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# ASSESSING CANDIDACY FOR INTENSIVE LANGUAGE THERAPY: A PRELIMINARY STUDY

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# ASSESSING CANDIDACY FOR INTENSIVE LANGUAGE THERAPY: A PRELIMINARY STUDY

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THESIS

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A thesis submitted in partial fulfillment of the requirements for the degree of Master of Communication Sciences and Disorders in the College of Health Sciences at the University of Kentucky

By

Jessica Bellamy

Lexington, Kentucky

Director: Dr. Robert Marshall, PhD

Lexington, Kentucky

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Abstract of Thesis

# ASSESSING CANDIDACY FOR INTENSIVE LANGUAGE THERAPY: A PRELIMINARY STUDY

The goal of the present study was to examine changes in the speech and language performance of patients with chronic, non-fluent aphasia over the course of a three-hour group speech and language treatment session, a time allotment comparable to intensive therapy practices. Nine participants, (three groups of three), with chronic, non-fluent aphasia were seen for a single group therapy session three hours in length. Therapeutic activities were designed to be as similar as possible for each group of participants. Each participant was individually assessed before (time 1), during (time 2), and after (time 3) the group treatment session. Assessments included four verbal tests: function, naming, sentence completion, and repetition, similar to those used with the Porch Index of Communicative Ability (PICA; Porch, 1981). Results indicated that participants performed significantly poorer on two of the four verbal tests (naming and repetition), and on an overall measure of verbal communication on the Time 2 assessment as compared to the Time 1 assessment. Findings have clinical implications for selecting candidates for intensive language therapy regimes.

KEYWORDS: aphasia, intensity, language therapy, group therapy, candidacy

Jessica N. Bellamy
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# ASSESSING CANDIDACY FOR INTENSIVE LANGUAGE THERAPY: A PRELIMINARY STUDY

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## Chapter 1: Introduction

### *Background*

Aphasia is an acquired language disorder that occurs in adults following focal brain damage, typically to the language dominant hemisphere (Brookshire, 2007; Holland, Fromm, DeRuyter, & Stein, 1996). Although aphasia can result from gunshot wounds, brain tumors, and other insults to areas of the brain concerned with language processing, the most frequent cause is stroke. According to the American Heart Association, stroke is the third leading cause of death in the United States and a major cause of long-term disability. The National Institute on Neurological Disorders and Stroke (1990) estimates that about 500,000 people have strokes each year, resulting in 80,000 new cases of aphasia. The National Aphasia Association has estimated that there are over one million Americans who have aphasia.

People with aphasia typically receive speech and language therapy from speech-language pathologists. Speech-language pathologists' major responsibility is to help individuals with aphasia regain as much of their language skills as possible (Rosenbek, LaPointe, & Wertz, 1989). In some instances this is accomplished through individual and/or group treatment specifically addressing the patient's communication needs. In other cases, treatment may focus on helping family members and other caregivers communicate effectively with the patient.

Until the latter portion of the 20th century, stroke survivors with aphasia usually received speech and language therapy until they ceased to make documentable functional progress. Typically, treatment was given throughout the patient's rehabilitation course (in the acute care hospital, the rehabilitation hospital, and on an outpatient basis). Treatment

sessions were usually one hour in length. In the early stages of treatment, patients were often treated 3-5 times per week. As their progress slowed, the frequency of treatment was systematically reduced until the patient was finally discharged.

## Statement of the Problem

For many years, Americans have spent more on health care than any other nation (DeLew, Greenberg, & Kinchen, 1992). As costs of health care have increased, Congress, health care specialists, and various policy-makers have enacted legislation to ration care to reduce its costs. A non-inclusive list of some of these actions include use of Prospective Payment Systems (PPS) for rehabilitation facilities (Batavia & DeJong, 1988), limiting payments for rehabilitation services for specific function related groups (FRGs; Stineman, Escarce et al. 1994; Stineman, Hamilton et al., 1994), clumping funds for rehabilitation to be shared by multiple rehabilitation providers (Busch, 1993), use of salary equivalency figures to establish reasonable cost for rehabilitation services (Zarella, 1995), and the recent Affordable Care Act.

Speech-language pathologists, patients with aphasia, and their families have been affected by actions specifically intended to control health care costs. For example, for several years, a cap (currently $1920) has been placed on the funds that can be spent to provide a patient with physical and speech and language services. The result of this is that many patients with chronic disablements can only be seen for a few treatment sessions in the course of each calendar year, and physical and speech-language therapists are forced to compete for treatment hours. Each year since the imposing of the cap, the American Physical Therapy Association (APTA) and the American Speech-Language-Hearing Association (ASHA) have petitioned Medicare directly and to Congress, indirectly, to

have the cap lifted in order to provide necessary treatment to patients with aphasia and concomitant disabilities.

Given that outpatient treatment for patients with aphasia is rationed, it is somewhat paradoxical that aphasiologists are advocating patients with chronic aphasia be seen for three-hour treatment sessions to provide them with "intensive language therapy." Specific information on intensive language therapy and empirical support for it will be presented in Chapter 2. The point to be made here, and the impetus for this study, is that it is unlikely that a treatment that increases costs will be supported by government policy makers in the absence of any information about patients who are and are not candidates for it.

Accordingly, the goal of the present study was to examine changes in the speech and language performance of patients with chronic, non-fluent aphasia over the course of a three-hour speech and language treatment session, a session length equivalent to that used in intensive language therapy programs.

## Chapter 2: Review of the Literature

This chapter summarizes: 1) how people with aphasia have been treated in the past and how they are treated now, 2) highlights concerns of aphasiologists and researchers for treatment of individuals with chronic aphasia, 3) presents some of the options for treatment of persons with chronic aphasia, 4) reviews information on a recently empirically-based treatment for chronic aphasia called intensive language therapy, and 5) offers brief rationale for the present study.

### *Aphasia Treatment: Past and Present*

Lyon (1998) pointed out that, in the past, stroke survivors with aphasia were (a) taken to the emergency room of the hospital in the initial hours after onset to identify the nature of the medical problem and stabilize vital functions; (b) sent to a medical ward for 10-14 days to ensure the precise cause of the stroke, restore vital life functions, reduce the risk of further injury, and establish a rehabilitation plan, and (c) ultimately transferred from the acute care hospital to a rehabilitation unit where they were treated by a multidisciplinary team of specialists who worked together for 2-12 weeks to restore impaired functions of daily life (e.g., talking, walking, eating, personal hygiene, and dressing). Patients with restored functional abilities, but still in need of speech and language therapy were then discharged home and, if recommended by the therapist, returned to the hospital on an outpatient basis for treatment. Those unable to go home were discharged to long term or residential care facilities for additional rehabilitation in the hopes of improving their condition so as to be able to live in the least-restrictive setting possible. This was the basic approach to aphasia rehabilitation from approximately 1965 to 1985, referred to by Lyon (1998) as “the road of the past.” There

were few worries about the cost of aphasia therapy and clinicians treated patients with aphasia as frequently, and as long as needed, so long as treatment benefits could be documented.

Present day aphasia treatment practices differ markedly from those of the past. Since 1985, concern for sky-rocketing health care costs, growth of managed care, passing of the Balanced Budget Act, and other legislation affecting health care have led in a rationing of medical care in general, and rehabilitation services specifically. These factors are interactive and complex; a discussion of the intricacies of the U.S. health care system is beyond the scope of this paper. It is important to note, however, that because aphasia rehabilitation is a part of medical care, it is a service that is now provided far less frequently, and for a much shorter duration, than in previous years. Lyon's (1998) conceptualization of the present day situation suggested aphasia treatment services have been reduced across the rehabilitation continuum. While stroke victims continue to make a "brief stop" in the ER, their length of stays (LOS) on medical and/or neurology wards are substantially shorter (3-7 days versus 10-14 days). The result of earlier discharges from the acute care hospital creates a situation where some patients are discharged to rehabilitation hospitals before they have recovered sufficiently to participate in a full-scale therapy regime. Thus, if it is discovered that a patient is unable to meet the minimum standard, ability to participate in 3 hours of treatment per day, he or she is sent to a skilled nursing facility (SNF) for treatment at a level commensurate with their physical and mental status. Those patients not in need of a full range of rehabilitation services (occupational, physical, and speech therapy) may be discharged home from the acute care hospital. This is particularly likely to happen for patients with Wernicke's

aphasia (Marshall, 2008) who rarely have physical disablements. Two other major changes in aphasia rehabilitation from the past to the present are that stroke survivors' LOS in the rehabilitation hospital are markedly shorter (2-4 weeks versus 2-12 weeks) and that outpatient treatment after the patient leaves the protective confines of the hospital and when the aphasia becomes chronic, has been dramatically curtailed (Lyon, 1998).

### *Concerns for Treatment of Persons with Chronic Aphasia*

While opinions vary, most would agree that aphasia has become chronic when it becomes obvious that the person will need to live with this disorder and cope with it as well as possible for the rest of their life. While efforts to minimize health care costs have resulted in a rationing of speech and language treatment for all patients with aphasia, those with chronic aphasia have been most affected by these practices. Presently, the pool of money to fund outpatient speech and language treatment services is shared with Physical Therapy (PT). Reportedly, P.T. uses approximately two thirds of the benefits (T. Stratton, personal communication). On the average, a Medicare patient with chronic aphasia in need of outpatient speech and language therapy receives approximately 8 treatment sessions per calendar year unless he or she has supplemental insurance. If one has purchased supplemental coverage, more visits may be allowed, but only if deemed to be medically necessary by the payer. In either case, speech-language pathologists must obtain approval for outpatient speech and language therapy sessions for most clients with chronic aphasia. To provide these services without prior approval puts the therapist and their employing organization at risk for the services not being funded.

Limited funding of treatment of persons with chronic aphasia is unfortunate for several reasons. First of all, there are a significant number of people with chronic aphasia. The National Institute of Deafness and other Communication Disorders (1999) has estimated that approximately one million people in the United States have chronic aphasia. These numbers are likely to increase as advances in medical care continue to improve stroke survival rates (Mlcoch & Metter, 2008). Moreover, the World Health Organization (WHO; 2001) considers aphasia as a chronic, long-term disease and has recognized the need to support people with aphasia throughout their lifespans. Secondly, failure to provide funds for treatment of those with chronic aphasia withholds speech and language therapy at a time when it is needed most and likely to be beneficial. In this respect, many clinicians have argued that aphasia rehabilitation cannot really start in earnest until the patient's medical condition has stabilized, spontaneous recovery has ended, and the patient is ready for goal-directed treatment (Brookshire, 2007; Holland & Frederickson, 2001; Marshall, 1997; van Harskamp & Visch-Brink, 1991; Wepman, 1972). One study has shown that many stroke patients with aphasia are unable to participate in a full-scale treatment program as late as four weeks post onset (Legh-Smith, Denis, Enderby, Wade, & Langton-Hewer, 1987). This suggests treating aphasia in the chronic state when the permanent problem is known may actually be preferable to earlier treatment because the patient is in a better condition to benefit from it. Finally, much aphasia research shows that individuals with chronic aphasia benefit from speech and language therapy, (Aten, Caligiuri, & Holland, 1983; Bollinger, Musson, & Holland, 1993; Brindley, Copland, Demain, & Martyn, 1989; Broida, 1977; Code, Torney, Guldea-Howardine, & Willmes, 2010; Elman & Burnstein-Ellis, 1999; Hagan, 1973;

Hanson & Cicciarelli, 1978; Hanson, Metter, & Riege, 1989; Hinckley & Craig, 1998; Katz & Wertz, 1997) as do several recent meta-analyses (Beeson & Robey, 2006; Robey, 1994, 1998; Robey, Schultz, Crawford, & Sinner, 1999). Restricting treatment of chronic aphasia in light of this empirical evidence has created a situation for clinicians that Rogers and colleagues have described as "enigmatic" (Rogers, Alarcon, & Olswang).

### *Options for Treatment of Chronic Aphasia*

Some options exist for individuals with chronic aphasia when funds to pay for it by third party payers are no longer available. One is for the patient to pay for treatment out of pocket. Some individuals do this, but most do not. Outpatient aphasia treatment, particularly from a health care organization, is just too expensive. For example, an hour of outpatient aphasia treatment at the University of Kentucky Medical Center is currently billed at a cost of $315 (S. Campbell, personal communication, 2013). In some cases, patients with chronic aphasia can receive speech and language therapy within health care systems that are relatively free from the constraints of managed care. For example, eligible veterans receive aphasia therapy at little-to-no cost from aphasia clinicians employed by the Department of Veterans Affairs Health Care System (Marshall, Golper, Boysen, & Katz, 2009). Similarly, some patients with chronic aphasia are treated at a reduced cost by free-standing, non-profit community clinics such as the Aphasia Center of California (www.aphasiacenter.net) and the Adler Center for Aphasia in New Jersey (www.adleraphasiacenter.org). Other patients, motivated to pursue treatment after funds have been depleted, are seen at University Speech and Language Clinics and treated by graduate student clinicians as part of their training.

While patients with chronic aphasia can pay for treatment out of pocket or avail themselves of less costly alternatives, clinicians and researchers have recognized that there will be no return to the "Camelot" years. As a consequence, they have developed treatment programs that are, or ultimately could be, considered reimbursable by third party payers. One set of options includes the participation-based treatments associated with an overarching philosophy of aphasia treatment referred to as Life Participation Approach to Aphasia (LPAA; Chapey, Duchan, Elman, Garcia, Kagan, Lyon, & Simmons-Mackie, 2001, 2008). Representative examples of these include programs such as supported conversation for adults with aphasia (SCA), (Kagan, 1998), conversational coaching (Hopper & Holland, & Rewenga, 2002), life-coaching (Worrall, Brown, Cruice, Davidson, Hersh, Howe, & Sherratt, 2010), and group therapy (Elman & Burnstein-Ellis, 1999a, b). LPAA reflects an intervention philosophy that emphasizes the need to support people with chronic aphasia at individual, community, and societal levels so as to bring about meaningful outcomes associated with participation in relevant life situations and events (Simmons-Mackie, King, & Beukelman, 2013).

Computer assisted treatment offers yet another option for persons with chronic aphasia. As computers have become affordable, smaller, and more user-friendly, there has been an exponential growth in the application of this technology to aphasia treatment, particularly for patients having chronic aphasia without funds or with limited access to treatment for various reasons (transportation, geography, and family support). While computerized therapy is considered supplemental treatment, not intended to replace the clinician, this technology has been used successfully to improve the reading, writing, speaking, and comprehension of persons with aphasia (See review by Katz, 2008). While

an all-encompassing review of computer applications to the treatment of chronic aphasia is beyond the scope of this paper, a representative example of how this technology can be utilized to treat chronic aphasia is the recently developed *AphasiaScripts* program (Cherney, Halper, Holland, Lee, Babbitt, & Cole, 2007). This computer software program was designed to train individuals with mild-to-moderate chronic aphasia to produce individualized conversational scripts that have been put on the computer. The program permits the person with aphasia to practice the script repeatedly with an avatar serving as a virtual therapist providing models and cues. A number of studies have shown that individuals with chronic aphasia improve their verbal performance and reflect more confidence in their speaking abilities after script training (Bilda, 2011; Cherney & Halper, 2008; Cherney, Halper, Holland, & Cole, 2008; Cherney, Halper, Holland, Lee, Babbitt, & Cole, 2007; Goldberg, Haley, & Jacks, 2012; Lee, Kaye, & Cherney, 2009; Mannheim, Halper, & Cherney, 2009; Youmans, Holland, Munoz, & Bourgeois, 2005; Youmans, Youmans, & Hancock, 2011).

### *Intensive Language Therapy*

Recently, researchers and clinicians have suggested that persons with chronic aphasia should be treated intensively. Although there is some evidence that patients with aphasia who receive more treatment have better outcomes that those who receive less treatment (Basso, 1987; Brindley, Copeland, Demain, & Martyn, 1989; Denes, Perazzolo, Piani, & Piccione, 1996; Lee, Kay, Cherney, 2009; Marshall, Tompkins, & Phillips, 1982; Mackenzie, 1991), it is important to point out that intensive language therapy means something different. Specifically, intensive treatment refers to delivering therapy in short bursts and at "a rate that is greater than usual" (Hinckley & Craig, 1998, p. 991)

to "jolt" the patient's damaged language system (Harnish, Neils-Strunjas, Lamy, & Eliassen, 2008).

Interest in intensive treatment was sparked by a paper from Bhogal and colleagues (Bhogal, Teasell, Speechley, & Albert 2003). These researchers conducted a detailed analysis of eight aphasia treatment studies that met pre-established quality ratings on the PEDro scale of the Australia Center for Evidence-Based Physiotherapy (http://www.pedro.fhs.suyd.edu.au/). Four studies (Brindley et. al., 1989; Poeck, Huber, & Willmes, 1989; Marshall, Wertz, Weiss, Aten, Brookshire, Garcia-Bunuel et al., 1989; Wertz et al., 1986) were determined to have positive treatment outcomes and four to have negative outcomes (David, Enderby, & Bainton, 1982; Hartman & Landuau, 1987; Lincoln, McGurk, Mulley, Lendrem, Jones, & Mitchell, 1984; Prins, Schoonen, & Vermeulen, 1989). The researchers examined therapeutic intensity in relationship to mean pre- and post-treatment changes on the Porch Index of Communicative Ability (PICA; Porch, 1967), Token Test, or Functional Communication Profile (FCP; Sarno, 1957). Findings revealed that, on the average, participants in positive studies received approximately 9 hours of treatment for 11 weeks whereas those in the negative studies received approximately 2 or fewer hours of treatment per week for 23 weeks. Participants in positive studies made significantly more improvement on the outcome measures than those in negative studies. The authors concluded "intense therapy over a short amount of time can improve outcomes of speech and language for stroke patients with aphasia." (p. 887).

Empirical evidence to support intensive treatment has been provided by German aphasiologists and a near-decade of study of constraint-induced aphasia therapy (CIAT;

Meinzer, Rodriguez, & Gonzalez-Rothi, 2012). CIAT is based on language action principles, forced use of the verbal modality, and massed practice (Pulvermuller & Berthier, 2008). These are incorporated into language action games (LAG), recently described in detail by Difrancesco et al. (2012). In CIAT, two or three patients work with a therapist 3 hours a day, 5 days a week, for two consecutive weeks (30 hours total). CIAT is contextually-based and links language use to actions such as requesting, giving, and refusing. Several studies have shown individuals with chronic aphasia improve on impairment-based, functional, and self-reported measures following CIAT (Barthell, Meinzer, Djundja, & Rockstroh, 2008; Kirmess & Maher, 2010; Meinzer, Djundja, Barthel, Elbert, & Rockstroh, 2005; Meinzer, Elbert, Djundja, Taub, & Rockstroh, 2007; Meinzer, Elbert, Wienbruch, Djundja, Barthel, & Rockstroh, 2004; Meinzer, Streiftau, & Rockstroh, 2007; Pulvermuller, Neininger, Elbert, Mohr, Rockstroh, Koebbel, & Taub, 2001). In some of these same studies, improved language outcomes have been accompanied by concomitant changes in brain plasticity (Meinzer & Breitenstein, 2008; Meinzer, Rodriguez, & Gonzalez-Rothi, 2012; Pulvermuller & Berthier, 2008).

Recently, the use of intensive treatment has been explored in English-speaking countries. This is evident in a number of studies of CIAT (Cherney, Patterson, Raymer, Frymark, & Schooling, 2008; Faroqi-Shah & Virion, 2009; Kurland, Pulvermuller, Silva, Burke, & Andrianopoulos, 2012; Maher, Kendall, Swearengin, Rodriguez, Leon, & Pingel et al., 2006; Taub & Johnson, 2012), other intensively-delivered treatments (Bakheit, Shaw, Barrett, Wood, Carrington, et al. 2007; Code, Torney, Guldes-Howardine, & Willmes, 2010; Davis, Harrington & Baynes, 2006; Hinckley & Carr, 2005; Hinckley & Carr, 2005; Hinckley & Craig, 1998; Kendall, Rodriguez, Rosenbek,

Conway, & Gonzalez-Rothi, 2006; Knollman-Porter, Dietz, & Lundeen,2011; Laganaro, DiPietro, & Schnider, 2006; Lee, Fowler, Rodney, Cherney, & Small, 2010; Lee, Kay, & Cherney, 2009; Ramsberger & Marie, 2007; Sage, Snell, & Lambon Ralph, 2011), and in an increase of clinical service programs advertising the provision of intensive aphasia treatment on the Internet. In general, positive outcomes have been noted in speech and language performance throughout an intensive therapy program; however candidacy issues have not received as much attention.

### *Purpose of the Study*

The purpose of this study was to examine changes in the speech and language performance of individuals with chronic non-fluent aphasia over the course of a single treatment session, equivalent in length to those provided in intensive treatment programs.

This study is important because, at present, intensive treatment of aphasia, chronic or otherwise, is not funded by 3rd party payers in the U.S. Because the amount of treatment provided each day in intensive therapy programs is substantially greater (at least 3 times as much) than standard practice (1 hour), and the U.S. health care system is struggling financially, it is unlikely that a treatment that increases costs will be viewed favorably. While there are empirical data to show that people with chronic aphasia benefit from intensive treatment, it could also be argued that some patients with chronic aphasia may not perform well over the course of a longer therapy session.

The aphasia literature provides a number of reasons why patients with chronic aphasia might not be able to tolerate longer treatment sessions. For example, speech and language abilities of persons with aphasia have been found to be negatively impacted by fatigue, late afternoon scheduling, and other factors (Buck, 1967; Marshall & King, 1973;

Marshall, Tompkins, & Phillips, 1980; Tompkins, Marshall, & Phillips, 1980). A study by Legh-Smith and colleagues (1987) found only 5 of 71 clients with aphasia were ready to begin intensive treatment at 4 weeks post-onset, mostly for medical reasons. Moreover, several resource allocation models have been proposed to explain the performance declines of brain injured aphasic adults as task complexity increases (Clark & Robin, 1995; McNeil & Kimelman, 1986; McNeil, Odell, & Tseng, 1990; Murray, Holland, & Beeson, 1997). These models might predict that performance of individuals with chronic aphasia would suffer over a longer treatment interval by taxing a patient's limited neural resources, particularly if task demands remained constant or increased.

This study does not argue for or against intensive language therapy. Rather, it seeks to provide objective information to assist clinicians in identifying patients with chronic aphasia who might be candidates for intensive treatment. In this vein, Kwakkel (2006) has suggested that the success of intensive therapies is as much determined by identification of patients who will benefit from them as the success of the therapies themselves. Accordingly, this study examined the speech and language performance of individuals with chronic aphasia over the course of a 3 hour speech and language treatment session.

Information from this study could be useful in three ways: (1) aiding fiscal intermediaries in making funding decisions about intensive therapy, (2) assisting clinicians in identifying patients who might benefit from intensive therapy, and (3) guiding clinicians already providing intensive treatment in planning, organizing, and scheduling these sessions.

# Chapter 3: Methods

## *Research Design*

This study used a time series design to assess changes in speech and language performance of individuals with chronic aphasia before, during, and after a three-hour period of group speech and language therapy. The study was approved by the University of Kentucky Medical Institutional Review Board.

## *Participants*

Nine adults with chronic aphasia, seven men and two women, took part in the study. These individuals incurred aphasia after a left-hemisphere ischemic stroke, lived at home, were Native English speakers, and were recruited from the University of Kentucky Aphasia Program (UKAP). All had received individual and group speech and language therapy in the UKAP, but none were in treatment at the time of the study. Demographic information on the participants is provided in Table 3.1.

Table 3.1 Demographic, speech, and language information on participants. a = Aphasia quotient (AQ) from the Western Aphasia Battery (WAB-R; Kertesz, 2006); b = Functional rating of communication from the Therapy Outcome Measure (Enderby, John, & Petheram, 2006); c = Overall score (1-100) from the Everyday Speech Production Assessment Measure (ESPAM; Watts, Marshall, Olson, & Kleinert, 2014)

| Participant | Age/ Gender | MPO | Handedness | Marital Status | Former occupation | Years of Education | Race/ ethnicity | WAB[a] | TOM[b] | E-SPAM[c] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 66M | 14 | Right | married | Banker | 18 | White | 57.4 | 4 | 56.9 |
| 2 | 82F | 114 | Right | married | Housewife | 12 | White | 67.9 | 3 | 31.4 |
| 3 | 82M | 131 | Right | married | Teacher | 18 | White | 64.5 | 3 | 49.3 |
| 4 | 61M | 78 | Right | married | Dentist | 29 | African American | 33.4 | 3 | 29.7 |
| 5 | 68M | 102 | Right | married | Aircraft mechanic | 14 | White | 84.5 | 5 | 58.9 |
| 6 | 75M | 59 | Right | married | Horseman | 13 | White | 66 | 3 | 43.4 |
| 7 | 66M | 58 | Left | married | IBM employee | 16 | White | 40.9 | 4 | 46.1 |
| 8 | 66F | 121 | Right | married | Executive secretary | 12 | White | 64.5 | 2 | 34.9 |
| 9 | 48M | 82 | right | single | Attorney | 20 | white | 31.1 | 4 | 74.6 |

Only individuals with chronic, non-fluent aphasia were included in this study. The reason for this is that studies of intensive language treatment cited in Chapter 2, have predominantly focused on these types of patients. While expert clinical judgments were used to determine if a participant exhibited characteristics of non-fluent aphasia, speech and language test results, shown in Table 3.1, confirm the presence of chronic, non-fluent aphasia. Table 3.1 shows that participants reflected a range of severity levels as

evidenced by their aphasia quotients (AQ), co-occurring apraxia of speech, and functional communication abilities. The participants were not compensated for being in the study, but a free lunch was provided to them at the conclusion of the day they participated in the study.

### *Procedure*

For this study, the nine participants were organized into groups of three. Participants 1, 3, and 7 made up one group; participants 2, 5, and 8 comprised a second group; and participants 4, 6, and 9 made up a third group. These groupings were arbitrarily formed on the basis of convenience of scheduling and travel time. Each group came to the University of Kentucky Speech and Hearing Clinic on a separate day in May of 2013 to complete all of the activities associated with the study. On this day, the investigators explained the purposes of the study, reviewed the day's schedule, and introduced each participant to the graduate student tester who would be assessing him or her over the course of the day. The investigators answered any questions or concerns participants had about the study. Informed consent was then obtained from each participant. Table 3.2 provides a time line for the tasks completed by the participants on each of these days.

Table 3.2 Timeline for the tasks completed by participants during the course of the study. This order of events was followed regardless of group assignment or day scheduled to participate in the study.

| Arrive: Consent | Assessment: Pre-test | Group Therapy (90 minutes) | Assessment: Mid-test | Group Therapy (90 minutes) | Assessment: Post-test | Lunch with investigators |
|---|---|---|---|---|---|---|
| 9:00am | 9:30am | 10:00am | 11:30am | 12:00pm | 1:30pm | 2:00pm |

*Group Therapy*

Each group was seen for a single three-hour session of speech and language therapy. A group treatment paradigm was selected for two reasons. First, prior and current investigations of intensive language therapy have typically provided patients with three hours of group treatment per day, five days a week, for two consecutive weeks (Difrancesco et al., 2012; Pulvermuller et al., 2008). Secondly, the investigators sought to control the content of the group treatment sessions and make them as similar as possible. It was felt a group treatment format would be better suited for this than an individual treatment.

The same investigator, a second year graduate student, served as the group therapist for each session. The therapist and the participants sat around a table in a group treatment room. The session was divided into two 90-minute blocks. Participants took breaks when needed and were provided water. Three therapeutic tasks, memory bingo, a word-symbol association task, and a modified version of the card game "Go Fish" comprised the "working" portion of the sessions. When necessary, the therapist engaged the participants in conversation to break up the session, provided short pauses to facilitate

response consolidation, and alerted participants when making transitions from one activity to another.

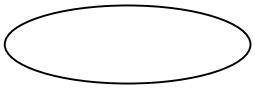
*Memory bingo*. Memory bingo was based on procedures used by Camp and colleagues in treatment of persons with dementia (Camp, Foss, & O'Hanlon, & Stevens, 1996). This task used three bingo boards with different themes: numbers, presidents, and states (See Figure 3.1). Each board was composed of a 5 x 5 matrix of numbers, presidents, or states, with a center "free space." When using this task, the therapist, provided a stimulus to evoke a response from the participants. For example, when using the boards with the numbers, she might read the statement "This is the number of days in a year." The participants would then select the appropriate number (e.g. "365") from one of the boxes on their board, and inform the group members and therapist of their choice. If the participant's board did not contain the target response, the participant "passed it on," and another participant was permitted to respond. A Memory Bingo game concluded after a participant had marked off five boxes in a row.

Figure 3.1 Example of a Memory Bingo board.

| | | | | |
|---|---|---|---|---|
| 25 | 50 | 30 | 100 | 10 |
| 60 | 100 | 7 | 12 | 0 |
| 3 | 10 | FREE | 50 | 2 |
| 25 | 14 | 24 | 18 | 365 |
| 12 | 4 | 21 | 1 | 7 |

*Word symbol association.* The Word Symbol Association task was based on the personalized cueing method for treating naming deficits developed by Marshall and Freed (2006). For this task, three sets of five symbols were created representing categories of living things, items to wear, and foods, with one theme being used at a time. Symbols grossly resembled the word they represented. For example, the symbol for "whale," a living thing, was an oval on its side (See Figure 3.2).

Figure 3.2. Example of symbol used in the Word-Symbol Association task. The example provided in this figure is from the category "living things". The symbol represented is a whale and is what you would see on the front of the card. The back of the card, in this case, would have the text "It's an ocean mammal. It's very large. It swallowed Jonah.", followed by the target word "whale".



Symbols were printed on one side of a 3" x 5" card. The reverse side of the card contained three cues associated with target word and the word itself. For example, for the "whale" symbol, the cues were "it's an ocean animal, it's very large, and it swallowed Jonah. This is a whale." When the Word Symbol Association task was used, the therapist cycled through the five items one-at-a-time. First, the therapist showed the participants the symbol, gave the three associative cues, and finally named the item. Next, the therapist read the associated cues, and asked the participants to name the symbol. Lastly, the therapist asked the participants to name the symbols without any verbal cues.

*Go Fish*. This task was selected because it is similar to the language action games of CIAT (Pulvermuller & Berthier, 2008). Materials for this task included two decks of regular playing cards with the kings, queens, and jacks removed. The therapist shuffled the 80 cards and dealt each participant a beginning hand of 7 cards. Participants placed the 7 cards face up on the table in front of them. Dividers were placed in front of and between the participants to prevent them from seeing one another's cards. The cards not initially dealt to the participants were held by the therapist. Participants were told that the goal of the game was to obtain as many matched pairs of cards as possible. To do this they were to ask one another if they had a certain card, e.g., "George, do you have a four of clubs?" When the response to the request was positive, the respondent gave the card to

the requester; the requester then placed the two matched cards on the table. If the response was negative, the respondent said "go fish" and the participant was given another card by the therapist. A round ended when a participant had matched all of the cards in his or her possession. The number of matches per participant was then determined and the "winner of the game" declared.

### *Assessments*

Participants' speech and language was assessed three times. The time 1 assessment took place before the group treatment session started. The time 2 assessment occurred between the two 90-minute group treatment blocks. And the time 3 assessment was carried at the conclusion of the treatment session.

Each assessment required the participant to perform four verbal tasks similar to those used with the Porch Index of Communicative Ability (PICA; Porch, 1981). The first task, function, required the participant to describe the function of 10 common objects (i.e. "you clean teeth with a toothbrush"). The second task, naming, required the participant to orally name common objects (i.e. "toothbrush"). The third, sentence completion, required the participant to complete a sentence using the name of a common object (i.e., you clean teeth with a "toothbrush"). And the fourth, repetition, required the participant to repeat the names of common objects after the examiner (i.e., "toothbrush"). Procedures for administering the four verbal tasks paralleled those of the PICA (Porch, 1981). The order in which the tasks were administered went from most to least difficult, function, naming, sentence completion, and repetition. Table 3.3 shows the instruction, examiner actions, and expected participant responses for the verbal tasks.

Table 3.3 Instructions, examiner actions, and expected responses for the verbal tasks.

| Subtest | Test Administrator | Participant |
|---|---|---|
| 1 | *"This is test number 1. As completely as possible, tell me what you do with each of these." (Gesture at test objects.)* | Complete spontaneous sentence regarding the function of an object. *(e.g., "I clean my teeth with a toothbrush.)* |
| 2 | *"This is test number 2. Tell me the name of each of these." (Gesture at test objects.)* | Recognizes item, recalls name, and expresses it verbally. *(e.g., "This is a toothbrush.")* |
| 3 | *"This is test number 3. Finish these sentences…" "You clean teeth with a…"* | Conceptualize, formulate, and express the names of test objects in order to complete sentences verbally. *(e.g., "Toothbrush.")* |
| 4 | *"This is test number 4. Now I'll (point to self) say the name of each one and then you (point to patient) say it after me." "Say 'toothbrush'."* | Imitative speech. *(e.g., "Toothbrush.")* |

To reduce the possibility of learning effects across the time 1, 2, and 3 assessments, different sets of 10 objects, sets A, B, and C, were used. Objects in selected for each set were balanced for word frequency. Each set of objects contained one item from the categories of tools, eating utensils, clothing, dental care, grooming tools, writing implements, personal hygiene, measurement tools, and smoking materials.

Table 3.4 lists the objects included in each set, their word frequencies, and the word frequency means for each set of objects. Participants were assessed once with items from sets A, B, and C, but the order of the administrations was not counterbalanced.

Table 3.4 Objects, word frequencies and word frequency means for objects included in sets A, B, and C.

| Set | A | Set | B | Set | C |
|---|---|---|---|---|---|
| **Object** | **Frequency** | **Object** | **Frequency** | **Object** | **Frequency** |
| Calculator | 13999 | Brush | 4366 | Clippers | 44505 |
| Comb | 12586 | Crayon | 38323 | Deodorant | 39037 |
| Cigarette | 3892 | Fork | 7813 | Floss | 33603 |
| Dime | 46660 | Glove | 13170 | Knife | 3439 |
| Pen | 4017 | Hammer | 6482 | Marker | 9293 |
| Scissors | 12220 | Lighter | 6539 | Matches | 3198 |
| Screwdriver | 18944 | Lotion | 19943 | Quarter | 1386 |
| Soap | 5751 | Nickel | 22123 | Scale | 1351 |
| Sock | 17834 | Ruler | 7664 | Watch | 1068 |
| Toothbrush | 22446 | Toothpaste | 19278 | Wrench | 20487 |
| Calculator | 13999 | Brush | 4366 | Clippers | 44505 |
| Mean Frequency: | 15,834.9 | Mean Frequency: | 14,570.1 | Mean Frequency: | 15,736.7 |

*Administration*

For each assessment, the participant and the tester sat side by side at a rectangular table with the participant seated to the left and the tester to the right. The 10 objects from set A, B, or C were placed in the center of the table in two parallel rows of five, with the objects arranged in alphabetical order. Each assessment for a participant always took place in the same room. The assessments were recorded on video tape. Assessments began at approximately the same time for each participant within a group, but since individual participants took different amounts of time to complete the four verbal tasks, the ending times for each participant varied.

*Testers.* Three graduate students in the University of Kentucky College of Health Sciences' Communication Sciences and Disorders Program conducted the assessments. All had previously taken a graduate course in aphasia. The graduate students received approximately two hours of training before doing any testing. This involved familiarizing them with the goals of the study, the testing materials, and providing them with background information about the participants they were to assess. One of the investigators, highly experienced in use of the PICA, demonstrated how to administer the function, naming, sentence completion, and repetition tasks. Largely, this demonstration focused on conditions under which instructions should be repeated, when response could be facilitated with a repeat or a cue, how to keep the participant on task, and when to terminate a specific response and move to the next item. The testers were also provided written scripts with instructions for giving repeats and cues similar to those used with the PICA (Porch, 1981). Finally, each of the testers was required to demonstrate that she could administer the verbal subtests, with one of the investigators providing feedback during the process.

*Other measures.* Participants were asked to rate their perceived happiness (PH), tiredness (PT), stress (PS), and communication satisfaction (PCS) before each assessment. This was done using a 4-item questionnaire and procedures based on the experience sample method (ESM) of Fitzgerald-DeJean and colleagues (Fitzgerald-DeJean, Rubin, & Carson, 2012). The four questions answered by each participant included: How happy do you feel right now? How tired do you feel right now? How stressed do you feel right now? How satisfied are you with your communication? The questions were read to the participant by the graduate student tester. The participant

directed the tester to mark his or her answer on the five-point Likert Scale shown in Figure 3.3. These questions were presented in an identical manner for the time 1, 2, and 3 assessments.

Figure 3.3 Likert scale used to provide ratings of perceived happiness, tiredness, stress, and satisfaction with communication.

1. How happy do you feel right now?

Really Happy
Happy
Okay
Sad
Really sad

*Scoring*

Participants' responses to each of the 10-items of the function, naming, sentence completion, and repetition tasks were scored from the videotapes by a single investigator using the 16-point multidimensional scoring system of the PICA. The investigator did not watch any of the original assessments, and was blinded to whether the videotape represented the time 1, 2 or 3 assessments. A total of 1080 verbal responses were scored by the investigator (40 responses per assessment x 3 assessments x 9 participants). To assess intrascorer reliability, 300 of the responses were randomly selected and rescored

by the investigator two months later without referring to the original scores. To assess interscorer reliability, the same 300 responses were scored by an independent examiner, also experienced in the use of the PICA scoring system. The scores of this examiner were then compared with the original examiner's scores. For each assessment, the 10 item scores for the function, naming, sentence completion, and repetition tests were summed and averaged to obtain a mean score for each task. Mean scores for the 4 tasks were then summed and averaged to obtain an overall mean score.

## Chapter 4: Results

### *Scoring Reliability*

As previously stated, to assess intrascorer reliability, 300 of the 1180 responses were selected randomly and rescored by the primary investigator two months after doing the original scoring. To assess interscorer reliability these 300 responses were also scored by another clinician trained in the use of the PICA scoring system. Percentages of point-to-point intra- and interscorer agreements were calculated for the first and second scorings of the primary investigator and the original scores of the primary investigator and the second veteran clinician. Percentages of intra- and interscorer agreement were 93% and 90.2%, respectively.

### *Time 1, 2, and 3 Speech and Language Changes*

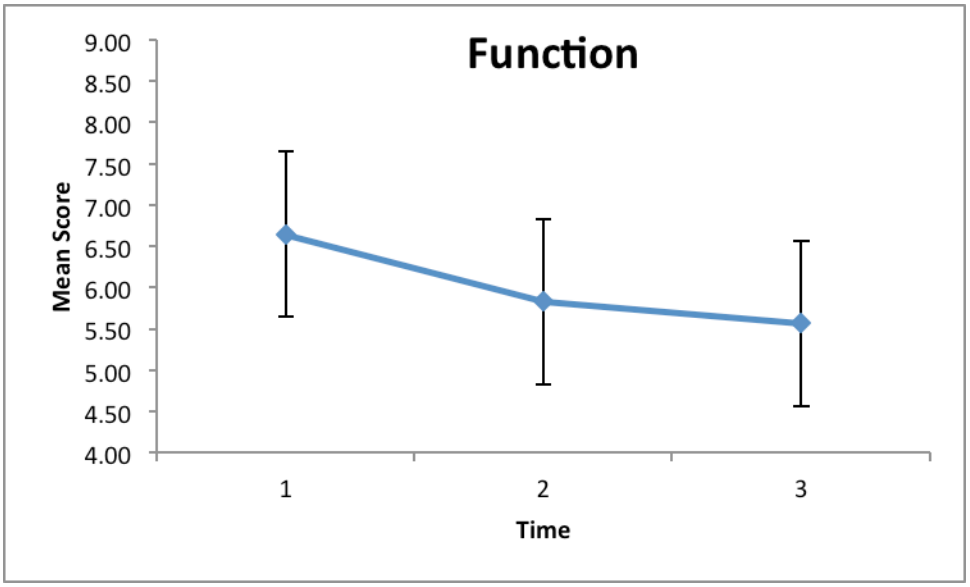
Table 4.1 gives the mean scores for the function, naming, sentence completion, and repetition tasks, and the overall mean scores that were derived by averaging the mean scores for the four tasks for the time 1, 2, and 3 evaluations. Table 4.1 provides the scores for individual participants. Figures 4.1, 4.2, 4.3, 4.4, and 4.5 depict the group mean scores and standard deviations for the function, naming, sentence completion, and repetition tasks, and the overall group means for the time 1, 2, and 3 evaluations. For the comparison of ratings of each verbal task, we used the Wilcoxon signed-ranks test because equal intervals between consecutive points on the rating scales could not be assumed.

Table 4.1 Mean scores for function, naming, sentence completion, and repetition tasks for participants and overall means for the verbal tasks for each participant

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| Function | | | | | | | | | |
| 1 | 7.9 | 5.1 | 5.0 | 6.2 | 6.6 | 6.9 | 7.7 | 7.0 | 7.4 |
| 2 | 4.7 | 7.1 | 4.6 | 6.2 | 5.3 | 6.1 | 6.2 | 6.1 | 6.2 |
| 3 | 4.4 | 7.2 | 5.0 | 5.2 | 6.2 | 6.1 | 6.2 | 4.4 | 5.4 |
| Naming | | | | | | | | | |
| 1 | 9.9 | 6.4 | 9.9 | 6.8 | 9.2 | 7.0 | 9.8 | 9.0 | 11.6 |
| 2 | 7.0 | 6.3 | 9.1 | 6.7 | 8.2 | 6.8 | 7.0 | 8.8 | 11.0 |
| 2 | 5.8 | 6.9 | 6.4 | 8.3 | 7.7 | 7.2 | 8.3 | 8.0 | 10.7 |
| Completion | | | | | | | | | |
| 1 | 6.9 | 7.2 | 8.8 | 9.3 | 6.4 | 9.9 | 7.7 | 9.8 | 11.9 |
| 2 | 6.1 | 10.0 | 9.8 | 9.1 | 7.7 | 6.7 | 7.4 | 6.3 | 9.5 |
| 3 | 7.0 | 6.8 | 8.6 | 8.4 | 6.2 | 9.4 | 8.8 | 7.5 | 8.5 |
| Repetition | | | | | | | | | |
| 1 | 12.9 | 10.1 | 14.4 | 11.7 | 14.9 | 13.5 | 11.2 | 10.1 | 14.0 |
| 2 | 10.7 | 6.3 | 13.2 | 10.9 | 14.0 | 9.7 | 9.6 | 11.6 | 14.8 |
| 3 | 13.9 | 7.7 | 10.7 | 11.5 | 13.4 | 14.1 | 10.4 | 11.6 | 14.2 |
| Overall | | | | | | | | | |
| 1 | 9.35 | 7.35 | 9.52 | 8.50 | 9.28 | 9.32 | 9.10 | 8.97 | 11.00 |
| 2 | 7.12 | 7.43 | 9.18 | 8.23 | 8.80 | 7.32 | 7.55 | 8.20 | 10.37 |
| 3 | 7.77 | 7.15 | 7.67 | 8.35 | 8.37 | 9.20 | 8.42 | 7.87 | 9.70 |

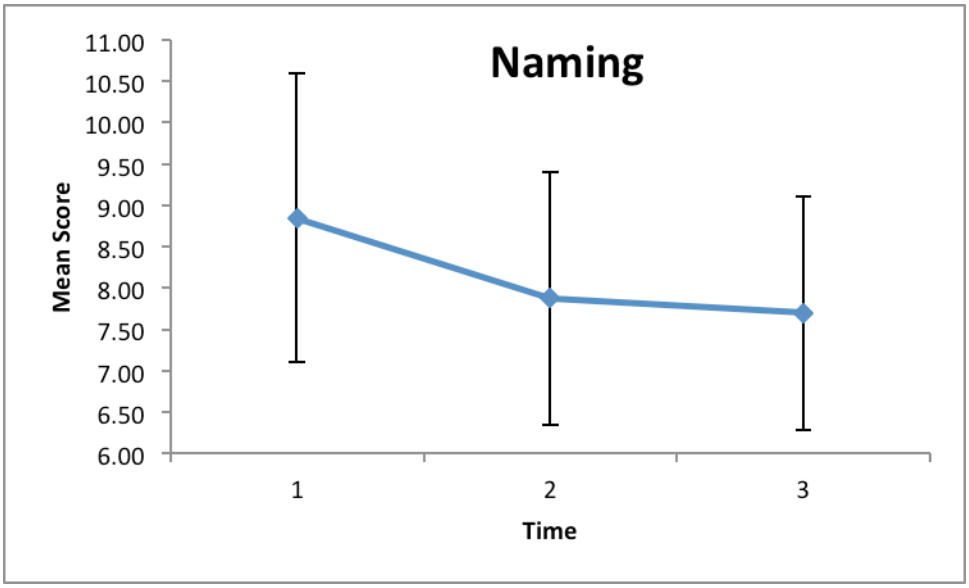
*Function.* Figure 4.1 shows that the group mean scores for the function task were 6.64 (SD = 1.04), 5.83 (SD = .809), and 5.57 (SD = .932) for the time 1, 2, and 3 evaluations, respectively. Results of the Wilcoxon rank sum test revealed that the time 2 mean (n = 9) did not differ from the time 1 mean (n = 9), z = -1.540, $p > .05$ and that the time 3 mean (n = 9) did not differ from the time 2 mean (n = 9), z = -.845, $p > .05$.

Figure 4.1 Group mean scores and standard deviations for the function task for the time 1, 2, and 3 evaluations.



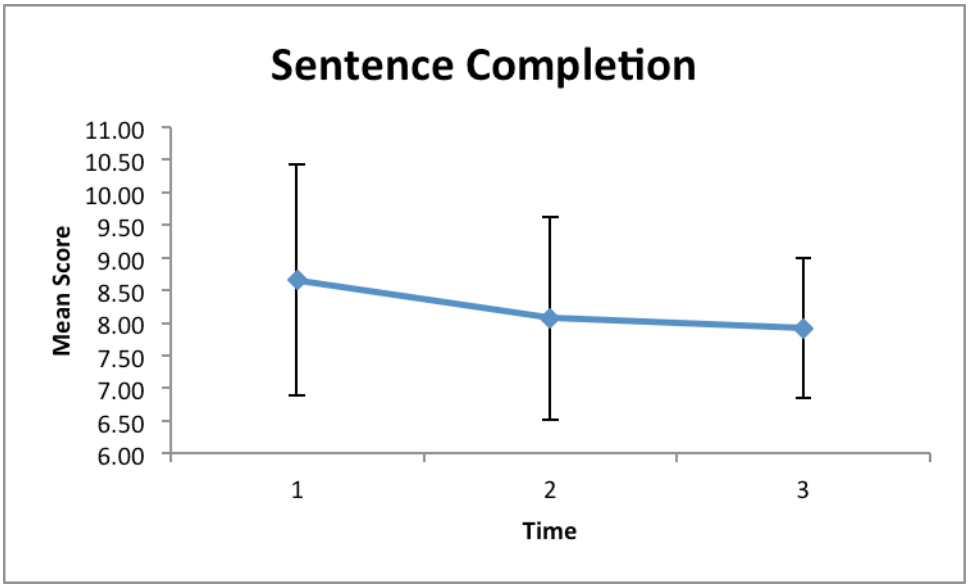

*Naming.* Figure 4.2 shows that the group mean scores for the naming task were 8.84 (SD = 1.75), 7.88 (SD = 1.53), and 7.70 (SD = 1.41) for the time 1, 2, and 3 evaluations, respectively. Wilcoxon rank sum test results indicated that the time 2 mean (n = 9) was significantly lower than the time 1 mean (n = 9), z = -2.670, $p < .05$, and that the time 3 mean (n = 9) did not differ from the time 2 mean (n = 9), z = -.178, $p > .05$.

Figure 4.2 Group mean scores and standard deviations for the naming task for time 1, 2, and 3 evaluations.



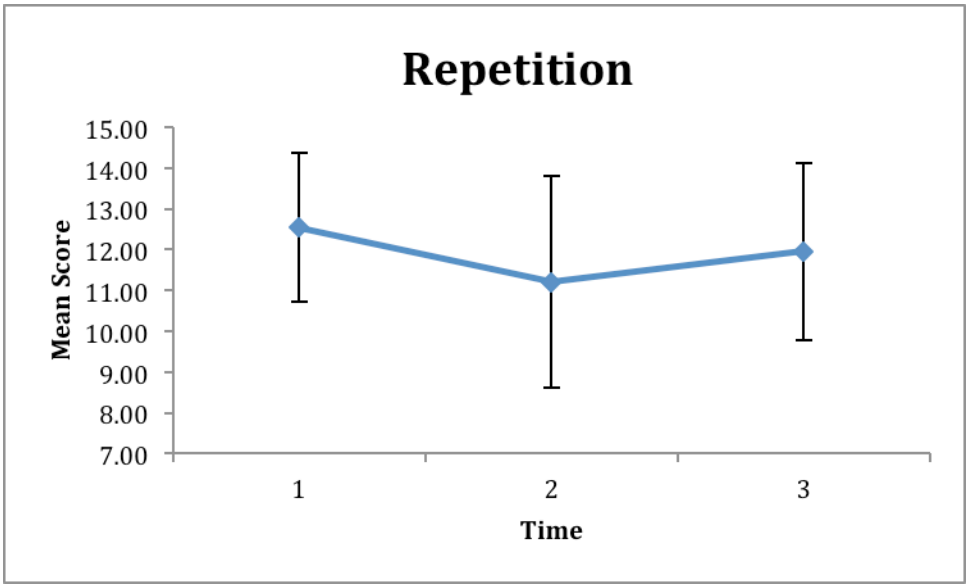

*Sentence completion.* Figure 4.3 shows that the group mean scores for the sentence completion task were 8.66 (SD = 1.77), 8.07 (SD = 1.55) and 7.91 (SD = 1.07) for the time 1, 2, and 3 evaluations, respectively. Wilcoxon rank sum test results indicated that the time 2 mean (n = 9) did not differ from the time 1 mean (n = 9), z = -.770, $p > .05$, and that the time 3 mean (n = 9) did not differ from the time 2 mean (n = 9), z = -.237, $p > .05$.

Figure 4.3. Group mean scores and standard deviations for the sentence completion task for the time 1, 2, and 3 evaluations.



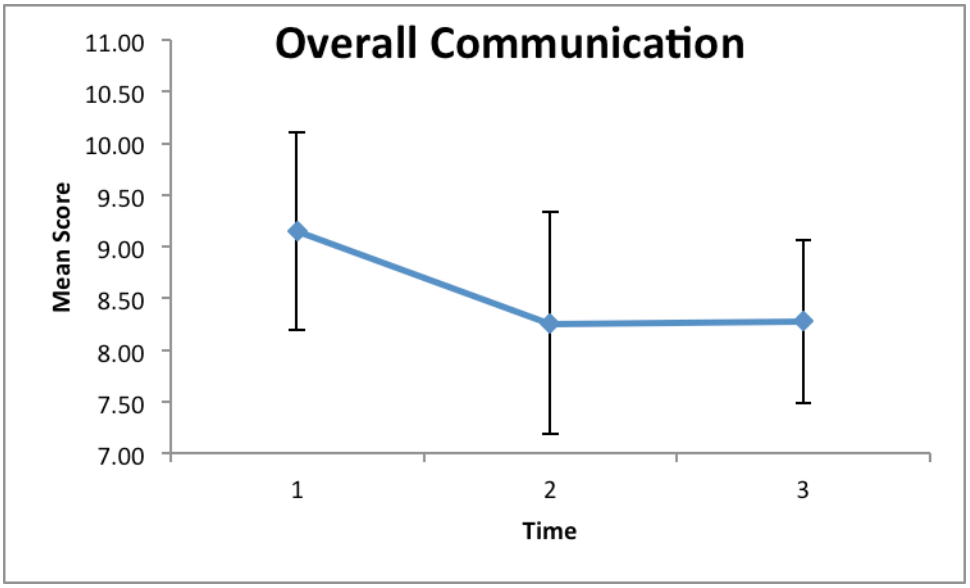

*Repetition.* Figure 4.4 shows that the group mean scores for the repetition task were 12.53 (SD = 1.52), 11.2 (SD = 2/60), and 11.94 (SD = 2.18) for the time 1, 2, and 3 evaluations, respectively. Wilcoxon rank sum test results indicated that the time 2 mean (n = 9) was significantly lower than the time 1 mean (n = 9), z = - 1.90, $p < .05$, and that the time 3 mean (n = 9) did not differ from the time 2 mean (n = 9), z = -.1.13, $p > .05$.

Figure 4.4. Group mean scores and standard deviations for the repetition task for the time 1, 2, and 3 evaluations.




*Overall mean.* The overall mean was derived by averaging the mean scores for the sentence formulation, naming, sentence completion, and repetition tasks. Figure 4.5 shows that the overall mean scores for the group were 9.15 (SD = .958), 8.26 (SD = 1.08), and 8.28 (SD = .788) for the time 1, 2, and 3 evaluations, respectively. Wilcoxon rank sum test results indicated that the time 2 mean (n = 9) was significantly lower than the time 1 mean (n = 9), z = - 2.547, $p < .01$, and that the time 3 mean (n = 9) did not differ from the time 2 mean (n = 9), z = -.059 , $p > .05$.

Figure 4.5 Group mean scores and standard deviations for the overall verbal mean for the time 1, 2, and 3 evaluations.




*Ratings of Perceived Happiness, Tiredness, Stress, and Communication Satisfaction*

Table 4.2 shows participants' ratings of perceived happiness (PH), tiredness (PT), stress (PS), and satisfaction with communication (PSC) at the time of each assessment. These data, which were not examined statistically, suggest that individual participants were relatively consistent in rating PH, PT, PS, and PSC from one evaluation to the next. Table 4.2 shows that individual participants ratings on the 5-point Likert scale seldom varied by more than a single point across evaluations. There were, however, differences in the values of the ratings for individual participants. Table 4.2 shows that some participants consistently gave themselves low ratings, suggesting they perceived themselves as unhappy, tired, stressed, and unsatisfied with their communication. Others had consistently high ratings for PH, PT, PS, and PSC.

Table 4.2. Ratings of perceived happiness (PH), tiredness (PT), stress (PS) and satisfaction with communication (PCS) for individual participants for the time 1, 2, and 3 evaluations.

How happy do you feel right now?
Really happy = 5; Happy = 4; Okay = 3; Sad = 2; Really Sad = 1

| Participant | Time 1 | Time 2 | Time 3 |
|---|---|---|---|
| 1 | 4 | 4 | 4 |
| 2 | 5 | 3 | 2 |
| 3 | 5 | 5 | 5 |
| 4 | 5 | 5 | 5 |
| 5 | 4 | 4 | 5 |
| 6 | 1 | 3 | 3 |
| 7 | 5 | 5 | 3 |
| 8 | 4 | 4 | 3 |
| 9 | 4 | 4 | 3 |

How tired do you feel right now?
Really Awake = 5, Awake = 4, Okay = 3, Tired = 2, Really Tired = 1

| Participant | Time 1 | Time 2 | Time 3 |
|---|---|---|---|
| 1 | 5 | 4 | 4 |
| 2 | 3 | 2 | 2 |
| 3 | 5 | 5 | 4 |
| 4 | 3 | 3 | 2 |
| 5 | 2 | 2 | 3 |
| 6 | 1 | 2 | 2 |
| 7 | 5 | 5 | 2 |
| 8 | 4 | 3 | 4 |
| 9 | 3 | 2 | 2 |

How stressed do you feel right now?
Really Relaxed = 5, Relaxed = 4, Okay = 3, Stressed = 2, Really Stressed = 1

| Participant | Time 1 | Time 2 | Time 3 |
|---|---|---|---|
| 1 | 4 | 4 | 4 |
| 2 | 3 | 2 | 2 |
| 3 | 5 | 4 | 5 |
| 4 | 4 | 4 | 4 |
| 5 | 5 | 5 | 4 |
| 6 | 3 | 5 | 2 |
| 7 | 4 | 4 | 3 |
| 8 | 3 | 3 | 3 |
| 9 | 3 | 3 | 2 |

How satisfied are you with your communication?
Very Satisfied = 5; Satisfied = 4; Okay = 3; Unsatisfied = 2; Very Unsatisfied = 1

| Participant | Time 1 | Time 2 | Time 3 |
|---|---|---|---|
| 1 | 5 | 4 | 4 |
| 2 | 2 | 1 | 1 |
| 3 | 4 | 5 | 4 |
| 4 | 3 | 5 | 3 |
| 5 | 4 | 4 | 4 |
| 6 | 2 | 2 | 2 |
| 7 | 3 | 3 | 2 |
| 8 | 3 | 4 | 3 |
| 9 | 4 | 5 | 5 |

*Correlations*

Because individual participants reflected some consistency in rating PH, PT, PS, and PSC across the three assessments, the self-ratings were summed and averaged across all evaluations to provide a single score, ranging from 1-5 for each participant. The aggregate ratings were then examined in relationship to four variables: changes in overall communication from the time 1 to the time 2 assessment, changes in overall communication from the time 2 to the time 3 assessment, age, and months post onset. Table 4.3 provides the data from individual participants that were used to compute Pearson Product-Moment correlations amongst these variables. There was a significant negative correlations between the aggregate self-ratings for PH, PT, PS, and PCS and age, $r$ (9) = -.753, $p$ = .019. There was also a significant negative correlation between months post onset and the change in the overall mean score from the time 1 to the time 2 time 2 evaluation, $r$ (9) = - .661, $p$ = .053. None of the other correlations were significant.

Table 4.3. Participants' ages, months post onset, amount of change on overall communication from time 1 – 2 and time 2- 3 evaluations, and collapsed ratings for perceived happiness, tiredness, stress, and satisfaction with communication for individual participants.

| Participant | Aggregate rating | Age | Months Post-onset | Time 1-2 change | Time 2-3 change |
|---|---|---|---|---|---|
| 1 | 4.16 | 68 | 102 | -2.32 | +.65 |
| 2 | 2.33 | 75 | 59 | +.08 | -.28 |
| 3 | 4.67 | 61 | 78 | -.34 | -1.51 |
| 4 | 3.83 | 66 | 58 | -.27 | + .12 |
| 5 | 3.83 | 66 | 14 | -.48 | -.43 |
| 6 | 2.33 | 82 | 131 | -2.00 | +1.80 |
| 7 | 3.67 | 66 | 121 | -1.55 | + .87 |
| 8 | 4.25 | 48 | 82 | -.77 | -.33 |
| 9 | 3.33 | 82 | 118 | -.63 | -.67 |

## Chapter Five: Discussion, Clinical Implications and Limitations

The goal of the present study was to examine changes in the speech and language performance of patients with chronic, non-fluent aphasia over the course of a three-hour speech and language treatment session, a time allotment comparable to one session of Constraint Induced Aphasia Therapy (CIAT). Participants with chronic, non-fluent aphasia received a single group therapy session, three hours in length. There were three sessions, each involving three participants with aphasia, and a therapist. The therapist was the same person for each session, but the participants differed. Group treatment activities were similar for each of the groups, and sessions were split into 90 minute blocks. Participants were individually assessed before (time 1), mid-way-through (time 2), and after (time 3) the group session. The assessment included four verbal tasks: function (describing the function of objects), naming (naming objects), sentence completion (providing the names of objects to complete sentences), and repetition (repeating the names of objects after the examiner), similar to those used with the PICA (Porch, 1981). Before each assessment, the participants also rated their perceived happiness (PH), tiredness (PT), stress (PS), and satisfaction with communication (PSC) using a 5-point Likert scale.

### *Discussion*

Results revealed that most participants performed poorer on the verbal subtests on the time 2 evaluations than the time 1 evaluations. Table 4.1 shows that seven, nine, six, and six of the nine individual participants had lower mean scores on the function, naming, sentence completion, and repetition tests, respectively, for the time 2 evaluation. Table 4.1 also shows that eight of nine participants had lower overall scores the time 2

assessments. Group mean scores and standard deviations for the function, naming, sentence completion, repetition tasks, and overall group mean scores are displayed in Figures 4.1 – 4.5, respectively. Wilcoxon rank sum tests were carried out to determine differences in group means from the time 1 to the time 2 evaluations. These revealed that scores were significantly lower on the time 2 evaluations than the time 1 evaluations for the naming, repetition, and overall measures, but not the function or sentence completion measures.

Examination of participants' scores for the function, naming, sentence completion, and repetition tasks and their overall mean scores from the time 2 to the time 3 evaluations (see Table 4.1) indicated that four, five, five, and two of the nine participants had lower mean scores on the function, naming, sentence completion, and repetition tasks, respectively, for the time 3 evaluation. Five of nine participants had lower overall scores for the time 3 than the time 2 evaluation. Thus performance declines on the verbal tasks were not as great from the time 2 to the time 3 evaluation as they were from the time 1 to the time 2 evaluation. Some participants actually performed a little better on the time 3 evaluation than the time 2 evaluation. In all cases, however, participants' scores for the time 3 evaluation were below those of the time 1 evaluation. Wilcoxon rank sum tests did not reveal any differences for the group mean scores for the function, naming, sentence completion, repetition tasks, and the overall scores for from the time 2 to the time 3 evaluations.

One of the verbal tasks used to assess changes in speech and language performance across the three hour treatment period, the function task, appear to be less useful than the other verbal tasks. The function task required the participant to describe

the use of objects (i.e., you clean teeth with a toothbrush). Examination of participants' scores on this task (See Table 4.1) suggests it was challenging. Most participants had low mean scores (below 7.0) on this task. Post-hoc examination of individual responses to this task from the videotapes indicated some participants gave up, and/or did not respond to this task, whereas others provided minimal or unintelligible responses. This is not totally surprising, as the participants in the study were chronic, non-fluent aphasic patients, and many had co-occurring apraxia of speech.

The overall mean score is perhaps the best indicator of how participants with chronic aphasia perform over the course of a three hour treatment period. This score takes into consideration performance on all tasks. When overall scores were examined for each of the nine participants across the three evaluations and in relation to time 1 scores, three distinct patterns of performance emerged: two participants (P2 and P4) showed little variation in their overall score from one evaluation to the next. Three participants (P1, P6, and P7) showed a marked decline in their overall performance from the time 1 to the time 2 evaluation. P1 continued to perform poorly on the time 3 evaluation; P6 and P7, however, "bounced back" and improved their scores on the time 3 evaluation, but still had lower scores than they did on the time 1 evaluation. Four participants (P3, P5, P8, and P9) reflected lower scores from one evaluation to the next, suggesting that their speech and language abilities deteriorated across the three hour treatment period.

Each of the 10 responses for the function, naming, sentence completion, and repetition tasks was scored using the 1-16 point multidimensional scoring system of the PICA. While these scores often suggested that participants were performing slightly worse from one evaluation to the next, the numerical scores do not capture the

participants' emotional reactions, negative comments, body language, and facial expressions, and other indicators of general frustration. Anecdotally, when participants' responses were scored from the videotapes, it was apparent that some participants became discouraged at the time 2 or time 3 evaluations. This was reflected in disparaging comments (e.g., "Why can't I do that?"), anger, use of profanity, looking to the examiner for help, and other behaviors. These types of reactions tended to occur more frequently in participants with apraxia of speech, particularly on the repetition task. Some participants became upset when they encountered difficulties with the repetition task on the time 2 and time 3 evaluations that they had not experienced at the time 1 evaluation.

Participants rated their perceived happiness (PH), tiredness (PT), stress (PS), and satisfaction with communication (PSC) using a Likert scale at the start of each evaluation. It was anticipated that this information might provide some insight about how participants felt about their communication performance across the evaluations. It was also hypothesized that ratings would correlate with changes in speech and language performance from the time 1 to the time 2, and from the time 2 to the time 3 evaluations. While the participants seemed to understand the nature of the rating task, they reflected little-to-no change in their self-ratings from one evaluation to the next. Pearson-Product-Moment correlations failed to reveal any relationship between aggregate self-ratings of PH, PT, PS, and PSC and changes in speech and language performance from time 1 to time 2, or time 2 to time 3. There were, however, significant negative correlations between aggregate self-ratings and age, and changes in speech and language performance from the time 1 to the time 2 evaluation and months post onset. This suggests persons with aphasia who are older and more chronic tend to have negative perceptions about

their communicative ability, and might be more likely to reflect performance declines over longer treatment sessions.

### *Limitations*

This study has some limitations regarding its general applicability of its findings. Paramount among these is its limited sample size. Only nine individuals with chronic aphasia participated in the study. All had relatively severe non-fluent aphasia, and some had co-occurring apraxia of speech. The tasks use to evaluate changes in performance were exclusively verbal tasks. In hindsight, it may have been better to include a variety of measures, particularly, non-verbal tasks.

The findings of this study have some clinical relevance for identifying persons with chronic aphasia as candidates for intensive language therapy. These findings, however, are not yet directly applicable to aphasia treatment practices in the U.S. The reasons for this are that patients in the U.S. with chronic aphasia receive very little, if any, speech and language treatment because there are no funds allocated to pay for it (Lusis & Polovoy, 2014).

The tasks used in the three hour treatment period, memory bingo, word-symbol association, and go fish were designed to provide some consistency for the treatment across groups. These tasks, however, placed different cognitive demands on the participants. Moreover, since the group session was broken into two 90 minute blocks, one activity always needed to be started before, and resumed after, the break and its associated the time 2 evaluation; which activity this involved, however, varied across groups. Therefore, the possibility exists that the group engaged in the most difficult

activity before the break, e.g. word-symbol association, could have been at a disadvantage when undergoing their time 2 evaluation, whereas those engaged in one of the simpler activities, may have had an advantage at the time 2 evaluation.

Some methodological issues could also have impacted participants' performance on the evaluations. The intention was to provide participants three hours of treatment, which is equivalent to one session of CIAT. However, to avoid having participants come to the clinic more than once, all activities associated with the study were carried out in a single day (introduction and explanation of the study, informed consent, therapy, and three tests). Thus the amount of time participants were engaged in cognitively demanding activities was actually closer to four hours, rather than three. This could have been fatiguing to participants and affected their performance.

When scoring the videotapes, the investigator noted that the student testers differed in their use of repeats, cues, and the manner in which they dealt with participants' errors; to this regard, the testers probably should have had more training in administration of the verbal tests, as they had limited experience in assessing people with aphasia. The testers also occasionally displayed a degree of nervousness and anxiety typical of graduate students. Retrospectively, it may have been better to use more experienced testers, or to use a different protocol to document changes in speech and language performance across the therapy period.

Another methodology limitation of the study is that no ground rules were established for dealing with emotional responses from the participants to the evaluations. For example P6 became emotionally distressed at the time 2 evaluation. This is clearly

evident in his overall score of 7.32 for the time 2 evaluation which is two full points below his time 1 score. P6, however, was provided redirection and a bit of emotional support after the time 2 evaluation, the effects of which are clearly seen in his improved performance at the time 3 evaluation.

### *Clinical Implications*

The findings of this study are relevant for patients with chronic aphasia who are considering pursuing intensive therapy. Eight of the nine participants performed worse on a set of verbal tasks from the time 1 evaluation to the time 2 evaluation; four of the participants performed poorer on the time 3 evaluation than the time 2 evaluation. These evaluations were evenly spaced across a three-hour group treatment period, equivalent to one session of intensive language therapy.

Reasons for participants' performance declines across the three evaluations cannot be determined at this time. It is certainly possible that fatigue, resource allocation deficits, boredom, and the challenge of being repeatedly tested could all have been variables to that extent. Participants did not overtly acknowledge any of these things, but some did reflect obvious frustration with their inability to name objects and repeat words from one evaluation to the next.

Administration of the four, 10-item verbal subtests of the evaluation, function, naming, sentence completion, and repetition took little time. Responses were scored objectively with the multidimensional scoring system of the PICA (Porch, 1981). Measures of intra– and interscorer reliability were acceptable. This procedure is useful for screening clients with chronic aphasia for their ability to participate in a three-hour

treatment period. It is also possible that clinical utility of this procedure could be improved by using fewer tasks. In this regard it might be useful to use tasks that are sensitive to subtle changes in language processing ability, such as the repetition task.

The fact that the speech and language performance of patients with chronic aphasia declined over the course of a three hour treatment period should not be surprising. Consider that in most universities, three-credit classes are taught in two formats in one hour increments on separate days, or in three-hour blocks on one day. Most university professors have observed differences in the alertness levels, participation, and engagement of their students at the end of the class period for these two formats. Similar effects might be observed for persons with aphasia participating in three hours, versus one hour, of therapy. Another issue that arises from this study is that a three-hour period of therapy for a patient with chronic aphasia will cost more than a one hour period of treatment. To justify these costs, it is important to determine that individual patients with chronic aphasia can perform optimally throughout the longer session, maximizing the impact of the intensive treatment. A question arising from this study is whether or not intensive language treatment needs to be delivered in a three hour block. An alternative might be to separate the three treatment hours by hourly rest breaks. Some proponents of intensive language therapy are considering this treatment paradigm. Kirmess and Maher (2010) recently reported the need to manipulate the treatment schedule for patients with aphasia receiving intensive language action therapy in the acute phase of rehabilitation.

Another discussion point is the magnitude of a performance drop across a three hour treatment period, which would cause a clinician to be concerned regarding the patients candidacy for intensive treatment. On a test that uses a multi-dimensional scoring

system such as the PICA, a change in the overall mean score of 1.5 or more would be considered clinically relevant because the overall mean score represents an averaging of several subtest mean scores. In this study, four mean scores were averaged to obtain the overall mean score. Post-hoc analyses using the 1.5 value as a standard to examine declines in the overall score from time 1 to time 2, or time 1 to time 3, revealed that P1, P6, and P7 fell short on the time 2 evaluation; P1, P3, P8, and P9 fell short on the time 3 evaluation.

This study addresses candidacy for intensive language therapy, a factor that has yet to be discussed in the aphasia literature. Candidacy for intensive treatment is not a new concept. Kwakkel (2006) has acknowledged the success of intensive therapy as being as much determined by the identification of patients who will benefit most from it as it is the effectiveness of the therapy itself. Moreover, researchers in other disciplines have developed guidelines to identify candidates for intensive treatment. For example, to participate in a randomized control trial examining the effects of intensive treatment on functional improvement by chronic stroke patients with upper limb paresis, participants were required to demonstrate willed control of upper finger and wrist extension to grasp (Kwakkel, Kollen, & Lindeman, 2004; Kwakkel, Kollen, van der Grond, & Prevo, 2003). It is important to point out that the findings of this study relate to *candidacy* for intensive language therapy, not the efficacy and effectiveness of intensive language therapy per se. CIAT, as described in the literature involves three hours of treatment per day, five days per week, for two consecutive weeks. One of the activities of the group treatment used in this study, Go Fish, was similar to procedures of CIAT. The other activities were

different. In addition, the effects of CIAT are cumulative. The treatment provided in this study consisted of a single session of group treatment, three hours in length.

Decisions about intensive therapy and the manner in which the therapy will be provided will be decided by the health care system. However, research on intensive therapy will have an impact on these decisions. Clinicians, responsible for helping patients with aphasia live as successfully as possible with this enigmatic disorder need to take a proactive role in determining candidates for "new age" therapies such as CIAT. This is not a straight-forward process, and it can be misleading to patients, families, and payers to deliver the message that "more is better" for all patients. This study represents a small step in assessing candidacy of patients for intensive language therapies. Much more research is surely needed.

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## Vita

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