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INVESTIGATING THE EFFECT OF PHOTOGRAPHIC REPRESENTATIONS ON SCORES
OF THE STROKE AND APHASIA QUALITY OF LIFE SCALE-39 FOR PEOPLE WITH
MODERATE TO SEVERE APHASIA

A Thesis

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Arts

in

The Department of Communication Disorders

by
Samantha M. Studrawa
B.A., Louisiana State University, 2012
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LIST OF ACRONYMS

AAC	Alternative and Augmentative Communication
BDAE	Boston Diagnostic Aphasia Evaluation
CVA	Cerebrovascular Accident
IRB	International Review Board
LSU	Louisiana State University
LSU-SLHC	Louisiana State University- Speech, Language, Hearing Clinic
<i>M</i>	Mean
PWA	People with Aphasia
QOL	Quality of Life
RT	Response Time
SAQOL	Stroke and Quality of Life Scale
<i>SD</i>	Standard Deviation
SS-QOL	Stroke Specific Quality of Life Scale
TextPic	Text Plus Photograph Condition
TextOnly	Text Only Condition
VSD	Visual Scene Display

ABSTRACT

Background: The Stroke and Aphasia Quality of Life-39 (SAQOL-39) is a valid and reliable measure of quality of life (QOL) for stroke survivors and people with mild-to-moderate aphasia. However, it could not be validated for people with severe aphasia due to their language deficits. Research has shown that combining pictures with written text can support communication effectiveness of people with aphasia. Combining language modalities in this way is a form of alternative or augmentative communication (AAC). The use of AAC has been explored as a possibility to improve communication for people with severe aphasia (Dietz, McKelvey & Beukelman, 2006).

Aim: This study sought to examine whether photographic representations of the SAQOL-39 would improve self-reported ratings when completed by people with moderate to severe aphasia.

Methods: This study was a prospective, within group design. Four adults with moderate to severe aphasia self-reported their QOL rating through the SAQOL-39. All participants completed the SAQOL-39 in two conditions: written text only, and written-text paired with photographic representations. A 5-point rating scale, derived from the SAQOL-39, was displayed onscreen for participant rating of the degree to which they believed specific aspects of QOL had been impacted by their aphasia. Levels of instruction required to elicit a response were recorded for every item to conclude whether the photographs reduced the amount of researcher cueing required for each item. The mean response time for each item was also recorded.

Results: The method of data analysis was changed secondary to recruitment of only four participants. Results of the Wilcoxon Signed Ranks Test ($\alpha = .05$) showed that the text plus photograph condition compared to the text only condition did not result in QOL rating changes [$Mdn = 0$, $Z = -.66$, $p = .551$]. Likewise, the Wilcoxon Signed Ranks Test ($\alpha = .05$) showed that

the text plus photograph condition compared to the text only condition did not result in faster rating response time [$Mdn = 0$, $Z = -.94$, $p = .348$]. Descriptively, comparison of changes in level of instruction between the two conditions showed no differences either.

Discussion: Further research is encouraged to discover an approach for allowing people with severe receptive aphasia to self-report on their QOL. Replication of this study with a larger sample size is essential to further investigate the effect of using photographic representations of the SAQOL-39 to improve ratings with people with severe receptive aphasia.

INTRODUCTION

Aphasia is an acquired language impairment resulting from a focal brain lesion that alters the usage and comprehension of language (Hilari, Needle & Harrison, 2012; Papathanasiou, Coppens, & Potagas, 2013). Aphasia affects nearly one million people in the United States, and approximately 200,000 Americans acquire aphasia each year (National Aphasia Association, 2011). Communication impairment resulting from aphasia involves multiple modalities and can produce difficulties with speaking, listening, reading and writing (National Aphasia Association, 2011). These communication impairments are also thought to have an effect on the individual's quality of life. Quality of life is defined as an "individuals' perceptions of their position in life in the context of the culture and value systems where they live and in relation to their goals, expectations, standards and concerns" (The WHOQOL Group, 1996, p. 354). Because aphasia affects QOL, it is important that assessment and treatment of people with aphasia (PWA) include personal measures of their aphasia and its impact (Best, Greenwood, Grassly & Hickin, 2008).

The ability of a person with aphasia to accurately complete a QOL assessment may be compromised due to the linguistic processing required (Cruice, Worrall, Hickson & Murison, 2005; Engell, Hütter, Willmes, & Huber, 2003). Completing self-report assessments and evaluations may be challenging for PWA due to their linguistic impairments. Taking this challenge into consideration, Hilari and colleagues (2003) began to modify the Stroke Specific Quality of Life Scale (SS-QOL: Williams, Weinberger, Harris, Clark & Biller, 1999) for PWA. Their work led to the SAQOL, which they validated for individuals with mild and moderate aphasia. However proxy respondents completed the survey for people with severe aphasia (Hilari et al., 2003). The literature has demonstrated that proxy respondents of PWA can report QOL when they are consistently in contact with the person (Cruice et al., 2005). However, in other

areas related to stroke, proxy scores are typically lower than the self-reported scores by PWA with severe impairments. In the case of the SAQOL-39 similar findings were reported (Hilari, Owen, & Farrelly, 2007.) Due to the subjectivity of health-related QOL, self-reporting is preferred over proxy respondents if at all possible (Cruice et al., 2005; Hilari et al., 2007).

Research has shown that visual scene displays (VSDs) presenting rich pictures and written text combined onscreen, increase the number of responses initiated by PWA (Hux, Buechter, Wallace & Weissling, 2010). These rich images “depict situations, places, or experiences in ways that clearly represent relationships and interactions among important people or objects (Hux et al., 2010, p. 644).” VSDs may also reduce the linguistic load for people with aphasia, and aid reading comprehension. This information led to the idea that perhaps photographs that represented the SAQOL-39 items might assist people with more severe aphasia to self-report their QOL.

Photographic representations of the SAQOL-39 were created in the Louisiana State University Communication Outcomes Research Lab (Brouwer, 2013). Two studies were completed to demonstrate preliminary face validity of the photographs by asking groups how well the photographs represented the SAQOL-39 items: first with normal-aging adults (Brouwer, 2013) and second with adults mild-to-moderate aphasia (Heise-Jensen, 2014). Both studies demonstrated that the photographs represented the SAQOL-39 items very well. With face validity established, this study aims to examine whether or not photographic representations of the SAQOL-39 will enable people with moderate to severe aphasia to self-report using the SAQOL-39 better than they would with written text alone.

REVIEW OF THE LITERATURE

What is Aphasia?

As stated earlier, aphasia is an acquired language impairment resulting from a focal brain lesion that alters the usage and comprehension of language (Hilari, et al., 2012; Papathanasiou et al., 2013). Communication impairment resulting from aphasia involves multiple modalities and can produce difficulties with speaking, listening, reading and writing (National Aphasia Association, 2011). People with severe aphasia cannot effectively express their own point of view depending on the degree of their language disability (Hilari & Byng, 2009). People with aphasia often experience deficits in auditory comprehension, articulation, fluency, word finding, repetition, reading disorders, or writing (Goodglass, Kaplan & Barresi, 2001). There are several different types of aphasias, and each comes with their own impairments.

Furthermore, rate and amount of recovery differs for each individual according to period post onset, severity of the disorder and whether or not the person received rehabilitation. However, rehabilitation soon after the insult, can improve the outcome of intervention (Papathanasiou et al., 2013).

The *Boston Aphasia Severity Rating Scale* (Goodglass et al., 2001) profiles speech characteristics into severity levels. Mild aphasia demonstrates slight impairments of speech and language and the individual may have fewer observable difficulties. Mild-to-moderate aphasia involves some dysfluency in the individual's speech and trouble with comprehension; however, they can converse about everyday activities without much support. People with moderate aphasia require more assistance from a communication partner, and exhibit consistent breakdowns in their speech and language. More severe levels involve communication that is broken up into short phrases and requires maximum assistance and probing from a communication partner. The

most severe level of aphasia leaves an individual without functional speech or auditory comprehension (Goodglass et al., 2001).

To reiterate, the severity of language impairment affects QOL in individuals with aphasia (Hilari & Byng, 2009). By considering QOL outcomes during treatment, clinicians can better understand the impact that aphasia has on a client's life. Current practice has changed from "just taking into consideration the views and thoughts of our clients, to putting them in the center of our process" when planning for intervention (Threats, 2012, p.128).

Quality of Life Assessment for People with Aphasia

Cruice, Worrall, Hickson and Murison (2003) completed a review of several studies to determine what was important when considering QOL for people post-stroke. They determined that "physical functioning, emotional health or depression, social functioning, psychological functioning, well-being, communication, autonomy, and relationships" were key components to an individual with aphasia (Cruice et al., 2003, p.335). Others have reported that PWA have reported a considerably lower QOL than those of non-brain-injured adults (Hilari, 2011; Ross & Wertz, 2000).

The ability of a person with aphasia to accurately complete a QOL assessment may be compromised due to the linguistic processing required (Cruice et al., 2005; Engell et al., 2003). People with aphasia who have suffered from a left-middle cerebral artery stroke may demonstrate deficits in any or all language modalities including listening, speaking, reading, and writing (Beeson, Rising, Kim & Rapcsak, 2010). Reading and writing are of particular concern when asking a PWA to complete a survey. For those who cannot understand, read or write well, the alternative is to have proxy respondents, or significant others complete the assessments on behalf of PWA. However, results have shown that QOL assessments are quite subjective, and

proxy respondents may rate PWA more severely than PWA would rate themselves (Cruice et al., 2005; Hilari & Byng, 2009).

Stroke and aphasia-specific QOL assessments. As stated above, completing self-report assessments challenging for PWA due to their communication impairments. Because of their communication impairment, people with severe aphasia are often omitted from stroke outcome studies (Hilari & Byng, 2009). For that reason, limited information regarding QOL for PWA. PWA may struggle to complete self-report assessments due to difficulty comprehending questions, and expressing responses. In such cases it may be necessary to alter test materials to reduce the linguistic complexity (Hilari & Byng, 2001). The *Stroke Specific Quality of Life Scale (SS-QOL)*; Williams et al., 1999) was designed to obtain self-reported QOL ratings from stroke survivors. Next, the *SS-QOL* revised to permit interview-administration for stroke survivors with aphasia (Hilari et al., 2003). After field testing and removal of certain items, the outcome was the *Stroke and Aphasia Quality of Life Scale-39 (SAQOL-39)*; Hilari, 2003). The process used to develop and validate the SAQOL-39 is described next.

The SAQOL-39 includes variations approved by groups of speech and language pathologists with experience in aphasia (Hilari & Byng, 2001). Modifications to the SS-QOL included increasing font size, fewer items presented on each page, administration occurring as an interview, reduction of sentence length, answer format and key words placed in bold (Hilari & Byng, 2001). All of these modifications were completed to reduce the linguistic complexity of the SAQOL-39. Hilari and Byng (2001) explored an easier format for client responses, and their pilot study included 12 PWA. It was determined that the newly adapted QOL assessment would use a “yes-no” response format as no participant rated that layout as most difficult. However, not all participants agreed this was the easiest format to understand (Hilari & Byng, 2001). In an

effort to reduce difficulty, further changes were made, including: rewriting the test items into questions, and removing negation from all test items. Lastly, transitional questions and practice items were inserted between different sections of the test (Hilari & Byng, 2001). Psychometric evaluation of the original SAQOL reduced the item number from 53 to 39. The SAQOL-39 was established as a relevant measure for individuals with mild to moderate aphasia (Hilari et al., 2003).

Limitations of severe aphasia. The SAQOL-39 has yet to show validity or reliability as a measure of QOL for people with severe receptive aphasia (Hilary & Byng, 2009; Hilari et al., 2009; Hilari et al., 2007). Impairments in language comprehension prevent people with severe aphasia from being able to self-report. Consequently, people with severe aphasia are often omitted from QOL stroke studies, and self-report evaluations in a clinical setting (Hilari & Byng, 2009).

Alternative and Augmentative Communication Modifications for People with Aphasia

Alternative and augmentative communication (AAC) often serves as a supplement to improve communication effectiveness in people with severe aphasia (Dietz, McKelvey & Beukelman, 2006). While language impairments are evident in aphasia, visuo-spatial capability is usually maintained. Therefore, visual images represent written information, and reduce the effects of language impairments caused by the disorder. AAC strategies can aid a person with aphasia to achieve their communication desires (Dietz et al., 2006).

Brennan, Worrall and McKenna (2005) conducted a study of 9 individuals with mild to moderately severe aphasia to determine whether or not an “aphasia-friendly” format could improve reading comprehension skills. They investigated a series of modifications, including simplified vocabulary, large print, increased white space, and pictures compared to control

paragraphs without any adjustments. Results showed that reading comprehension improved with all of the manipulations, and were not significantly improved with pictures alone. When all “aphasia-friendly” formats were included, participants’ improvement in reading comprehension was statistically significant (Brennan et al., 2005). Therefore, a combination of adjustments made to written language may reduce the linguistic impairment of aphasia.

Dietz, Hux, McKelvey, Beukelman and Weissling (2009) found that visuographic support provides facilitation for better reading comprehension in some PWA. High-context photographs have also led to improve reading comprehension for some people with non-fluent aphasia (Dietz et al., 2009). Visual scene displays (VSDs), rich pictures and written text combined onscreen, increased the responses initiated by a person with aphasia (Hux et al., 2010). The participant also rated communication as being easier with VSDs, and researchers noted an increased use of pointing and referencing of the visual materials (Hux et al., 2010).

AAC has provided a way for PWA to effectively compensate for acquired language deficits (Beukelman, Fager, Ball & Dietz, 2007). Photographic representations are one AAC option that may reduce the impact of the deficits. Engell and colleagues (2003) found that the use of simple line drawings as a pictorial representation of a German-adapted QOL measure provided a valid and reliable method for assessing QOL for PWA. Dietz and colleagues (2009) argue for the use of high-context photographs to improve reading comprehension for people with non-fluent aphasia. When color is included within AAC, it may assist in perception, processing, and recall of objects (Wilkinson & Jagaroo, 2004). Thus, research has demonstrated that pictures may provide a reference point for past knowledge, recall, or actions that may reduce the load of written language comprehension. These findings served as the impetus for developing the high-context color photographs used in the present study, as described next.

Photographic Representations of the SAQOL-39

Photographic representations of the SAQOL-39 were created for the Louisiana State University Communication Outcomes Research Lab. The photographs aimed to provide representation of the SAQOL-39 items (Brouwer, 2013). Brouwer (2013) completed an expert review of the many photographs taken to find the 42 that best represented the SAQOL-39 items (39 items and 3 practice photos). That corpus of photographs served as the stimuli used to establish the face validity of how well the photographs represented the SAQOL-39 items. The participants of the Brouwer (2013) study consisted of 20 adults who were native English speakers, aged 65-85 years, without any history of stroke, neurological disease, or brain injury, and demonstrated satisfactory vision and hearing. The photographs were presented through a computer task containing a 7-point Likert scale, and the photographs were rated on how well they represented the corresponding SAQOL-39 items (Brouwer, 2013).

Results of the Brouwer (2013) study provided evidence that participants agreed that most photographs depicted the same information as the questions on the SAQOL-39. The overall mean was 6, and all but four photographs received a mean rating of ≥ 6 or higher after rounding (1 = very dissimilar, 4 = somewhat similar, 7 = very similar). Further analysis demonstrated that 37 of the 39 SAQOL-39 items represented were rated a 6 or 7 at least 60% of the time. This study demonstrated that the photographs of the SAQOL-39 items presented with strong face validity when examined by adults without aphasia, however further research was required to know whether or not people with language and cognitive impairments may hinder the practicality of these photographs (Brouwer, 2013). Research has demonstrated that images need to accurately represent the intended script to lower the linguistic demands of the written text and possibly aid PWA (Deroche, 2011).

Photograph validity for mild-to-moderate aphasia. Heise-Jensen (2014) continued investigation of the photograph similarities as judged by adults with mild-to-moderate aphasia. While the overall goal was for these photographs to prove useful with the adults with severe aphasia, validity first needed to be established with the mild-to-moderate severity level. The severity of each participant's aphasia was determined with use of the *Boston Aphasia Severity Rating Scale* (Goodglass et al., 2001). Participants included 9 native English-speaking adults, between the ages of 30-89, who had experienced one or more left hemisphere cerebrovascular accident(s) (CVA) and without history of other neurologic or language impairment (Heise-Jensen, 2014). Heise-Jensen (2014) also suggested that it would be beneficial to use a structured format to cue participants if they needed it during the experiment.

As in Brouwer (2013), results from Heise-Jensen (2014) indicated strong agreement among raters with aphasia that the photographs represented the items very well. Mean rating of similarity between photographs and items was 6.40 out of 7 possible and 92% of the photographs were rated a 6 or 7 at least 60% of the time. Mean response time was also analyzed at the three severity levels included in this study (mild, mild to moderate, moderate). The shortest mean response time was recorded for a participant with mild aphasia. However, the mean response time for the participants with moderate aphasia was shorter than the time recorded for the mild to moderate participants, a possible indication that the pictures helped the person with more severe aphasia. Intra-rater reliability was 93%, indicating that participants were very consistent in their ratings, which lends a measure of confidence in the findings that the photographs represented the SAQOL-39 items well.

Rationale for the proposed study. In summary, the literature supports the need for modifications to allow people with severe aphasia to self-report QOL. Previous studies have

examined AAC as one approach to improving both auditory and reading comprehension for PWA (Dietz et al., 2006; Hux et al., 2010). In an effort to address the need for a QOL measure for people with severe aphasia, high-context color photographs representing the SAQOL-39 items have been developed and validated (Brouwer, 2013; Heise-Jensen, 2014). The next step is to administer to PWA to determine whether or not the photographs assist or augment self-reporting for people with severe aphasia.

Aim of the proposed study. This study aims to establish whether a set of high-context color photographs representing the SAQOL-39 items will help people with moderate to severe aphasia self-report on their QOL. The experimental questions include:

1. Do people with moderate to severe aphasia rate the SAQOL-39 differently in the text only condition compared to the text plus photograph condition?

Based on the literature (Dietz et al., 2006; 2009), I hypothesize that participant ratings on the SAQOL-39 would be lower in the text only condition compared to the text plus photograph condition.

2. Do people with moderate to severe aphasia demonstrate different response times when rating the SAQOL-39 in the text only condition compared to the text plus photograph condition?

Based on the literature (Dietz et al., 2006), I hypothesize that participant response times for SAQOL-39 items would be slower in the text only compared to the text plus photograph condition.

3. Does the level of instruction decrease significantly in the text plus photograph condition compared to the text only condition?

Based on the literature (Brennan et al., 2005; Hux et al., 2010), I hypothesize that participants will require more instruction when rating the SAQOL-39 in the text only condition (i.e. without visual assistance to augment linguistic information) compared to the text plus photograph condition (i.e. visual assistance augments linguistic information).

METHODS

Design

This study was a prospective, within group design. The Louisiana State University Institutional Review Board approved this study. Informed consent was obtained prior to data collection.

Participants

Four adults, aged 40-85 years, with moderate to severe aphasia were recruited. The participants met the following inclusion criteria: (1) between 40-85 years old; (2) native monolingual English speakers; (3) no history of additional neurological or language disorders; (4) had experienced one or more left hemisphere cerebrovascular accident(s) (CVA); (5) displayed moderate to severe aphasia as determined by the *Boston Aphasia Severity Rating Scale* (Goodglass et al., 2001); (6) had adequate hearing ability aided or unaided to follow directions; (7) had adequate vision aided or unaided to read the stimuli, as measured by the *Rosenbaum Pocket Vision Screener* (Rosenbaum, 1982); and (8) were not color-blind (Ishihara, 1917).

Sampling Procedures

Participants were recruited through a convenience sampling method of flyer distribution and word-of-mouth communication. Flyers were distributed at the Louisiana State University Speech, Language, Hearing Clinic, stroke support group facilities, and rehabilitation centers.

Age, language, and medical history data were obtained from a telephone, or face-to-face interview to determine participant eligibility. The study was described to the participants, questions were answered, and informed consent was obtained from all using a Louisiana State University (LSU) IRB-approved consent form.

Due to time constraints, only 4 PWA participated in this study. Participants ranged from 54 to 78 years of age. Of the four participants, three were female and one was male. Two participants demonstrated moderate severity of aphasia, and two participants demonstrated moderate to severe aphasia. Participant demographic information is displayed in Table 1.

Table 1. Participant Demographics

ID #	Age (Years)	Sex	Aphasia Severity
10	54	F	Moderate-Severe
11	78	F	Moderate
16	70	F	Moderate-Severe
17	77	M	Moderate
<i>M</i> age = 69.8 years, <i>SD</i> = 11.1 years			

Screening and Assessment Instruments

Before participants completed the experiment, the following screening assessments were administered: hearing screening, *Rosenbaum Pocket Vision Screener*, and the *Ishihara Color Test*. All screening measures chosen for participants were valid and reliable assessments, and administered by the researcher. Each screener is described next.

Hearing: The researcher administered a hearing screening with an otoscope, and audiometer completed by the researcher. Participants passed the screening aided or unaided at 40dB unilaterally 500, 1000, 2000 & 4000 Hz. Informal observations during unstructured conversation demonstrated participant hearing sufficient to functionally communicate.

Vision: The *Rosenbaum Pocket Vision Screener* (Rosenbaum, 1982) is an assessment tool that evaluates visual acuity through a display card complete with various sizes of letters and numbers. The display card was 14 inches away from each participant's face, and the researcher asked each individual to read the lines on the card out loud. Participants were required to prove 20/100 visual acuity in order to partake in the study.

Color Perception: *Ishihara Color Test* (Ishihara, 1917): The *Ishihara Color Test* is a color perception test. Participants needed to correctly identify five out of six stimuli to pass.

Finally, each participant received an aphasia severity rating using the *Boston Aphasia Severity Rating Scale* a valid and reliable tool used by clinicians and researchers to determine aphasia severity (Goodglass et al., 2001). The *Boston Aphasia Severity Rating Scale* uses a 0-5 rating scale, which rates conversational and expository speech elicited from unstructured discussion and a picture description task. Characteristics judged through the *Boston Aphasia Severity Rating Scale* include: articulation, phrase length, grammar, prosody, paraphasia, word finding, sentence repetition, and auditory comprehension (Goodglass et al., 2001). Individuals were eligible for participation in this study with a severity rating of 0-2 (moderate to severe aphasia). See Table 2.

Table 2. Boston Aphasia Severity Rating Scale Ratings

<i>Boston Aphasia Severity Rating Scale Ratings</i>		
Rating	Aphasia Severity Level	Definition
5	Mild	Minimal discernible speech handicap; the patient may have subjective difficulties that are not obvious to the listener.
4	Mild-to-moderate	Some obvious loss of fluency in speech or facility of comprehension, without significant limitation on ideas expressed or form of expression.
3	Mild-to-moderate	The patient can discuss almost all everyday problems with little or no assistance. Reduction of speech and/or comprehension, however, makes conversation about certain material difficult or impossible.
2	Moderate	Conversation about familiar subjects is possible with help from the listener. There are frequent failures to convey the idea, but the patient shares the burden of communication.
1	Moderate-to-severe	All communication is through fragmentary expression; great need for inference, questioning, and guessing by the listener. The range of information that can be exchanged is limited, and the listener carries the burden of communication.
0	Severe	No usable speech or auditory comprehension.

Materials

SAQOL-39: Written questions were copied into the computer program as they are displayed in the SAQOL-39. There were two sections and rating scales included, and both were taken directly from the SAQOL-39 (Hilari, 2003). The first section of the SAQOL-39 included questions that ask an individual to respond with how much trouble they have with certain activities. The second section of the SAQOL-39 included questions regarding their feelings about their productivity, social life, and family life. The SAQOL-39 items were also represented through photographs taken in the Brouwer (2013) study.

Photographs: The SAQOL-39 written items were represented by digital photographs that were created in the Brouwer study (2013). These photographs were taken using a Nikon D40 digital camera in automatic mode with a Nikon AF-S DX Nikkor 55-200mm lens.

Device: The SAQOL-39 uses a 5-point rating response format (i.e. Likert scale) to obtain participant rating of the degree to which they believe their life is represented by each item for the feelings (1 = Definitely yes, 2 = Mostly yes, 3 = Not sure, 4 = Mostly no, 5 = Definitely no) and trouble (1 = Couldn't do it at all, 2 = A lot of trouble, 3 = Some trouble, 4 = A little trouble, and 5 = No trouble at all) questions. Each rating was assigned a specific color, and highlighted in that color onscreen. Secondary to the limited color options provided in the software, the researcher chose colors different enough to prevent confusion when selecting a response. The rating scale was displayed through E-prime, a computer software program, on a Dell Latitude E5540 laptop computer. The investigator assigned a color to each rating unit and affixed a matching colored sticker on the laptop keyboard. The response format for the trouble questions was: Teal = Couldn't do it at all, Cyan = A lot of trouble, Silver = Some trouble, Lime = A little trouble,

Yellow = No trouble at all. The response format for the feelings questions was: Teal = Definitely yes, Cyan = Mostly yes, Silver = Not sure, Lime = Mostly no, Yellow = Definitely no.

Procedures

After the participants provided informed consent and passed all screening criteria, data collection began. The participant chose the location of the task completion. Participants were required to attend two separate sessions within one week of each other. Both conditions, text only and text plus photograph, were included in each session's task presentation. Participants completed two experiments, one each session, and half of each condition-type was in each. If the test item was presented in text only condition during Experiment A, it was presented as text plus photograph condition in Experiment B. Two participants were administered Experiment A in the first session, and two participants were administered Experiment B in their first session. The remaining experiment was then completed in the second session. The order of the item presentation was randomized across sessions and participants. As in the SAQOL-39, the assessment was administered as an interview.

The participant sat in front of the laptop computer, and the researcher provided an example of the task. Next, the participant completed six practice questions. The researcher consistently reminded the participant that they were rating themselves on each item, and repeatedly explained each rating on the response format scale.

Instructions for the participant were displayed on the computer screen. The directions for this study were adapted from the Brouwer (2013) protocol and SAQOL-39. There were two response formats, depending on the SAQOL-39 item. There was also an introduction slide before each set of questions, as seen in the SAQOL-39 (Hilari, 2003). The introduction slides and question format without photographs were presented as:

A. Introduction Slide I

We would like to know how you are doing with activities or feelings that can sometime
be affected by stroke.

Each question will ask about a specific activity or feeling.

For each question, think about how you have been in the past week.

Press any key to continue.

B. Introduction Slide II

The first set of questions ask about HOW MUCH TROUBLE you have had with DAILY
ACTIVITIES.

Press the key that best describes HOW MUCH TROUBLE you have had with each
activity IN THE PAST WEEK.

Press any key to continue.

C. Trouble Question Format Example

DURING THE PAST WEEK

How much trouble did you have:

Doing daily work around the house?

Press the key that matches the color of your response:

Teal = Couldn't do it at all

Cyan = A lot of trouble

Silver = Some trouble

Lime = A little trouble

Yellow = No trouble at all

Press SPACEBAR to continue.

D. Introduction Slide III

The next part is about PROBLEM or FEELINGS that some people have after their stroke.

Press the key that best describes HOW YOU FELT DURING THE PAST WEEK.

Press any key to continue.

E. Feelings Question Format Example

DURING THE PAST WEEK

Did you:

Have to write things down to remember them?

Press the key that matches the color of your response:

Teal = Definitely yes

Cyan = Mostly yes

Silver = Not sure

Lime = Mostly no

Yellow = Definitely no

Press SPACEBAR to continue.

Six practice problems allowed the participant to become familiar with the computer program, and ensured the researcher that the task instructions were understood. There were three practice problems for the text only condition, and three practice problems for the text plus photograph condition. For the text only condition, each screen consisted of: instructions, the SAQOL-39 written question for each item, and the 5-point rating response format with background colors. For the text plus photograph condition, each screen included: the SAQOL-39 photograph, instructions, the corresponding written question, and the 5-point rating response format. Again, the order in which the items and conditions were arranged was randomized for

each session and participant. After the practice problems were completed, the researcher answered any questions from the participant. Once the participant was ready, the SAQOL-39 test items began. The software program recorded both the participant's rating for each item, and the response time for all 51 questions of the SAQOL-39 (39 items, 6 reliability questions, 6 practice questions). A screenshot of each condition type is provided.

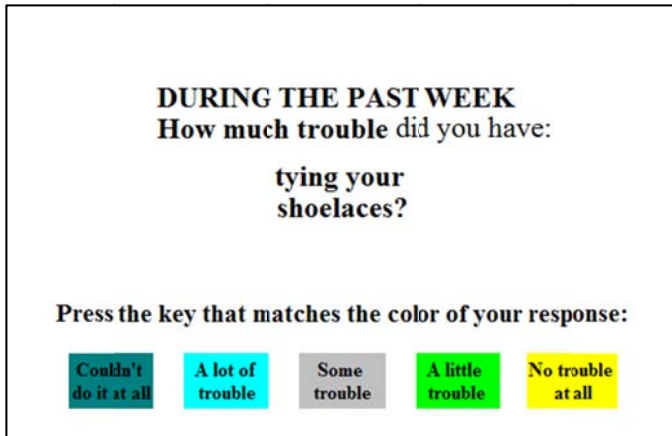


Figure 1. Screenshot of Text-Only Condition

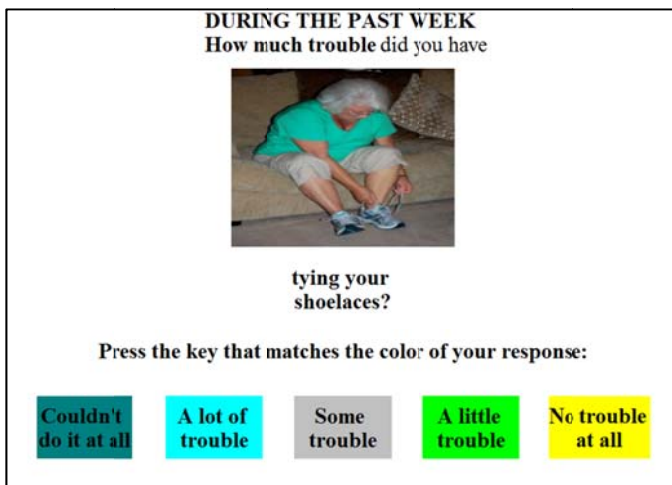


Figure 2. Screenshot of Text plus Photograph Condition

Levels of Instruction: Due to the level of language impairment, it was possible that some participants could have difficulty at some point during test administration. Therefore, the researcher designed and used a five-level cueing hierarchy to highlight possible problem items,

or examine the severity level of each participant and the amount of cueing required. A level of assistance required by the participant was recorded for each item of the SAQOL-39. The hierarchy can be found in Table 3.

Table 3. Levels of Instruction

Levels of Instruction	
Level of Instruction	Definition of Assistance Provided
4	Immediate Response-No Assistance Required
3	Directions Repeated
2	Picture or Written Text Explained Once
1	Picture or Written Text Explained Multiple Times
0	Instruction did not lead to response

Reliability: To determine the inter-rater reliability of aphasia severity, the researcher rated each participant during the initial meeting. Two graduate-level clinicians also rated each individual on severity level without previous knowledge of the participant.

To establish a measure on intra-rater reliability for the SAQOL-39 ratings, three duplicate pairs of items were included in the experimental protocol for each condition, text only and text plus photograph.

Response Time: E-prime software collected rating of response time data automatically.

RESULTS

Non-parametric and descriptive statistics were used to answer the experimental questions due to the limited sample size. A Wilcoxon signed-rank test was completed to compare the two related sample for SAQOL-39 ratings and response time. Further analysis for response time and level of instruction were completed descriptively to investigate possible tendencies. Inter-rater reliability was calculated by three individuals for rater agreement of participants' aphasia severity through the *Boston Aphasia Severity Rating Scale*. Intra-rater reliability was conducted by the repetition of three stimuli pairs per experiment to evaluate consistency of participating ratings.

Question 1

Do people with moderate to severe aphasia rate the SAQOL-39 differently in the text only condition compared to the text plus photograph condition? Using SPSS (v.22), a Shapiro–Wilk test was conducted to determine the normality of the data for both conditions. Results concluded that a normal distribution could not be found for both the text only condition ($W = .811, p < .001$) and text plus photograph condition ($W = .816, p < .001$). The mean rating total was 3.76 ($SD = 1.29$) for the text plus photograph condition. The mean total was 3.83 ($SD = 1.26$) for the text only condition. A summary of the ratings per condition completed by each participant can be found in Table 4.

Nonparametric measures were chosen to analyze the data. The Wilcoxon Signed Ranks test was used to compare two related samples QOL ratings. Results of the Wilcoxon Signed Ranks Test ($\alpha = .05$) showed that the text plus photograph condition compared to the text only condition did not result in a change in QOL ratings [$(Mdn = 0), z = -.66, p = .551$]. See Table 5. In summary, participants rated their QOL the same in both conditions.

Table 4. Summary of SAQOL-39 Response Ratings by Participant ID and Condition

SAQOL-39 Item	10 TextPic	10 TextOnly	11 TextPic	11 TextOnly	16 TextPic	16 TextOnly	17 TextPic	17 TextOnly
1	5	5	3	4	2	4	5	3
2	5	5	4	4	2	5	5	5
3	5	5	3	4	4	5	5	5
4	5	5	4	4	2	3	5	3
5	5	5	4	4	2	4	5	5
6	5	5	5	5	5	5	5	4
7	5	5	4	3	4	4	5	5
8	5	5	4	4	2	5	5	5
9	5	5	4	5	2	5	5	5
10	5	5	3	3	2	4	5	3
11	5	2	4	5	2	4	5	5
12	5	5	4	4	2	1	2	3
13	5	5	5	4	5	5	5	5
14	5	5	5	4	4	5	5	1
15	5	5	3	4	4	2	5	5
16	4	5	4	5	4	1	5	5
17	2	2	4	3	5	3	3	4
18	2	2	5	4	5	2	2	4
19	3	2	3	4	4	2	3	3
20	3	2	3	4	2	5	2	4
21	3	2	4	4	4	4	3	3
22	1	2	2	2	3	4	5	3
23	3	4	2	3	2	5	5	5
24	3	5	2	2	5	2	5	5
25	3	5	2	3	5	5	5	5
26	3	5	2	5	5	5	1	5
27	5	4	1	4	5	4	5	5
28	2	3	2	4	5	5	5	5
29	5	5	3	2	4	5	5	5
30	2	4	5	4	5	4	5	5
31	5	3	4	2	4	2	5	4
32	4	3	2	3	4	4	5	5
33	3	2	3	5	5	5	5	5
34	2	2	3	2	5	5	3	5
35	3	2	2	2	5	5	5	5
36	4	2	2	2	1	2	5	5
37	2	2	2	2	1	5	5	4
38	5	2	2	2	4	1	5	5
39	2	1	2	2	4	2	3	5
TextPic $M = 3.76$ ($SD = 1.29$)								
TextOnly $M = 3.83$ ($SD = 1.26$)								

Table 5. Summary of Wilcoxon Signed Ranks Test for QOL Ratings

		N	Mean Rank	Sum of Ranks	Test Statistic	Asymptotic Significance (2-tailed)
TextOnly- TextPic	Negative Ranks	41*	42.98	1762.00	-.66	.511
	Positive Ranks	46**	44.91	2066.00		
	Ties	69***				
	Total	156				

*TextOnly < TextPic

**TextOnly > TextPic

***TextOnly = TextPic

Question 2

Do people with moderate to severe aphasia demonstrate different response times when rating the SAQOL-39 in the text only condition compared to the text plus photograph condition?

Response time was recorded in milliseconds (ms), and all data were rounded to two decimal places. See Table 6.

Using SPSS (v.22), a Shapiro–Wilk test was conducted to determine the normality of the data for both conditions. In the text plus photograph condition $M = 15453.19$ ms ($SD = 11338.88$ ms). In the text only condition, the mean response time (RT) was 14626.00 ms ($SD = 10638.21$ ms). Results concluded that a normal distribution could not be found for both the text only condition ($W = .882, p < .001$) and text plus photograph condition ($W = .893, p > .001$).

Therefore nonparametric analyses were conducted. The Wilcoxon signed-rank test was used to compare response times for the two experimental conditions. Results of the Wilcoxon Signed Ranks Test ($\alpha = .05$) showed that the text plus photograph condition did not increase RT, as hypothesized, compared to the text only condition [$(Mdn = 0), z = -.94, p = .348$]. See Table 7.

Table 6. Summary of SAQOL-39 Response Times by Participant ID and Condition

SAQOL-39 Item	10 TextPic	10 TextOnly	11 TextPic	11 TextOnly	16 TextPic	16 TextOnly	17 TextPic	17 TextOnly
1	8572	1629	4181	4928	23724	30566	6692	7604
2	3195	1531	4917	7702	14616	19391	5174	5869
3	1589	2658	25769	6354	32884	18113	7730	6753
4	4223	1361	4687	6072	21935	20804	7184	14662
5	2684	1832	9827	15712	26926	17095	6739	12879
6	3527	1667	10692	7916	12891	26953	4764	7974
7	4401	1442	9137	22671	19082	31622	7146	13368
8	1432	5092	7640	12930	17702	18859	16086	8638
9	1834	4744	6541	11599	15180	16732	5456	7348
10	3068	1992	12076	10049	36029	26641	15461	13776
11	2115	19834	24858	13169	27852	24159	9921	12974
12	20673	1532	18276	13474	26620	53105	16849	7107
13	3318	2429	29137	21195	21582	26432	4110	5457
14	1469	4208	9676	15270	30971	22830	12285	10160
15	1192	4119	32315	10234	29676	17168	5029	8377
16	4574	23228	12532	21042	37772	22417	6745	7414
17	8594	19086	7194	5084	19917	21451	10100	8181
18	6458	2638	19810	10747	18362	22974	13277	17658
19	17668	10625	7848	8858	8879	20024	15193	9438
20	24899	19949	12982	15127	7689	35236	28282	9547
21	12922	10313	10523	6558	34718	25147	21574	12777
22	10886	8738	6057	8834	24359	40400	10384	9682
23	27160	12364	6370	9862	25585	23555	7196	10430
24	11870	5267	12928	10399	24845	30959	4684	4475
25	38751	1535	9789	32720	43968	40784	17434	17555
26	12898	1609	12437	8250	34735	10359	15538	7115
27	10135	9040	19326	23759	63574	14599	21034	11985
28	5648	10526	15940	21482	47276	19912	7731	3583
29	1294	10202	50440	24265	19809	13593	12374	9462
30	7272	10238	7274	7976	9696	17040	18246	9000
31	3194	11778	7229	4958	19861	59712	6689	10661
32	8072	19910	8080	19625	24908	41657	5639	5567
33	27980	12609	41411	18341	21529	22849	7103	5144
34	13137	5317	43120	24440	14207	24308	14628	8346
35	11742	6549	15879	3809	16019	31803	17781	15429
36	2531	21706	28262	13201	44555	34381	13701	7716
37	12434	10694	11007	14447	32560	22261	16192	32225
38	6483	8665	13938	12373	21227	52352	11587	8713
39	11887	6750	22991	34627	15527	14382	12835	8517
TextPic $M = 61812.74$ ($SD = 11338.88$)								
TextOnly $M = 58504.00$ ($SD = 10638.21$)								

Table 7. Summary of Wilcoxon Signed Ranks Test for RT

		N	Mean Rank	Sum of Ranks	Test Statistic	Asymptotic Significance (2-tailed)
TextOnly- TextPic	Negative Ranks	84*	79.21	6653.50	-.94	.348
	Positive Ranks	72**	77.67	6692.50		
	Ties	0***				
	Total	156				

*TextOnly < TextPic

**TextOnly > TextPic

***TextOnly = TextPic

Further analysis was done to determine how aphasia severity may have affected RT ratings. Participants with moderate to severe aphasia (Severity Rating 1) had a longer response times in both text plus photograph condition ($M = 17320.87$, $SD = 12982.52$ ms) and text only condition ($M = 17282.45$ ms, $SD = 13016.73$ ms) when compared to the participants with moderate aphasia in text plus photograph condition ($M = 13585.50$ ms, $SD = 9121.25$ ms) and text only condition ($M = 11969.55$, $SD = 6639.32$). Unexpectedly, it appears that for both levels of severity the text plus photograph condition resulted in longer response times than the text only condition. See Table 8.

Table 8. Mean RTs by Aphasia Severity Level

Severity Rating	Aphasia Severity Level	TextPic Mean RT (ms) (SD)	TextOnly Mean RT (ms) (SD)
2 ($n = 2$)	Moderate	13585.50 (9121.25)	11969.55 (6639.32)
1 ($n = 2$)	Moderate-Severe	17320.87 (12982.52)	17282.45 (13016.73)

Question 3

Does the level of instruction required decrease significantly in the text plus photograph condition compared to the text only condition? Ratings ranged from 0 (required most instruction)

to 4 (least instruction). The mean rating, and standard deviation were recorded for the level of instruction required per item across all participants, for both conditions. See Table 9.

Table 9. Mean Level of Instruction Required to Respond to SAQOL-39 Items

SAQOL-39 Item #	TextPic	TextOnly
1	3.75	4.00
2	4.00	3.50
3	3.25	3.75
4	4.00	3.75
5	3.75	4.00
6	4.00	4.00
7	4.00	4.00
8	3.75	4.00
9	4.00	4.00
10	4.00	3.75
11	4.00	3.75
12	4.00	4.00
13	4.00	3.50
14	4.00	4.00
15	3.75	3.75
16	3.00	4.00
17	4.00	3.75
18	3.50	3.25
19	4.00	4.00
20	3.50	3.50
21	3.25	4.00
22	3.50	3.75
23	4.00	4.00
24	4.00	3.25
25	4.00	3.25
26	3.25	4.00
27	3.25	3.50
28	3.50	3.75
29	3.50	4.00
30	3.00	4.00
31	4.00	4.00
32	4.00	4.00
33	3.75	3.50
34	3.50	3.50
35	4.00	4.00
36	3.00	3.75
37	3.50	3.00
38	3.75	4.00
39	4.00	4.00
TextPic $M = 3.72$ ($SD = 0.64$)		
TextOnly $M = 3.78$ ($SD = 0.57$)		

The ratings were then grouped and analyzed by severity level to determine whether there was a pattern between the two. Mean ratings were calculated for each condition-type and each severity level. The mean level of instruction required for the text plus photograph condition was 3.72 ($SD = 0.64$). The mean level of instruction required for the text only condition was 3.78 ($SD = 0.57$). A summary of ratings by condition-type can be found in Table 10. Based on this analysis the text plus picture condition did not reduce level of instruction needed as we had hypothesized. Neither group needed more than instructions repeated to complete the SAQOL-39.

Table 10. Level of Instruction Mean Ratings by Condition Type

Condition Presentation	Mean Level of Instruction (SD)
TextPic	3.72 (0.64)
TextOnly	3.78 (0.57)

For the participants with a moderate aphasia the mean level of instruction was 3.72 ($SD = 0.60$) in the text plus photograph condition and 3.86 ($SD = 0.39$) in the text only condition. For the participants with moderate to severe aphasia the mean level of instruction was 3.72 ($SD = 0.68$) in the text plus photograph condition and 3.71 ($SD = 0.70$) in the text only condition. A summary of ratings by severity level can be found in Table 11.

Table 11. Level of Instruction Mean Ratings by Aphasia Severity Level

Severity Rating	Aphasia Severity Level	Mean Level of Instruction TextPic (SD)	Mean Level of Instruction TextOnly (SD)
2 ($n = 2$)	Moderate	3.72 (0.60)	3.86 (0.39)
1 ($n = 2$)	Moderate-Severe	3.7 (0.68)	3.71 (0.70)

An item-by-item visual examination of level of instruction required was completed to investigate possible tendencies in the data. As a group across all items, the mean level of instruction required was 3.72 for the text plus photograph condition, and 3.78 for the text only condition. Items were examined to see the occurrence of each type of level of instruction required per participant. A level of 3 simply required a repetition of instructions to the participant. A level of 2 or below indicated that the participant required explanation of either the written text or picture on that SAQOL item. A summary of level of instruction required for the text plus photograph condition and text only condition can be found in Table 12 and Table 13, respectively.

Table 12. Summary of Level of Instruction Required in Text Plus Photograph Condition

TextPic	Participant	10	11	16	17
Level of Instruction Required per Session	1	0	0	1	0
	2	1	1	6	5
	3	4	5	1	5
	4	34	33	31	29

Table 13. Summary of Level of Instruction Required in Text Only Condition

TextOnly	Participant	10	11	16	17
Level of Instruction Required per Session	1	0	0	2	0
	2	0	1	5	0
	3	3	4	4	5
	4	36	34	28	34

Reliability

Inter-rater reliability. Inter-rater reliability was established for participants' severity ratings on the *Boston Aphasia Severity Rating Scale*. All raters were graduate-level clinicians, and each person individually ranked severity. Raters agreed on all four participant severity ratings. For this study, a severity rating between 0-2 is considered moderate-severe. Overall inter-rater reliability was calculated to be 100% across all participants as seen in Table 14.

Table 14. Inter-Rater Reliability of Severity Levels

Participant	Rater #1	Rater #2	Rater #3	Percent of Agreement
10	1	1	1	100%
11	2	2	2	100%
16	1	1	1	100%
17	2	2	2	100%
Overall Inter-Rater Reliability				100%

Intra-rater reliability. Three SAQOL-39 items per experiment were repeated in order to determine how consistently each participant was rating the assessment in each experiment. On SAQOL-39 item 1 in text only condition, intra-rater agreement was 100%. On SAQOL-39 item 1 in text plus photograph condition, intra-rater agreement was 75%. On SAQOL-39 item 6 in text only condition, intra-rater agreement was 75%. On SAQOL-39 item 6 in text plus photograph condition, intra-rater agreement was 100%. On SAQOL-39 item 17 in text only condition, agreement was 75%. On SAQOL-39 item 17 in text plus photograph condition, intra-rater agreement was 75%. Overall intra-rater reliability was 83.33% across participants. A summary of participants rating consistency can be found in Table 15.

Table 15. Summary of Reliability Items by Participant and Item

SAQOL-39 Item	Participant 10	Participant 11	Participant 16	Participant 17
Item 1 TextPic	+	+	-3	+
Item 1 TextOnly	+	+	+	+
Item 6 TextPic	+	+	+	+
Item 6 TextOnly	+	+	-4	+
Item 17 TextPic	+	+	-2	+
Item 17 Text Only	+	+	-2	+
Overall Intra-Rater Reliability				20/24 83.33%

DISCUSSION

This study aimed to establish whether a set of high-context photographs representing the SAQOL-39 items with proven content validity (Brouwer, 2013; Heise-Jensen, 2014) would help people with moderate to severe aphasia to self-report on their QOL. However, the sample size was extremely small. Therefore, the study should be replicated with a larger sample size.

Summary of Results

Results from this study indicate that this set of high-context photographs representing the SAQOL-39 items (Brouwer, 2013) did not increase self-reported ratings for four participants. The overall mean rating for the text plus photograph condition across all participants was 3.76 ($SD = 1.29$). The overall mean rating for the text only condition across all participants was 3.83 ($SD = 1.26$). Both means suggest that participants did not indicate any difficulty with completing the task in either condition. The two subsequent sections will outline and discuss the findings gathered regarding the initial experimental questions presented, their hypotheses, and the relationship to the literature considering the use of high-context photographs to reduce the linguistic complexity of a task and people with aphasia.

Question 1. The first experimental question asked in this study looked to answer whether people with moderate to severe aphasia rate the SAQOL-39 differently in the text only condition compared to the text plus photograph condition. This study's hypothesis was that participant ratings would be higher when high-context photographs were paired with each written statement of the SAQOL-39 because they would help the participants comprehend the written statements better. Previous research showed that the use of AAC may reduce the effect of a language disorder, and may improve communication effectiveness in people with severe aphasia (Dietz et al., 2006; 2009). Results determined from this study did not support this finding in that the

participants did not rate the SAQOL-39 differently when the high-context photographs were presented. However, in retrospect, it is possible that participants understood the statements in both conditions and simply rated their QOL accordingly.

In Brennan, Worrall and McKenna (2005), an “aphasia-friendly” format, or combination of several adjustments made to written language, resulted in significant improvement in reading comprehension for 9 individuals with mild to moderately severe aphasia. Many of these characteristics were similarly involved in this study as well. Protocol included an enlarged print, increased white space, and pictures added alongside text onscreen. However, these features did not appear to improve performance, as overall mean ratings were almost indistinguishable between the two conditions presented.

Question 2. The second question sought to determine whether the text plus photograph condition improved RT compared to the text only condition. Mean RT was also calculated for each item in both conditions for all participants. As seen in the response ratings, the mean response times for the text plus photograph condition ($M = 15453.19\text{ms}$, $SD = 11338.88\text{ ms}$) and the text only condition ($M = 14626.00\text{ ms}$, $SD = 10638.21\text{ ms}$) were not significantly different across all participants. Unexpectedly, the text only response times were faster than the text plus photograph responses. While this finding goes counter to the hypothesized outcome, one reason for the results could be that participants were not using the photographs to augment text comprehension. A second reason is that for the participants having difficulty with text comprehension, the photographs might have distracted rather than assisted participants. While the difference between the two conditions is negligible, a difference was noted when response times were compared by aphasia severity. In that case, RT measures for the two participants with moderate to severe aphasia were slower than those for the two with moderate aphasia severity in

both text plus photograph and text only conditions. It may be that people with moderate aphasia are more receptive to linguistic information from visual graphics than those with moderate to severe aphasia.

Question 3. The third experimental question asked in this study was whether the level of instruction would decrease significantly in the text plus photograph condition compared to the text only condition. Previous literature (Brennan et al., 2005; Hux et al., 2010) presented that visual scene displays (VSDs) that utilize both rich pictures and written text combined onscreen may lighten the linguistic load for people with aphasia, possibly aiding reading comprehension. Therefore, this study's hypothesis was that participants would require more instruction when rating the SAQOL-39 without the high-context photographs due to the lack of visual aids that would reduce the linguistic complexity of the task. Results indicated that the level of instruction required did not have a substantial difference.

The mean level of instruction required for the text plus photograph condition was 3.72 ($SD = 0.64$). Based on these results, the text plus photograph condition did not reduce level of instruction needed as we had originally hypothesized. The mean level of instruction required for the text only condition was 3.78 ($SD = 0.57$). On average, this group did not need more than instructions repeated to complete the SAQOL-39. The level of instruction required was also examined by aphasia severity level; nonetheless again, the results demonstrated that there was no meaningful difference between the conditions for either severity level. For levels of instruction results were similar. Those with moderate aphasia ($M = 3.72$ for TextPic, $M = 3.86$ for TextOnly), and those with moderate to severe aphasia ($M = 3.72$ for TextPic, $M = 3.71$ for TextOnly) required about the same level of instruction in both conditions. These results indicate that that participants did not rely on the researcher more when the text was presented alone, as

had been hypothesized. Conversely, the photographs did not reduce the amount of instruction needed, although none of the participants needed much instruction to complete this task in either condition. This could be secondary to the fact that participants understood the task due to its simplicity. Since each item had a similar response format, the participants might not have needed instructions repeated to them. It may also be that participants did not utilize the photographs, and relied on the written text, which appeared in both conditions. Since the text was always presented, participants may have been reading the text in both conditions without using the photographs. It is also possible that providing both photographs and written statements onscreen resulted in multiple systems being engaged, and this provided more difficulty for these participants.

As the experiment permitted six practice questions, three in each condition, before recording the SAQOL-39 assessment, the researcher felt confident that participants understood the instructions of the task. Repetition of instructions was the most frequently used level of instruction when a participant did not press a key. All participants verbally stated their response while pressing a key during the sessions. However, at some point each participant required a reminder to press the key and not just state his or her response. Explaining either the written text or picture was the next most often used level of instruction. In these cases the researcher to explained how the specific item (i.e. How much trouble do you have speaking?) related to the response options. The participants asked the researcher to explain what a certain response type would look like. For example, if the SAQOL item was “How much trouble do you have speaking,” the participants would frequently state how often per week they experienced the difficulty and asked which response option was appropriate. The majority of the questions from participants were defining the response options, and not confusion about what the SAQOL item

was describing. Only Participant 16, with moderate to severe aphasia, required the examiner to explain the written text or picture more than once before generating a response. Another issue encountered when the participants were answering the SAQOL items included statements that contained the words “less often,” specifically in Item 36, and Item 37. Two participants stated that they see their friends, and needed clarification on what “less often” meant. The semantic complexity of these SAQOL items proved difficult for those two participants. However, for the majority of the items, participants did not ask the researcher for clarification on written text or photographs. This is not to say that the participants did not need clarification, only that they did not make a request.

Reliability. The reliability of the SAQOL-39 has yet to be proven for people with severe receptive aphasia (Hilari et al., 2009; Hilari et al., 2007). Results from reliability measures calculated in this study for one participant support the idea from previous research regarding a lack of consistency in their responses. Intra-rater reliability for Participant 16, with moderate to severe aphasia, proved to be poor. Of the six reliability items taken from their sessions, Participant 16 reliably answered on two items (33.33% reliability). Their rating response differed by 3 points, 4 points, 2 points, and 2 points on the other four reliability items. Participant 16 also required the most instruction regarding the SAQOL-39 items. There were several questions in which they did not understand a word used in the written statement. This outcome may indicate that the written statements of the SAQOL-39 were too linguistically complex for Participant 16. This finding corresponds with findings that people with a severe receptive aphasia cannot reliably report on their QOL (Hilari et al., 2007). The three remaining participants were 100% reliable.

Study Limitations

This study was limited by a small sample size. Nonparametric statistical analysis was completed due to a lack of normal distribution of the data. Therefore, these results should be considered descriptive only. However the study will be replicated in the near future. Although we aimed to recruit individuals with a range from moderate to severe aphasia, no individuals with severe aphasia volunteered to participate. Even recruiting individuals with moderate to severe aphasia proved challenging. Perhaps because of comprehension deficits several people were hesitant to participant. All participants were recruited from the LSU Speech Language Hearing Clinic, although outpatient settings, local speech and language clinics, and former participants were contacted.

Future Research

Further research is essential to discover an approach that will allow people with severe receptive aphasia to self-report on their QOL. The most important next step is replicating the study with a larger sample size. One possible alternative may be to remove the written statement from the screen when the photograph is presented. If the written statements were more comfortable for the participants to read, it may be a better indicator of the effectiveness of these photographs. This would also ensure that the individuals would be utilizing the photographs, rather than reading the text displayed. It may be beneficial to establish more of a conversation between the PWA and the interviewer than used in this study. Although Hilari (2003) states the SAQOL may be administered in an interview format, limited instructions are given on the parameters administrators should use to obtain ratings. Cues provided in the manual to prompt an individual when confusion arises did not seem to provide clarification for these participants. Discussion format could allow the interviewer more insight into what the PWA understands.

Furthermore, it could give the interviewer a way to clarify or confirm the PWA's intent. By describing their opinions, it might ensure that the appropriate response rating was chosen.

All participants demonstrated some level of confusion about the options for response ratings. The definition for "some trouble" and "not sure" were specifically asked about frequently during the practice problems. Further research into providing clearer definitions of these responses, and how to describe them to participants could improve self-reporting. Or a different rating scale could be developed that is more user friendly. In addition, if the interviewer receives a description of the PWA's thoughts on the SAQOL-39 item rather than just a score, it could increase the reliability of the response ratings. If the PWA is simply asked to describe how they feel about an item, then the interviewer can repeat back to them with a response rating chosen. For example, if the question was "How much trouble do you have getting dressed," and the PWA responded "it happens once or twice a week," the interviewer could discuss in depth the response ratings possible to choose. This would eliminate the need for the PWA to process the question, think about their opinion, and then have to choose a response rating. If the interviewer could judge their response and choose a rating, this may increase reliability of people with aphasia because the linguistic task is reduced. However, by allowing the interviewer to pick a response rating, this eliminates the PWA from being the individual actually reporting the rating.

Research should continue to examine the utility of AAC for people with aphasia. If a researcher could discuss the QOL item while the PWA was looking at a high-context photograph, it might be easier for them to comprehend. By combining visual and verbal stimuli, with discussion of each item rather than answering questions more complex linguistically, people with severe aphasia may be able to self-report QOL.

Conclusion

This study based on small sample found that photographic representations of SAQOL-39 questions (Brouwer, 2013) did not improve response ratings among a sample of adults with moderate to severe aphasia. While previous research studies demonstrated content validity of these photographs (Brouwer, 2013; Heise-Jensen, 2014), this study did not show an effect on the response ratings when comparing the text plus photograph condition to the text only condition. With further research, people with severe aphasia may be able to independently report on QOL. More cueing and information provided by an interviewer, or a change in AAC stimuli presentation may positively impact the reliability of response ratings by people with severe aphasia on the SAQOL-39. Improving QOL continues to be an important treatment outcome for speech-language pathologists in clinical practice. Gaining access to these ratings would better allow SLP's to incorporate QOL into intervention goals and purposes.

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APPENDIX A: IRB APPROVAL

ACTION ON PROTOCOL APPROVAL REQUEST



Institutional Review Board
Dr. Dennis Landin, Chair
130 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.5983
irb@lsu.edu | lsu.edu/irb

TO: Neila Donovan
COMD

FROM: Dennis Landin
Chair, Institutional Review Board

DATE: October 15, 2014

RE: IRB# 3551

TITLE: Investigating the Effect of Photographic Representations on Scores of the Stroke and Aphasia Quality of Life Scale-39 for People with Moderate to Severe Aphasia

New Protocol/Modification/Continuation: New Protocol

Review type: Full Expedited **Review date:** 10/14/2014

Risk Factor: Minimal Uncertain Greater Than Minimal

Approved **Disapproved**

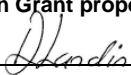
Approval Date: 10/14/2014 **Approval Expiration Date:** 10/13/2015

Re-review frequency: (annual unless otherwise stated)

Number of subjects approved: 15

LSU Proposal Number (if applicable): _____

Protocol Matches Scope of Work in Grant proposal: (if applicable) _____

By: Dennis Landin, Chairman 

PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –
Continuing approval is CONDITIONAL on:

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants, including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. SPECIAL NOTE:

**All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at <http://www.lsu.edu/irb>*

APPENDIX B: CONSENT FORM

IRB# 3551

Consent Form

Project Title: Investigating the Effect of Photographic Representations on Scores of the Stroke and Aphasia Quality of Life Scale-39 for People with Moderate to Severe Aphasia

Performance Site: LSU Speech, Language, and Hearing Clinic; Communication Outcomes Research Lab; in the participant's home; or a location in the community chosen by the participant

Investigators: The following investigators are available for questions, Monday-Friday 8:00 a.m.-4:30 p.m. |

Samantha Studrawa

Nella Donovan, Ph.D., CCC-SLP

Department of Communication Disorders, LSU

Department of Communication Disorders, LSU

(225) 772-8931

(225)578-3938

Purpose of the Study: To answer a question. Do pictures help people with aphasia take a test?

Inclusion Criteria: Persons with moderate to severe aphasia from stroke. They speak English only. They are 40 – 85 years old. They can see and hear enough to be in the study.

Exclusion Criteria: No past problems with brain or speech. Not pregnant.

Description of the Study: There are two parts to the study. You will take Part 1. 7 days later, you will take Part 2. In Part 1 you will answer questions about your life now. In Part 2 you will see pictures and answer questions about your life now. Each part will take about 1 hour.

Benefits: Your answers will help us make better tests.

Risks: This study will not hurt you. This study will not cause you problems later.

Right to Refuse: You can stop the study any time you want. That is not a problem for us or you.

IRB# 3551

Privacy: We keep your information secret. Your name is given a code. We only use the code. Nobody sees any information except me and my helpers. We lock everything up 2 times. We store results on a computer. The computer has a password. We do not use your name when we write reports.

Financial Information: This study is free. You do not pay us. Also, we do not pay you.

I. Signature for participant who can read the consent form: I agree to be in this study. The researcher reviewed this form with me. She told me all about this study. She answered all of my questions. I can call Samantha Studrawa or Dr. Neila Donovan, 225-578-3938 if I have other questions. I may call Dennis Landin, Chairman, Institutional Review Board, at (225)578-8692 or email irb@lsu.edu if I have any problems with the study. I agree to be in the study described. I know I get a copy of this form after I sign it. I agree to participate in the study described above and acknowledge the researchers' obligation to provide me with a copy of this consent form if signed by me.

Signature of Participant

Date

II. Signature for participant who cannot read: The participant has indicated to me that he/she is unable to read the informed consent form. I certify that I have read the consent form to the participant. I explained that by signing below they have agreed to participate in the study.

Signature of Reader

Date

APPENDIX C: SAQOL-39 ITEMS

(Hilari et al., 2003)

SAQOL-39 Item	Text
1	How much trouble did you have preparing food?
2	How much trouble did you have getting dressed?
3	How much trouble did you have taking a bath or shower?
4	How much trouble did you have walking?
5	How much trouble did you have keeping your balance when bending over or reaching?
6	How much trouble did you have climbing stairs?
7	How much trouble did you have walking without stopping to rest? Or using a wheelchair without stopping to rest?
8	How much trouble did you have standing?
9	How much trouble did you have getting out of a chair?
10	How much trouble did you have doing daily work around the house?
11	How much trouble did you have finishing jobs that you started?
12	How much trouble did you have writing or typing?
13	How much trouble did you have putting on socks?
14	How much trouble did you have doing buttons?
15	How much trouble did you have doing a zip?
16	How much trouble did you have opening a jar?
17	How much trouble did you have speaking?
18	How much trouble did you have speaking clearly enough to use the telephone?
19	How much trouble did you have getting other people to understand you?
20	How much trouble did you have finding the word you wanted to say?
21	How much trouble did you have getting other people to understand you even when you repeated yourself?
22	Did you have to write things down to remember them?
23	Did you find it hard to make decisions?
24	Did you feel irritable?
25	Did you feel that your personality has changed?
26	Did you feel discouraged about your future?
27	Did you have no interest in other people or activities?
28	Did you feel withdrawn from other people?
29	Did you have little confidence in yourself?
30	Did you feel tired most of the time?
31	Did you have to stop and rest often during the day?
32	Did you feel too tired to do what you wanted to do?
33	Did you feel that you were a burden to your family?
34	Did you feel that your language problems interfered with your family life?
35	Did you go out less often than you would like?
36	Did you do your hobbies and recreation less often than you would like?
37	Did you see your friends less often than you would like?
38	Did you feel that your physical condition interfered with your social life?
39	Did you feel that your language problems interfered with your social life?

VITA

Samantha Marie Studrawa first attended Louisiana State University where she earned her Bachelor of Arts degree in Communication Disorders in December 2012. She began her Master of Arts degree in August 2013 at Louisiana State University and will graduate in May 2015. Her thesis was completed under the guidance of Dr. Neila J. Donovan. Upon graduation, Samantha plans to work as a clinical fellow speech-language pathologist in a medical setting with a special interest in treating stroke and traumatic brain injury patients.