as a primary language	_____	_____
7. Have a minimum of a 12th grade education	_____	_____
8. Have been able to read and comprehend a newspaper pre-morbidly	_____	_____
9. Be awake and attentive for six or more hours in the home environment per day	_____	_____
10. Have no dramatic fluctuations in alertness due to medical conditions	_____	_____
11. Demonstrate functional visual acuity (aided or unaided) as determined by the ability to match printed words in 16pt font	_____	_____
12. Demonstrate functional hearing (aided or unaided) as determined by the ability to look at a speaker calling his or her name, and by demonstrating a pure tone average	_____	_____

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of 35dbHL in at least one ear (aided or
  unaided) at frequencies of 500, 1000,
and 2000 Hz
13. Show no evidence or reported history of   _____   _____
    disease processes associated with dementia
    or chronic substance abuse

Please circle the number corresponding to your rating of the patient's
capabilities on each of the following scales:

1. patient rarely meets   patient usually meets
   communication needs   communication needs
   with speech   with speech
            1   2   3   4   5   6   7

2. patient rarely   patient usually
   responds accurately   responds accurately
   to commands   to commands
            1   2   3   4   5   6   7

3. patient rarely   patient usually
   communicates   communicates
   specific information   specific information
   with gestures when   with gestures when
   unable to speak   unable to speak
            1   2   3   4   5   6   7

4. patient rarely   patient rarely
   shows comprehension   shows comprehension
   of written text   of written text
            1   2   3   4   5   6   7

Appendix B

NAME of PARTICIPANT:_____ DATE:_____
NAME OF SCREENER/CERTIFICATION:_____

This screening task will be administered by a trained graduate student clinician who is naïve to the purpose and independent of the study. The examiner will first ask the person with aphasia to match three typed word pairs to ensure adequate vision to comprehend the IRB consent forms as well as to participate in the experimental tasks. The participant will then answer 5 questions requiring yes/no or single-word answers, for which the true answers are known. If necessary, she will provide supplemental (augmented) input to the individual (graphic, verbal, gestural) to ensure that they understand the concepts represented in the question. Potential methods for augmenting input are indicated in italics. All correct answers to questions will be obtained from the medical records/chart or corroborated by the participant's close family member. The participant will be allowed to answer through any modality (gestural, verbal, pointing to written choices, intonation). If there is any discrepancy in communication modes (i.e., the participant says "yes" but nods "no"), the question will be repeated and written choices will be provided for the individual to point to. The examiner will also confirm whether the 2nd response was the intended response by repeating the response and asking, "Is this right?" This protocol reflects a typical comprehension screening task for people with moderate-to-severe aphasia. The graduate student clinician will also record the number of verbal responses, if any, during the screening task to ensure that accepted participants meet the non-verbal criteria for the study. The participant will then be screened to ensure adequate hearing levels for the tasks.

Task #1: Word Matching to ensure adequate vision:
The subject will be presented with a card containing three single words (16pt. font) listed vertically. The investigator will then present a small card with a single target word written on it and instruct the participant to "find the word that is the same on your card". The investigator will demonstrate the task 1 time before beginning the activity.

Words -   S=successful
                                           U=unsuccessful
1) March   S   U
2) soccer   S   U
3) candle   S   U
*Criterion: 3/3 → Total successes ___   **Subject Accepted? ___***

Task #2: Comprehension questions: answer 4 of 5 correctly
1.   **Are you married** (*point to person, point to wedding band finger),* **yes…or no?**

+   -   Correct answer: _____
                      Response modes: head nods, verbal, point to ring, written choice

+   -   2nd try needed?   Y   N
                      Confirmed?   Y   N

2. **Did you grow up in New York, Pittsburgh, or _____?** (*write key words/choices and draw outline map of PA or US*)

+   -   Correct answer:_____
                  Response modes: verbal, point in direction, written choice/map

+   -   2nd try needed?   Y   N
                  Confirmed?   Y   N

3. **Do you have any children** (*gesture in a descending manner representing tops of the children's heads*), **yes…. or no?**

+   -   Correct answer:_____
                  Response modes: verbal, point in direction, written choice/map

+   -   2nd try needed?   Y   N
                  Confirmed?   Y   N

4. **What month is it….(*write 3 choices, and say them as writing them*)**

+   -   Correct answer:_____
                  Response modes: verbal, point in direction, written choice/map

+   -   2nd try needed?   Y   N
                  Confirmed?   Y   N

5. **Do you think talking to someone is PAINFUL/HURTS YOU** (*gesture back and forth as if talking, then exaggerate facial expression and intonation to indicate pain, gesture back to participant*)**, yes…or no?**

+   -   Correct answer:_____NO____
                  Response modes: verbal, head nods, point to written choices

+   -   2nd try needed?   Y   N
                  Confirmed?   Y   N

Number Correct _____/5 (criteria = 4/5 correct answers)

Number Verbal Responses _____ (maximum of 1 verbal response for individual to qualify for participation in this study)

Accepted for study? _____

Task #3: Pure Tone Average Hearing Test:

Does the participant have a pure tone average of 35dbHL in at least one ear (aided or unaided) at frequencies of 500, 1000, and 2000 Hz?

	500 Hz	1000 Hz	2000 Hz
LEFT EAR			
RIGHT EAR			

Referral Check-Off _____   *Secondary Screening _____*

Appendix C

Simplified Consent/Assent Form

ADULT PARTICIPANT WITH APHASIA: MODIFIED INFORMED CONSENT/ASSENT FORM

TITLE: Comparing Decontextualized and Contextualized Reading Skills in Persons with Global Aphasia

PRIMARY INVESTIGATOR: **Carey E. Smith B.S.**
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garrettk@duq.edu

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.

PURPOSE:

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 <u>aphasia</u>. You are also between the ages of <u>40 and 85 years</u>.

---

*APHASIA – 1+ years ago

* **Between ages 40 and 85**

In this study, I want to see how you respond to questions. On some questions, you will get help with pictures and gestures. During the sessions, you will talk with your clinician.
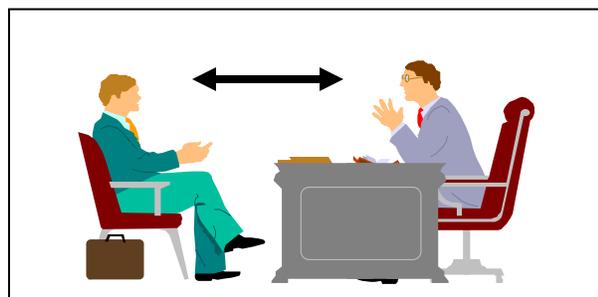
We need to meet for approximately 10 hours total. The first two sessions would involve testing, informed consent, and secondary screening. The next 5 sessions would be 1/2 hour sessions where you answer some questions and talk to your

clinician. The 8 experimental sessions should last no more than 1/2 hour each. We will meet here at the clinic at DUQUESNE when you are here for therapy. We can reschedule any session if you are sick or too tired.

- 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	Questions, Talk	1/2 hr
	Friday	Questions, Talk	1/2 hr
* Week 2	Tuesday	Questions, Talk	1/2 hr
	Friday	Questions, Talk	1/2 hr
* Week 3	Tuesday	Questions, Talk	1/2 hr
* Week 4	Tuesday	Testing	1/2 hr
	Friday	Testing	1/2 hr

I would like to film you with a video camera each time we meet. After the conversations are finished, I will look at the film and count things that you do. We will use this for the research.

RISKS AND BENEFITS:

There is very low risk for discomfort in this research. You should not be in pain, feel tired, or be uncomfortable.   This study will <u>not</u> help you get better – BUT we hope to understand aphasia more with this information. We will use some of your health information (age, description of stroke) but we will protect your privacy at all times.

<div style="border:1px solid black; display:inline-block;">

NO PAIN!!

</div>

You will **not** have to pay $$$ to be a part of this study.

CONFIDENTIALITY:

<div style="border:1px solid black; display:inline-block;">

#1a.

PWA 7

</div>

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. I will keep the film and data in a locked file. We will

destroy the videotapes after we are done coding them – unless you sign the extra form. We may publish the results of this study and limited health information (date of stroke, age) however your name will not be used.

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. 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 <u>consent</u> to participate in this research study
__ informed <u>assent</u> to participate in this study (<u>must</u> also attach agent consent)

X_____   _____

Signature of Primary Investigator   **Date**

X_____   _____

Signature of Faculty Advisor   **Date**
****

If you have any questions about whether it is appropriate to participate in this study, call:

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

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

TITLE: **Comparing Decontextualized and Contextualized Reading
Skills in Persons With Global Aphasia**

PRIMARY INVESTIGATOR: **Carey E. Smith B.S.
Resource Room Mailbox
403 Fisher Hall
Pittsburgh, PA 15282-2231
(412) 915-2924
smith144@duq.edu**

**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**

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

INVITATION TO PARTICIPATE: Your family member, _____
_____,is invited to participate in my
Master's thesis research study. In this study, I will train graduate student clinician
in proper administration of two reading therapy conditions. 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 40 and 85. Your family member was recruited
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, I will train the graduate student clinician proper administration procedures in traditional decontextualized stimulus reading techniques (DSRT) and in appropriate contextual choice reading conversation techniques (CCRC).

Your family member will need to meet with the primary investigator for approximately 10 hours total. First, they will be asked to participate in testing so we can better understand their skills and challenges. We need to complete an aphasia test, a vision screening test, and a hearing screening test. This testing should take approximately 3 hours, and can be completed across more than one session if your family member tires. Some of the testing may be completed at the Duquesne Speech-Language-Hearing Clinic during regular therapy times.

Next, the trained clinician will begin experimental procedures at the beginning of regularly scheduled therapy sessions. These procedures will not last more than the first 30 minutes of the session, and will occur across 5 total dates. Each ½ hour session will be video recorded for later analysis.

The conversations will be conducted in the clinic, a familiar setting during regular therapy times. No additional traveling will be necessary. The experimental sessions will be scheduled around any other treatment sessions or appointments and can be rescheduled at any time if your family member does not wish to participate on a given day. The experiment will not interfere with any treatment your family member is already receiving.

Total Number of Sessions/Time Requirements for Participant with Aphasia

	Testing/Informed Consent/Secondary Screening	Experimental Sessions	Post-Testing
Person with Aphasia (PWA)	-Verify selection criteria -Informed Consent -Administer RCBA -Secondary Screening _____ **One 1-hour meeting to obtain informed consent at Duquesne Univ. after regular therapy session.** **2 to 3, 1-hour testing sessions at Duquesne University Speech-**	-rating scales -decontextualized task -contextualized task -response accuracy verification _____ **Five 30 minute sessions at the Duquesne UniversitySpeech-Language-Hearing**	-RCBA -WAB _____ **Three 1-hour sessions at Duquesne University during regularly scheduled therapy sessions.**

	Language-HearingClinic during regularly scheduled therapy sessions (no additional time req'd.)		

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 are familiar with and which does not deviate from typical scheduling. This research may also benefit other individuals with aphasia and their families. We will protect your privacy throughout the study.

COSTS
There is no cost to you and your family member for participating in this study.

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, and test scores. 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 upon completion of this research unless you have signed this additional consent form.

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 s/he is entitled even if s/he 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 concerning your rights as a research participant you may contact 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   **Date**
Carey E. Smith B.S.
(C) 412-915-2924

_____   _____

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

Appendix E

Contextual Choice Reading Conversation (Condition B)

Guideline/Checklist

Participant's Code____   Date of Session_____ (#:)
Graduate Student Initials ___   Date of Check _____

Checklist Items	1	2	3	4	5
Presented topic choices to participant					
Introduce topic relevant question					
Repeated question/responses if necessary (no more than 3 times, however)					
Paused for response (5 seconds)					
If intelligible response given, asked a clarifying y/n question.					
Asked follow-up question after confirmed response (after pause)					
Asked clarifying question for partially intelligible responses					
If no response or unintelligible, repeated question with choices and supportive context					
Presented 3-5 choices vertically (large letters)					
Required participant to wait until all options were presented before selecting					
Paused for response (5-10 second)					
Ask y/n clarifier for response to contextual choice					
Asked follow-up question from same topic after confirmed response					
If still no response or unintelligible, asked one more question from same topic (pause).					
If second failure, changed topic					

Appendix F

Family Member Response Verification

Following the CCRC (Condition C) tasks, family members will be asked to verify the

accuracy of the participant's answers on a scale of 3. On this scale, 1 indicates that the

response is "Definitely not accurate"; 2 indicated that the response given is "Likely

accurate"; and 3 indicates that the participant's response is "Definitely accurate".

Please rate your family member's responses to clinician questions:

1= Definitely NOT accurate

2= LIKELY to be accurate

3= DEFINITELY accurate

Conversational Turns	1	2	3
Response 1			
Response 2			
Response 3			
Response 4			
Response 5			
Response 6			
Response 7			
Response 8			
Response 9			
Response 10			

Appendix G

5-Point Rating Scale of Alertness and Attentiveness

Before beginning each experimental session, the family and participant will fill out a rating scale indicating whether it is an excellent day for testing ("5") or a terrible day for testing ("1"). If for any reason (e.g., fatigue, health fluctuation, inattention, etc.) the participant or family member indicates a number less than three (3) on the 5-point scale, testing will be rescheduled for a better day.

  TERRIBLE   EXCELLENT

day for testing   day for testing

             1   2   3   4   5

Appendix H
Clinician Competency Checklist

Administration of Standardized Tests
 ___ Appropriate verbal delivery of test instructions
 ___ Appropriate presentation of test materials
 ___ Appropriate allowance for response time
 ___ Does not provide verbal assistance or specific feedback on performance
 ___ Scores unobtrusively
 ___ Scores accurately

Administration of Traditional Reading Passages
 ___ Appropriate verbal delivery of test instructions
 ___ Appropriate presentation of passages
 ___ Allows appropriate reading time (5-10 minutes)
 ___ Guides client to review and answer questions when necessary
 ___ Does not provide verbal assistance or specific feedback on performance
 ___ Allows appropriate response time (20 seconds)

Administration of Contextual Choice Reading Conversation Task
 ___ Appropriately presents topics for selection (verbal and graphically)
 ___ Asks wh-questions at an appropriate rate
 ___ Asks consecutive wh-questions
 ___ Uses concrete wording for questions
 ___ Allows appropriate time for participant response (20 seconds)
 ___ Rephrases question if necessary
 ___ Provides similar/supportive clarification words
 ___ Gestures/draws to augment comprehension of written choices
 ___ Provides supplemental written input for answer choices (3-5)
 ___ Appropriately directs participants' attention to written choices
 ___ Verbalizes choices *while* writing them
 ___ Asks appropriate questions related to previous participant responses
 ___ Makes participant wait until all options are presented before selecting
 ___ No more than 3 repetitions of response choices per session

Appendix I

DSRT (Condition A) Guidelines/Checklist

Guideline Checklist	1	2	3	4	5
Presented passage to participant					
Provided clear instructions					
Allowed 5 minutes for participant to read					
Guided participant to questions					
Provided instructions for answering questions and indicated that the question would be removed in 3 minutes					
Provided adequate response time					
Did not provide verbal or performance contingent feedback					
Did not assist participant in answering questions					

1. STIMULUS QUESTION?

- **RESPONSE CHOICE 1**

- **RESPONSE CHOICE 2**

- **RESPONSE CHOICE 3**

- **RESPONSE CHOICE 4**

2. STIMULUS QUESTION 2?

- **RESPONSE CHOICE 1**

- **RESPONSE CHOICE 2**

- **RESPONSE CHOICE 3**

- **RESPONSE CHOICE 4**

Appendix K

Interest List for CCRC Topics

The participants of the study will work with a clinician and/or family member to choose a list of 6 topics that they are interested in discussing. Survey results will then be tallied and the 5 most popular responses will be selected for the list of CCRC topics. Subjects will be shown a list of ten (10) topics in large bold font and asked to point to select their choices.

Topic Choices	*# of Votes*
1) Politics	_____
2) Travel	_____
3) Music	_____
4) Hobbies	_____
5) Occupation	_____
6) Leisure	_____
7) Sports	_____
8) Family	_____
9) Current Events	_____
10) Pop Culture	_____

Appendix L

Sample Contextual Choice Reading Conversation (CCRC)

C=clinician

P=participant

----

1) **C:** Hi! How are you today? (presents choices: good, so-so, bad)

    P: [points to good, provides thumbs up]

2) **C:** Great! Here are our topics today: world news (pause), travel

    (pause), family (pause). Which one do you want to talk about?

    P: [points to travel]

3) **C:** Ok! Let's talk about traveling. Where do you like to travel?

    Europe (pause), in the United States (pause), Canada (pause),

    Other (pause). [clinician draws a map as she presents choices]

    P: [points to United States]

4) **C:** Oh, you like to travel around here?

    P: [nods yes]

5) **C:** What part of the United States have you been to? [points to

    west, east, north, south, all]

    P: [makes circle around entire map of U.S.]

6) **C:** I see. You've been everywhere?

    P: [nods yes]