

VARIABILITY IN APHASIC PATIENTS' RESPONSES

By

MELISSA MYERS-BRASHEAR

//
Bachelor of Science

Phillips University

Enid, Oklahoma

1980

Submitted to the Faculty of the Graduate College
of the Oklahoma State University
in partial fulfillment of the requirements
for the Degree of
MASTER OF ARTS
May, 1983



VARIABILITY OF APHASIC PATIENTS' RESPONSES

Thesis Approved:

Nancy E. Monroe

Thesis Adviser

Cheryl M. Scott

Kenneth P. Searles

Norman D. Durham

Dean of the Graduate College

PREFACE

This investigation is concerned with the variability of response observed in three adult aphasics.

The author wishes to express her appreciation to her major adviser, Dr. Nancy E. Monroe, for her guidance, assistance, and patience throughout this study. Appreciation is also expressed to other committee members, Dr. Kenneth D. Sandvold, Dr. Burchard M. Carr, and Dr. Cheryl M. Scott, for their individual assistance in the preparation of this final manuscript.

A note of thanks is given to Marcia Myers and Nadean Myers for their assistance in typing earlier drafts of the manuscript, and to Charlene Fries for the excellence of the final copy. In addition, appreciation is extended to Dr. Jim Stark for his assistance with the visual screening procedure.

Finally, special gratitude is expressed to my husband for his financial support, encouragement, and understanding.

TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION	1
Support for Variability of Performance	5
Summary	12
II. METHODS	13
Subject Selection	13
Experimental Stimuli	14
Presentation Procedure	18
Scoring Procedure	19
Reliability Measures	21
Treatment of the Data	21
III. RESULTS AND DISCUSSION	23
Subjects' Response Variability Over Ten Sessions	23
Differences in the Number of Correct Responses for Individual Task Items for the Members of the Aphasic Group	34
Patterns of Errors Displayed by Individual Adult Aphasics	40
Differences in the Number and Types of Errors Among the Individual Aphasics	57
IV. CONCLUSIONS	66
BIBLIOGRAPHY	71
APPENDIX A - VISUAL SCREENING PROCEDURE	73
APPENDIX B - MOTOR SPEECH SCREENING	75
APPENDIX C - SCREENING INFORMATION SHEET	77
APPENDIX D - DAILY CASE HISTORY	78
APPENDIX E - SAMPLE DATA SHEET	79
APPENDIX F - DEFINITIONS	104
APPENDIX G - ERROR CLASSIFICATION MATRIX	107

LIST OF TABLES

Table	Page
I. Correlations Obtained on the Initial and Final Tests	4
II. A Profile of the Three Subjects and Met Selection Criteria	15
III. The Parameters Judged by Task	22
IV. Overall Scores for Each Subject Over the Ten Sessions	24
V. Mode of Each Task and Days in Which Response Deviated from Mode, Listed by Parameter, for Each Subject	28
VI. Number and Percentage of Items That Corresponded to a Particular Variability Pattern	33
VII. A List of the Number of Correct Responses for Individual Items for Each Subject	35
VIII. The Number and Tasks Which Constitute Each Pattern Listed for Subject 1	45
IX. The Number and Types of Errors Displayed in Each Session for Subject 1 in the Tasks Requiring Verbal or Graphic Responses	46
X. The Number and Tasks Which Constitute Each Pattern Listed for Subject 2	51
XI. The Number and Types of Errors Displayed in Each Session for Subject 2 in the Tasks Requiring Verbal or Graphic Responses	52
XII. The Number and Tasks Which Constitute Each Pattern Listed for Subject 3	56
XIII. The Number and Types of Errors Displayed in Each Session for Subject 3 in the Tasks Requiring Verbal or Graphic Responses	58

Table	Page
XIV. Number and Percentage of Error Responses for Each Subject, According to Task	59
XV. Percentages of Distribution of Each Subject's Error Types Into One of Three Categories: Errors Common to All Subjects, Errors Common to Two Subjects, and Errors Unique to That Subject	63

LIST OF FIGURES

Figure	Page
1. The Number of Items Rated "1," "2," or "3" in Parameters I--Completeness and III--Gestural for Subject 3 in "Following Written Instructions"	31
2. The Number of Items Rated "1," "2," and "3" in Parameter I--Completeness for Subject 2 in "Writing Object's Name"	32
3. Percent the Mode Represents for Each Parameter for Each Session for Subject 1	41
4. Percent the Mode Represents for Each Parameter for Each Session for Subject 2	47
5. Percent the Mode Represents for Each Parameter for Each Session for Subject 3	54

CHAPTER I

INTRODUCTION

The patient suffering from aphasia has a variety of distinguishing characteristics in terms of linguistic and symbolic capabilities. It is not uncommon to observe problems in auditory retention span, auditory attention span and verbal attention span; verbal language disorders such as word-finding problems, jargon, paraphasia, rote or automatic responses, reduced vocabulary, loss of verbal fluency, loss of ability to apply and use grammatical rules; reading disturbances such as loss of ability to read individual letters or to comprehend written material and writing disturbances such as omission, reversal or confusion of letters (Head, 1963; Benson, 1979; Schuell, 1964; Goodglass, Quadfasel and Timberlake, 1964; Schuell, 1965; Brown, 1972; Brookshire, 1973; Eisenson, 1973; and Goodglass and Kaplan, 1976). Among the less frequently observed behaviors are visual attention problems, partial auditory imperception and visual discrimination defects (Penfield and Roberts, 1959 and Schuell, 1964).

An insult to the brain results in complications other than linguistic or symbolic disorders. Even though less documentation has been provided concerning behavioral characteristics, they nevertheless have been shown to exist along with aphasia in many people. These behavioral characteristics include catastrophic reactions, memory loss, fatigability, perseveration, emotional lability, depression, euphoria,

irritability, personality changes, frustration and guilt which may last only through the first few days after the brain injury or throughout the recovery period (Goldstein, 1949; Wepman, 1951; Eisenson, 1973; Schuell, 1964; Agronowitz and McKeown, 1964; and Hecaen and Albert, 1978).

Variability of aphasic patients' responses within a task, a therapy session, a day or across several days has often been reported as another behavioral characteristic. A review of the literature reveals a broad division of opinion between those authors who support the theory of variability of task performance and those who do not. Schuell (1964), Porch (1971) and Darley (1978) report that the performance of the aphasic is reliable. While other authors, such as Head (1963), Kreindler and Fradis (1968), Sarno, Silverman and Sands (1970), Davis and Leach (1972), Brookshire (1973) and Marshall (Chapey, 1981) all contend that the variability of responses within a task, therapy session or day is typical in aphasia. The following discussion of the literature to date will consider whether or not variability is typical of aphasia, what form the variability takes and the contributing factors and causes of the variability.

It is important to note several differences in the literature dealing with variability of response. First, the authors arguing against variability of response discuss it in reference to testing conditions while the authors arguing for variability of response discuss it in reference to daily activities, therapy sessions and test conditions. Secondly, the data provided to support or refute variability come in slightly different forms. Proponents of variability offer some data in the form of test results, but the majority of their documentation is in the

locus and extent of brain damage. She included only those patients whose time post onset was just under three months to 10 years. The mean was three to six months. The subjects were tested on the Minnesota Test for Differential Diagnosis of Aphasia. The time interval between the tests ranged from one to 13 months, with a mean of three months. No data were available concerning individual responses or response patterns on the initial and final tests. However, she did provide the following correlations between the two tests of the aphasic patients as a group (see Table I). These correlations indicate a general consistency in the response patterns of aphasics, as a group, over time.

Other evidence demonstrating that the aphasic patient's performance is reliable is available (Porch, 1971). Like Schuell, the data substantiating Porch's viewpoint come from an investigation performed within testing conditions. He utilized 40 aphasic patients whose mean age was 60 years, mean educational level was 8.45 years, and mean weeks post onset was 37.97 (range of 1 to 478 weeks). The Porch Index of Communicative Ability (PICA) was administered to each subject twice with two weeks between the first and second tests. The results demonstrated that for the behaviors sampled (verbal imitation, verbal formulation, graphic matching, graphic formulation, gestural matching, gestural formulation and auditory comprehension), the scores on the first and second tests were very similar. For instance, the scores obtained on the two tests ranged from a difference of 0.30 of a point on the Gestural subtest to 0.44 of a point on the Verbal subtest. The overall scores differed 0.37 of a point. The changes that did occur were in a positive direction and shifted less than one point on a 16-point scale. Porch also reported stability coefficients for the two series of tests which exceeded 0.90

TABLE I
CORRELATIONS OBTAINED ON THE
INITIAL AND FINAL TESTS

Tests for Auditory Comprehension	0.89
Visual and Reading Tests	0.83
Speech and Language	0.79
Visuomotor and Writing Tests	0.82
Numerical and Arithmetic Tests	0.76
Tests for Body Image	0.73

for 13 of the 18 subtests. Those subtests included the Verbal subtests I, IX, and XII, and the Gestural subtests IV, V, VI, VII, VIII, A, B, C, D, and F. Porch feels that the variability that does exist results from examiner inconsistency rather than patient inconsistency. In saying this, he does acknowledge that inconsistency of response does occur.

Finally, Darley (1978), summarizing data from Schuell and Porch, indicated that variability of response is not typical of aphasia. He stated that the aphasic patient's performance is reliable when examined using standardized procedures. Some variability does exist from day to day but the "overall performance in terms of percentage correct is reasonably stable" (p. 184).

Support for Variability of Performance

Variability of performance in daily activities, therapy sessions or test conditions is viewed by several authors as being characteristic of aphasia (Head, 1963; Kreindler and Fradis, 1968; Sarno, Silverman and Sands, 1970; Eisenson, 1973; and Marshall in Chapey, 1981). Head (1963) felt that an "inconsistent response is one of the most striking results produced by a lesion of the cerebral cortex" (p. 145). He studied 26 subjects, following their progress over periods of several years by re-examining them at long-term intervals. He published the responses to clinical protocols for each subject along with detailed descriptions of observations made by the patients and himself. The following is but one of the 26 clinical examples describing the variability of performance Head thought so fundamental to aphasia.

Consider the condition of No. 21, who was almost completely speechless. He could just use "yes" and "no" correctly, but could not repeat them to order; yet under the influence of

emotion he was able to produce a phrase of considerable length and use the expression 'thank you' appropriately.

When I gave him a command by word of mouth he executed it extremely badly, failing twelve out of fifteen attempts to place the coin named by me into the right bowl. With the hand, eye and ear tests his errors were just as gross; and yet he had no difficulty in pointing to any one of a set of objects, or in choosing the correct colour named to him orally. It was not comprehension of words that was lacking, but the power to use them in a certain manner.

The most remarkable incongruity was shown when he attempted to read. Given a printed command, such as to touch eye or ear with one or the other hand, he made no effort to carry out even the simplest movement. He shook his head saying, 'I can't, I know what it is, I don't know what it says.' In the same way with the coin-bowl tests he was completely unable to execute an order printed in words or in numbers. But in spite of his inability to carry out these printed commands requiring some more or less complex choice, there was no doubt that he could read. On seventeen out of eighteen consecutive occasions he was able to point to an object named in print. He even carried out the following more severe test on similar lines. The six printed cards of the man, cat and dog tests were laid on the table in front of him; he was then shown pictures of one pair of the series, for instance the man and the dog, and picked out correctly ten times in succession the card which corresponded to the combination he had seen. Once he chose a card with the inscription 'the cat and the man', but rejected it for one in which the figures had been presented to him. Later in the same set of observations he again chose a card with the right names in the reverse order, but immediately corrected his mistake. Thus, he was not only accurate with regard to the verbal significance of the print, but also paid attention to the order, in which the words stood upon the card (pp. 207-208).

Among the various features common to people suffering from aphasia, Kreindler and Fradis (1968) considered variability from one day to the next one of the fundamental characteristics. Although they provide no data to confirm their theory, they base their statement on varying latency of responses as a subject's performance improves or worsens.

Sarno, Silverman and Sands (1970) investigated the effectiveness of different types of language therapy for aphasics. Results indicated that all three groups (programmed instruction, nonprogrammed instruction and control) tested made small and similar gains. Even the untreated

control group showed improvement which Sarno et al explained may have been "due to the day to day performance inconsistencies observed in aphasics" (p. 621). Descriptive data concerning the nature of the inconsistencies were not provided.

Inconsistency and variability of response were considered by Eisen-son (1973) to be intrinsic in an aphasic patient who is neurophysiologi-cally unstable. He also stated, without verifying data, that many apha-sics, who are presumed neurophysiologically stable, continue to display variable performances in varied situations.

Variability within a therapy session or from day to day was also discussed by Marshall (Chapey, 1981). He stated that aphasics may show differing patterns of response from day to day or within a session. How-ever, to understand the underlying cause of the variability, the clini-cian should examine a large number of responses or patterns of responses rather than individual responses.

Forms of Variability

Among the investigators discussing the issue of variability, only a few have described the form in which the variability exists (Schuell, 1964; Davis and Leach, 1972 and Brookshire, 1973). Schuell (1964) dis-cussed two phenomena in aphasic patients' responses. The first phenome-non was the stable percentage of errors across several days on identical and similar tasks. Second, most patients produced a particular type of error. For example, if three different patients were asked to name a set of pictures, one may produce jargon, another produce a intelligible but defective version of the target word and the third generally mis-name the picture, though the words sound normal. In other words, the

day-to-day responses may vary, but the level of ability and type of error remain the same.

Davis and Leach (1972) examined the performance of 18 aphasic patients on a picture-naming task, comparing similarity of responses to the target responses. Each subject was shown a set of 14 pictures (Set A) to name; and one to six days later 10 of these subjects were shown another set (Set B). The aphasics' responses were scaled in terms of the gross form of the response, the syntactic features of the response, and the phonological components of the response. A comparison of the test-retest performances for these 10 subjects demonstrated that some aphasics were consistent in all areas while others were consistent only in one or two areas. For example, three aphasics showed consistent performances on Sets A and B and for all three areas: phonological components and gross form of the response. Two other aphasic patients' performance on Sets A and B were consistent for the syntactic features and gross form of the response while less consistent for the phonological components.

Brookshire (1973), in an attempt to describe the form variability takes, provided an illustration of an aphasic patient's responses and an explanation for this particular variation in performance. He reported a patient may not be able to point to a "toothbrush" on command, but will respond appropriately when told, "If you have your glasses with you, why don't you put them on?" It seems logical that since both tasks involve auditory comprehension and the latter is longer and more complex, it would be the one the aphasic would fail. However, Brookshire explained that "whole body commands" were sometimes observed to "remain even in

the face of profound disabilities in other kinds of auditory comprehension tasks" (p. 83).

Factors Contributing to Variability of Performance

Factors influencing variability of performance were discussed by several authors (Head, 1963; Schuell, 1964; Eisenson, 1973; and Marshall in Chapey, 1981). Head (1963) pointed out that when making judgments about an aphasic patient's behavior, one needs to consider the external factors that continually change according to the situation, resulting in performance variability. Furthermore, vocabulary and speech construction are affected by combinations of these external factors. From the information available to date, the following external factors were reported to contribute to variability in performance.

1. Environmental noise may effect communicability (Eisenson, 1973).
2. Specific interpersonal relationships may influence communication. It is generally known that some people are easier to talk to than others. Also, a busy or hurried person is more difficult for an aphasic to talk to (Schuell, 1964; and Eisenson, 1973).
3. Possible responses to a task may determine the ability to respond. The greater the choices possible, the greater certainty that the desired response will be defective (Head, 1963).
4. Size of the audience may influence communicability. It is generally easier for an aphasic patient to talk to one person than to a group (Schuell, 1964).
5. Environments in which the aphasic patient must perform may

affect communication. It is more difficult for an aphasic patient to talk in a medical conference than in his own home (Schuell, 1964).

6. Scheduling may affect responses, because some patients may function better at particular times of the day than others. Aphasics generally do better in the mornings (Marshall in Chapey, 1981).

7. Medication could influence performance in that drugs taken for seizures, pain, or high blood pressure can often make the patient less attentive, more distractible and listless (Marshall in Chapey, 1981).

8. Upsetting news or events may affect an aphasic's performance (Eisenson, 1973).

In addition, Eisenson (1973) suggested that aphasic patients are ". . . more vulnerable to the effects of the unexpected or undesired . . ." (p. 73). Such undesirable effects elicit reactions which, in aphasic patients, could trigger a variation in performance. Among the internal factors presented are:

1. Motivation (Eisenson, 1973).
2. Illness (Marshall in Chapey, 1981).
3. Disappointment (Eisenson, 1973).
4. Fatigue (Schuell, 1964; Eisenson, 1973; and Marshall in Chapey, 1981).
5. State of Mind. What is on the aphasic's mind could alter his verbal performance (Eisenson, 1973).

Source of Variability of Performance

Some authors have attributed variability to a physiological cause (Goldstein (1948; Head, 1963; and Schuell, 1964). According to Goldstein (1948), "lability of threshold" determines variability. "Lability of

threshold" refers to the changes in threshold during stimulation which cause the aphasic patient to no longer see the visual stimulus despite the fact that the stimulus has not been discontinued.

External factors operating through "vigilance" have also been proposed as the cause of variation in performance (Head, 1963). Head explains that "vigilance" is the high degree of physiological efficiency which forms the basis of any and all activities, from muscle tone to complex speech mechanisms (Kreindler and Fradis, 1968, p. 71). A general physiological disorder of the cortex is a direct result of a cerebral lesion and can be seen in the loss of "vigilance". The most complex forms of behavior, and therefore language, are the first functional and organic processes to be damaged.

Finally, spontaneous recovery plays a part in the variable responses observed in the behavior of many aphasic patients (Schuell, 1964). As mentioned earlier, the aphasic patient's neurophysiological status is unstable during the first few days or weeks after the brain injury. Along with the fluctuating status, functional improvement is brought about by the brain healing and the temperature, pulse, and blood pressure stabilizing. As the organism gradually recovers from shock, the person is increasingly aware of what is going on around him, is fatiguing less readily, and is attempting more activities each day. All these factors merge to result in obvious improvement from one day to the next. Schuell explained that this period of spontaneous recovery is unpredictable in terms of extent and length; but after this, most patients become neurophysiologically stable. According to Schuell, performance becomes predictable at this point.

Summary

In summary, there exists a broad division of opinion concerning the variability of performance in the aphasic population. Those studies which support the reliability of aphasic patients' responses refer to testing conditions. Although those studies acknowledge that variability of individual responses does occur, they point out that overall scores remain reliable. Inconsistencies have been attributed to an unstable neurophysiological condition or to examiner inconsistencies. On the other hand, literature supporting variability of response states that variability in performance in daily activities, therapy sessions, and test situations is typical of aphasia. However, there is little information available concerning the types or patterns of inconsistencies shown. Consequently, the purposes of the present investigation were to determine:

1. Intrasubject variability: Does an individual adult aphasic demonstrate variability of response on a series of tasks repeated over 10 sessions?
2. Intersubject variability: Is there a difference in the number of correct responses for individual task items for the members of the aphasic group?
3. Intrasubject error patterns: Does an individual adult aphasic display a pattern or patterns of errors?
4. Intersubject error patterns: Are there differences in number and types of errors among the individual adult aphasics?

CHAPTER II

METHODS

Subject Selection

The experimental subjects selected for this study had to meet the following criteria: (1) a language deficit as a result of a documented brain injury suffered during adulthood; (2) six months post-onset in the case of patients who had suffered a cerebrovascular accident or head trauma; (3) an overall score of 3.5 (moderate-severe) to 9.0 (mild) on the Aphasia Language Performance Scale (ALPS) was obtained to rule out profound or insignificant language impairments; (4) 40 years or older; (5) a high school graduate; (6) spoke English only; (7) air conduction thresholds no greater than 25 dB at frequencies of 500, 1,000, and 2,000 (speech range) in the better ear and speech discrimination scores of 90 percent or greater in the better ear; and (8) displayed no visual deficits when screened with confrontation fields and near point acuity tests (see Appendix A).

In addition, a screening procedure was used to control for significant dysarthria or verbal apraxia (see Appendix B). Each experimental subject achieved the following minimum scores on a motor speech screening : (a) Diadochokinetic rate (single syllable) : 3.0 per second; (b) diadochokinetic rate (multi-syllable) : 1.0 per second; (c) imitation of one-syllable words and counting to 20 : 90 percent articulation; (d) sustaining "ah" : minimum of 10 seconds (Fletcher, 1972). Finally, no

subject exhibited upper extremity paralysis or paresis, bilaterally. All the information obtained was entered on a Screening Information Sheet (see Appendix C).

To assure that the variability seen in the experimental subjects was not typical of nonaphasic adults, each experimental subject was matched with a control subject who met criteria 4 through 8 as well as having suffered no previous illness or condition that affected his/her speech, language, or intelligence. Following the screening, the control subjects completed the same battery of tasks as the experimental subjects.

In order to obtain subjects for this study, speech-language pathologists, physicians, nursing homes, senior citizen centers, and churches were contacted in Stillwater, Oklahoma, and surrounding communities. Twelve prospective subjects were screened, but only three of these subjects met the selection criteria. A profile of the three subjects is included in Table II.

Experimental Stimuli

The battery of tasks was designed by the investigator to resemble tasks of a therapy session. The tasks focused on four fundamental areas of linguistic ability: auditory comprehension, verbal expression, reading, and writing. The tasks in a particular linguistic area represented a continuum of difficulty in order to determine if variability increased with task difficulty. The number of tasks within each area ranged from two in the area of writing to five in the area of verbal expression. With one exception (answering questions), the type of response required by the specific linguistic process being evaluated did not involve the

TABLE II
A PROFILE OF THE THREE SUBJECTS WHO
MET SELECTION CRITERIA

	Age	Medical Diagnosis	Speech and Language Diagnosis	Time Post Onset (If Applicable)	Educa- tion
Subject 1	73	CVA	Receptive/ Expressive Aphasia	3 yrs, 1 mo	BA
Subject 2	72	Progressive Neurological Disorder	Receptive/ Expressive Aphasia	Approximate- ly 3 yrs	BA
Subject 3	45	CVA	Receptive/ Expressive Aphasia	4 yrs	MA

other three processes. This way, the response elicited reflected the subject's capacity with that particular linguistic process and was not contaminated by impaired expressive language skills in another area.

Auditory Comprehension

Pointing to Objects Named. An array of 10 objects was placed before the subject. The investigator named each one of the 10 objects, one at a time, and the subject was to point to the appropriate object when named.

Match to Sample. The investigator requested the subject to choose the picture, from a set of three, that best described the sentence verbally presented by the investigator. A total of ten sentences was presented.

Answering Questions About a Passage Read. The subject was given the task of answering (two- to three-word answers) questions in reference to short passages (8 to 10 sentences) read by the instructor. Three passages were read with three questions per passage.

Verbal Expression

Imitation of Single Functional Words. During this task, the subject was to repeat each of the 10 stimulus words after the investigator. The words ranged from phonemically simple to complex.

Sentence Completion. The investigator verbally presented a simple sentence leaving off the last word, such as "Apples grow on. . ." The subject was requested to provide the appropriate word to complete the

sentence (i.e., "trees"). Each of the 10 stimulus sentences was presented in this manner.

Two-Word Construction. Two pictures of the same object, but with different features (i.e., a black car and a white car), were placed in front of a subject. During this task, the investigator pointed to one of the two pictures, said "This is the black car," then pointed to the other picture and said, "Which one is this?" The target response was "white car." A total of 10 sets of 2 pictures was presented in the same way.

Sentence Formulation. The subject was given the task of telling what is done with the object presented to him/her. For example, for the "pen," the appropriate response was "You write with a pen." All 10 objects were presented in the same manner.

Reading

Reading Single Words. A card with two pictures and one single printed word was presented to the subject. He/she was required to read the word silently and point to the picture that it represented. A total of 15 words was presented in this manner. The list of words included five nouns, four verbs, three pronouns, two adjectives, and one preposition.

Following Written Instructions. A card with an instruction printed on it (i.e., "Blink your eyes twice.") was presented to the subject. He/she was required to follow that instruction. A total of 10 separate instructions was presented in this manner.

Writing

Match Sound to Letter. During this task, the subject wrote 10 letters which were verbally presented by the investigator.

Writing an Object's Name. When presented with 10 objects, one at a time, the subject was instructed to write the name of the object presented.

Presentation Procedure

Each subject was seen individually in a room with no more than 40 dB signal to noise ratio in a clinic or home setting. The screening tests (ALPS, audiometric tests, visual screening and motor speech screening) were administered; and if selection criteria were met, he/she was seen over a period of 10 days within a two week period. The times of the sessions were randomly varied between morning and afternoon. On each of the days, each subject was administered the battery of 12 tasks. Sessions per person ranged from 35 to 60 minutes with a mean of 45 minutes. The time of the day in which the session was conducted, the order of the tasks, and the order of the items within each task were varied randomly to control for the possibility of fatigue. A Daily Case History (see Appendix D) was completed by the subject or a companion during each session in order to obtain information about the factors reported to contribute to variability in performance (i.e., illness, upsetting news, etc.).

The investigator began by presenting the first item in the first task and proceeded to the following items and tasks as long as the subject responded. However, if the subject failed to respond or asked for a repetition, the investigator said, "Let's go on to the next one."

After the initial instructions and stimuli were given, the investigator was allowed only one other comment, "Do your best."

The complete battery of tasks was audiotaped using a Sony Cassett-Corder TOM-131. An independent observer was present during three sessions for each subject in order to assess interjudge reliability. The subjects' responses to auditory comprehension, reading, and writing tasks were scored during the session. After the session, the investigator reviewed the audiotape, transcribed the responses and then scored the verbal expression tasks. Both responses scored during and after the session were recorded on a score sheet like the one included in Appendix E.

Scoring Procedure

The scoring procedures designed were based on the assumption that an aphasic's responses are "similar," to some degree, to the target response (Davis and Leach, 1972). Responses were analyzed with respect to the following parameters: The completeness of the response, time delay between the stimulus and response, and components of the response. In an attempt to reflect the degree of similarity or accuracy possible, "similarity scales" were developed for each parameter:

Parameter I (Completeness of the Response).

1. No response.
2. Incomplete.
3. Complete.

Parameter II (Time delay between the stimulus and response).

1. 1 - 10 seconds.
2. 11 - 25 seconds.
3. 26 seconds or more.

Parameter III (Components of the Response). This referred to the linguistic/symbolic nature of the response and was divided into gestural, phonological, and linguistic elements.

Gestural Component.

1. Demonstration of a meaningful and appropriate word, phrase or event.
2. Demonstration of a meaningful but inappropriate word, phrase or event.
3. Demonstration of a nonmeaningful gesture or series of gestures.
4. Random gesturing.

Phonological Component.

1. Correct articulation.
2. Mildly misarticulated but intelligible without contextual information.
3. Severely misarticulated but intelligible with contextual information.
4. Totally unintelligible with contextual information.

Linguistic Component.

1. One word response.
2. Two to three word response that is not grammatically or semantically complete.
3. More than a three word response that may or may not be grammatically and semantically complete.

Definitions for the terms used in the "similarity scales" are included in Appendix F.

Responses were not rated with regard to all parameters in all tasks. For example, a response made during the Verbal Expression task, "Sentence

Formulation," would be rated on Parameters I--Completeness, II--Time Delay, III--Linguistic, and III--Phonological (see Table III).

Reliability Measures

The reliability of scoring the battery of tasks administered at each session was checked by having an independent observer score the complete battery of tasks given during 3 of the 10 sessions for each subject. A correlation of 0.80 was obtained between the investigator's and independent observer's scoring using the Spearman-Brown formula (Ferguson, 1976).

Treatment of the Data

For each subject, the mode and range were computed for each task and for overall daily performance over the 10 sessions. In order to determine the types of errors, frequency, and consistency of error types, a classification matrix was used (see Appendix G). Data obtained from the computations and matrices were then presented in tables.

TABLE III
THE PARAMETERS JUDGED BY TASK

Task	Parameter I Completeness	Parameter II Time Delay	Parameter III Gestural	Parameter III Linguistic	Parameter III Phonological
Matching to Sample	X	X	X		
Pointing to Objects Named	X	X	X		
Answering Questions	X	X	X*	X	X
Imitating Single Words	X	X	X*	X	X
Sentence Completion	X	X	X*	X	X
Two-Word Constructions	X	X	X*	X	X
Sentence Formulation	X	X	X*	X	X
Reading Single Words	X	X	X		
Following Written Instructions	X	X	X		
Matching Sound to Letter	X	X	X		
Writing Object's Name	X	X	X		

* When a substitute for or in conjunction with a verbal response.

CHAPTER III

RESULTS AND DISCUSSION

Subjects' Response Variability Over Ten Sessions

Overall Daily Performance

The aphasic's overall daily performance for each of the 10 sessions for Parameter I--Completeness is summarized in Table IV. Correctness of a response is best reflected in Parameter I: Completeness. In order to receive a rating of "3" (complete), a response had to be linguistic or gesturally complete and appropriate. This table shows the mode of the overall score, percentage of the individual item responses the mode represents (PMR), range of scores, and number and percentage of "no responses." Parameter II--Time Delay was not included in this table or in any other discussion of the results since it did not appear related to correctness of response, and there was little evidence of variability in time required to respond. As Table IV illustrates, some of the measures reflect variability, while others do not. The overall performance represented by the mode remains unchanged throughout the 10 sessions for two of the three subjects. Only an infrequent occurrence of variation in the responses over the evaluating period is indicated by the range of each subject. Yet, variability is evident in the percentage of the total responses for a subject which is represented by the mode.

One parameter, rated for all the subjects, showed a remarkable

TABLE IV
OVERALL SCORES FOR EACH SUBJECT OVER THE TEN SESSIONS

		Parameter I Completeness			Parameter III Gestural			Parameter III Linguistic			Parameter III Phonological				
session		Mode	PMR	Range	Mode	PMR	Range	Mode	PMR	Range	Mode	PMR	Range	No Response	Percent
Subject 1	1	1	76	2	1	96	2	1	53	2	1	100	0	1	.008
	2	1	76	2	1	92	1	1	45	2	1	98	2		
	3	1	78	2	1	98	2	1	52	2	1	100	0		
	4	1	82	2	1	94	2	1	63	2	1	100	0		
	5	1	81	2	1	94	2	1	47	2	1	100	0		
	6	1	78	2	1	96	1	1	41	2	1	100	0		
	7	1	78	2	1	98	1	1	61	2	1	100	0		
	8	1	78	2	1	92	1	1	47	2	1	100	0		
	9	1	82	2	1	96	1	1	55	2	1	100	0		
	10	1	80	2	1	96	1	1	57	2	1	100	0		
Subject 1	1	1	61	2	1	85	2	3	44	2	1	100	0	6	.05
	2	1	67	2	1	90	2	3	51	2	1	100	0		
	3	1	72	2	1	85	2	3	49	2	1	100	0		
	4	1	70	2	1	85	2	3	48	2	1	100	0		
	5	1	68	2	1	88	2	3	46	2	1	100	0		
	6	1	71	2	1	88	2	3	47	2	1	100	0		
	7	1	71	2	1	83	2	1	44	2	1	100	0		
	8	1	71	2	1	83	2	3	44	2	1	100	0		
	9	1	74	2	1	88	2	3	50	2	1	100	0		
	10	1	72	2	1	83	2	1	46	2	1	100	0		
Subject 3	1	1	68	2	1	83	1	1	85	1	1	100	0	2	.02
	2	1	68	2	1	96	1	1	82	2	1	100	0		
	3	1	73	2	1	92	1	1	91	1	1	98	2		
	4	1	74	2	1	90	1	1	72	2	1	78	2		
	5	1	42	2	1	85	2	1	82	2	1	98	2		
	6	1	73	2	1	92	2	1	91	2	1	98	2		
	7	1	71	2	1	92	2	1	88	1	1	98	2		
	8	1	66	2	1	92	1	1	87	2	1	98	2		
	9	1	73	2	1	94	1	1	93	1	1	98	2		
	10	1	73	2	1	90	1	1	74	2	1	98	2		

degree of consistency, Parameter III--Phonological. For example, the phonological component observed in Subject I showed only a slight decrease in accuracy in only one session. In response to "Who does Kenneth Kerwin claim he is?" ("Answering Questions"), he responded "h z s little boy". The investigator was unable to determine whether the word was a neologism or if it was misarticulated. Nevertheless, the word was unrecognizable, even with contextual information, and thus rated "3" on Parameter III--Phonological. The stability of the articulation of the responses was not surprising since patients demonstrating significant dysarthria or verbal apraxia were excluded from the study.

Such consistency of response was not observed for the three subjects in Parameters I--Completeness, III--Gestural, and III--Linguistic. The scores obtained in Parameter III--Gestural and Parameter III--Linguistic, for Subject I, reflect deficits in gestural and linguistic skills typical of aphasic patients. As mentioned earlier, the linguistic component of the response showed greater inconsistency, probably due to the number of possible responses. However, all parameters revealed that days of declining performance were typically followed by days of improving performance.

Parameter I--Completeness exhibited a greater range of variability for Subject 3 than Parameters III--Linguistic or III--Gestural. In addition, the linguistic component exhibited a greater range than the gestural component. Declining performance was followed by improving performance, then another cycle of declining and improving performance followed. This pattern seemed to generalize to all parameters.

The results from each of the three subjects demonstrate that variability does exist (excluding Parameter III--Phonological) in the accuracy

of their responses when examining their overall daily performance for the 10 sessions. Although the amount of variability reflected by the mode was limited, showing a maximum variability of two points, the percentages of individual items which agreed with the mode indicate that in some cases over half of the subjects' responses varied from the mode.

It is evident that each aphasic exhibits variability that is more pronounced in certain parameters than others. Consider Subject I, for example. The range of overall PMRs for Parameter I--Completeness, Parameter III--Gestural, and Parameter III--Phonological equaled 6, 6, and 2 percent, respectively. But the largest amount of change occurred in Parameter III--Linguistic, in which the range equaled 22 percent. The wider range could have been the result of the greater number of possible types of responses in a task requiring a verbal response.

The area in which the most inconsistency existed for Subjects 2 and 2 was Parameter I--Completeness. The difference between the PMRs was 13 percent for Subject 2 and 32 percent for Subject 3. Parameter III--Phonological shows little to no variability for Subjects 2 and 3. The overall scores and ranges between PMRs reflect a predominant problem for both subjects, that of producing verbally or gesturally a complete response.

It is important to note that the nature of the responses made by the three subjects within each parameter can be described as fluctuant. Previously mentioned was the fact that the mode did not change over the 10 sessions. What was not mentioned was that each subject's PMR in Parameters I--Completeness, III--Gestural, and III--Linguistic did vary. Consider Subject 3, for example. The percentage of correct responses in Parameter I--Completeness, which were represented by the mode in session

4, equaled 74 percent. Then session 5 showed a decrease of 32 percent.

Some aphasics appeared to be less consistent than others in specific areas. Subject I, Parameter I--Completeness, exhibited a range of scores varying only 6 percent while Subject 2 exhibited a range of 32 percent. The former seems somewhat more stable in the accuracy of response, as judged by this parameter. However, Subject I displayed a range of 22 percent in Parameter III--Linguistic, indicating a greater variability than the other two subjects.

Task Performance

Inconsistencies are evident, not only in the daily overall scores, but also in the three subjects' overall task scores. For each task, the mode score and the sessions in which an item deviated from the mode are shown in Table V. At least two of the three subjects did not vary during "Imitating Single Words" and "Match to Sample", as rated by the completeness parameter; during "Match to Sample", as rated by the gestural component; during "Imitating Single Words", as rated by the linguistic component; and during "Answering Questions", "Imitating Single Words", "Sentence Completion", "Two Word Construction", and "Sentence Formulation", as rated by the phonological component. It should be noted again that all subjects exhibited only minimal amounts of variation in the articulation of their responses.

As Table V suggests, most tasks, for all three aphasics, involved inconsistent responses. More specifically, variability was observed in at least two subjects in 9 of the 11 tasks (82%) in Parameter I--Completeness; 3 of the 4 (75%) in Parameter III--Gestural; 4 of the 5 (80%)

TABLE V
 MODE OF EACH TASK AND DAYS IN WHICH RESPONSE DEVIATED
 FROM MODE, LISTED BY PARAMETER, FOR EACH SUBJECT

Task	Subject 1		Subject 2		Subject 3	
	Mode	Days the Response Deviated	Mode	Days the Response Deviated	Mode	Days the Response Deviated
<u>Parameter I--Completeness</u>						
Pointing to Objects Named	1	3,5,8	1	1,2,7,8	1	4,9,10
Matching to Sample	1	None	1	None	1	5
Answering Questions	3	1-10	1	1-10	3	1-10
Imitating Single Words	1	None	1	None	1	3-10
Sentence Completion	1	3,5-10	1	1-10	1	1-10
Two-Word Construction	1	1-10	1	1-10	2	1-10
Sentence Formulation	3	1-10	1	1-10	3	1-4,7,9
Reading Single Words	1	1-4,6, 8-10	1	1-10	1	1-3,5,7, 8,10
Following Written Instructions	1	1-10	1	1-10	1	1,3-10
Matching Sound to Letter	1	None	1	1-10	1	1-3,5,7, 8
Writing Object's Name	1	1-10	3	1-10	2	1-10
<u>Parameter III--Gestural</u>						
Pointing to Objects Named	1	3,5,8	1	1,2,7,8	1	4,9,10
Matching to Sample	2	None	1	None	1	5
Reading Single Words	1	1-4,6, 8-10	1	1-10	1	1-5,7,8, 10
Following Written Instructions	1	1-10	1	1-10	1	1,3-10
<u>Parameter III--Linguistic</u>						
Answering Questions	3	1-9	3	1,4-8,10	1	1-10
Imitating Single Words	1	None	1	None	1	None
Sentence Completion	1	1-8	1	1-10	1	4,5,8
Two-Word Construction	2	1-10	2	1-10	1	1-8,10
Sentence Formulation	3	2-10	3	None	1	1-6,10
<u>Parameter III--Phonological</u>						
Answering Questions	1	2	1	None	1	None
Imitating Single Words	1	2	1	None	1	None
Sentence Completion	1	None	1	None	1	None
Two-Word Construction	1	None	1	None	1	None
Sentence Formulation	1	None	1	None	1	None

in Parameter III--Linguistic; and none of the 5 (0%) in Parameter III--Phonological.

The variability between task scores was observed to follow one of two basic directions. Some aphasics' performance varied in a "positive direction." This type of inconsistency is characterized by a subject beginning at one level of performance and improving to another level throughout the 10 sessions. No deterioration of performance was observed. Since the same items in each task were presented in all 10 sessions, it is possible that a learning effect occurred and was responsible for the improvement in the task performance. (During the session, no indication was made by the examiner that the response was correct or incorrect. However, all subjects mentioned that they had consulted their spouses for the appropriate response between sessions.)

The other type of variability observed is a "fluctuant direction." This variability is similar to the type demonstrated by all subjects in overall daily performance. A person begins at one level of performance, and, within the 10 sessions, improves and declines in the levels of performance. The learning effect is unlikely to have occurred, since a stimulus eliciting an accurate response on one day elicits an inaccurate response the next day(s). Two of the aphasics demonstrated fluctuant variability when completeness was judged on all tasks. One subject displayed positive variability in this parameter when writing objects' names. Other task scores were fluctuant. It should also be noted that no subject exhibited negative variability in which performance began at one level of performance and continually decreased.

Two examples are provided to illustrate the two types of variability which occurred within a task. Consider Subject I, whose performance on

"Following Written Instructions" amplifies fluctuant variability. The mode of response for Parameter I--Completeness and III--Gestural was "1."

Notice in Figure 1, 6 of the 11 items presented in session 1 were rated "1" on Parameter I--Completeness and Parameter III--Gestural. Then performance during sessions 2 and 3 improved by two items. Performance began to decline in session 4 by one item but improved the next session, again by one item. Sessions 6 and 7 saw another decline, but this time by two items. The performance remained the same throughout session 8, but increased and decreased in sessions 9 and 10, respectively.

Positive variability is illustrated by Subject 2's performance on "Writing Object's Name". Figure 2 shows that, initially, the mode represented six items. The first increase was observed in session 3 and continued until session 10.

Item Performance

All three subjects exhibited inconsistency on some items as measured by Parameter I--Completeness. The two types of variability observed within tasks were also observed within items. Two of the three subjects' performance involved fluctuant variability on some individual items and positive variability on others, and one subject's performance on individual items was typical of fluctuant variability. Table VI summarizes this information. Again, no negative variability was observed in any subject on item performance.

Comments by the Subjects

The subjects themselves often made reference to the inconsistencies

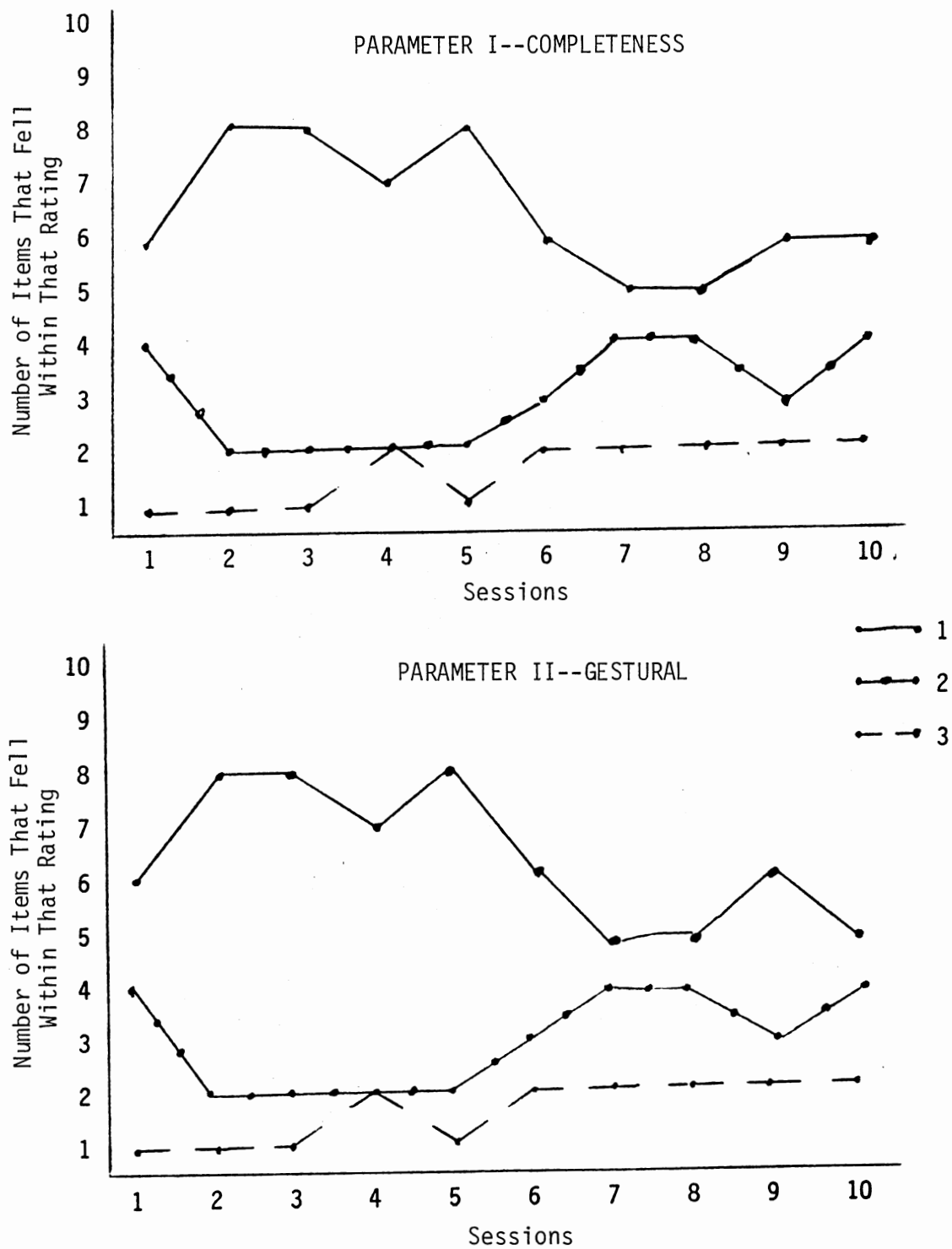
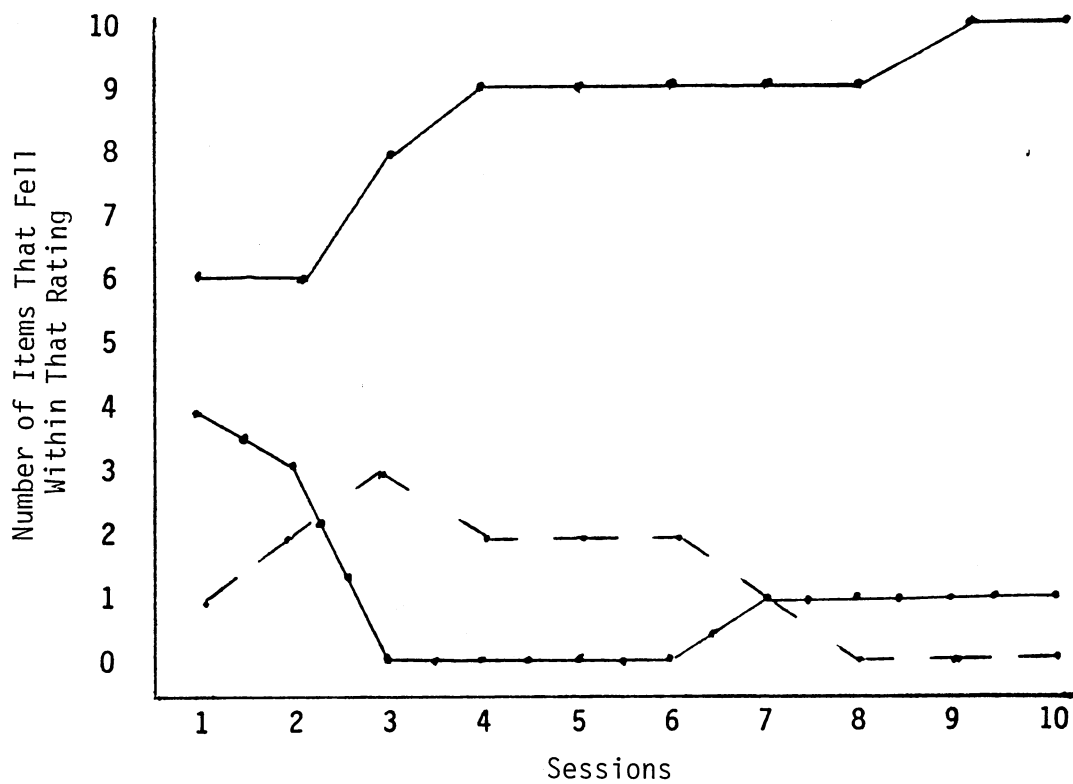


Figure 1. The Number of Items Rated "1," "2," or "3" in Parameters I--Completeness and III--Gestural for Subject 3 in "Following Written Instructions"



Ratings for Parameter I--Completeness:

1 ———

2 - - - -

3

Figure 2. The Number of Items Rated "1," "2," and "3" in Parameter I--Completeness for Subject 2 in "Writing Object's Name"

TABLE VI
 NUMBER AND PERCENTAGE OF ITEMS THAT CORRESPONDED
 TO A PARTICULAR VARIABILITY PATTERN

Subject	No Variability		Positive Variability		Fluctuant Variability	
	Number	Percent	Number	Percent	Number	Percent
1	75/119	63	4/119	3	40/119	34
2	55/119	46	0/119	0	64/119	54
3	66/119	55	7/119	6	46/119	39

present in their linguistic abilities. Comments such as, "Now that I could always say that, but not right now," "I can't tell you the name of it now," and "I can often say it, but not right now," were made by the subjects.

Differences in the Number of Correct Responses
for Individual Task Items for the Members
of the Aphasic Group

Table VII lists the number of correct responses that occurred for each task item for each subject. The specific items on which two or three subjects missed half will be discussed according to task.

Four of the six items in "Answering Questions" elicited incorrect responses half of the time by two to three subjects. The difficulty with these items may have been the result of the nature of the question and/or the response required. These items contained relatively abstract terms (i.e., "how" and "why"), assumed the passage and questions were comprehended, required specific responses, and required the subject to extract the appropriate response from the information presented.

Some items in "Sentence Completion" such as "You shoot with a . . ." could have elicited a variety of answers (i.e., "gun," "rifle," "bow and arrow"). Yet, the item "Milk comes from a . . ." would probably be completed with the answer "cow." More errors in this task seemed to occur on items which could have a variety of responses.

Items most frequently missed by two or three subjects during "Two Word Construction" were ones which were less familiar (i.e., "Sharpened/unsharpened pencil") or somewhat of an unnatural construction (i.e., "On/off T.V.").

TABLE VII
 A LIST OF THE NUMBER OF CORRECT RESPONSES FOR
 INDIVIDUAL ITEMS FOR EACH SUBJECT

Task	Item	Subject 1	Subject 2	Subject 3
Answering Questions	How was the baby lost in the first place? ¹	5	2	1
	What action did Kenneth take against the State of N.J.?	4	0	4
	Who does Kenneth Kerwin claim he is? ¹	2	4	3
	What was the return letter about? ¹	0	4	0
	Who did Kevin write to?	6	6	0
	Why did Kevin write to Reagan? ²	0	2	0
Pointing to Objects Named	Book	9	10	10
	Dollar bill	10	10	10
	Envelope	8	8	9
	Fork	10	9	10
	Key	10	10	10
	Matches	10	8	10
	Necklace	10	10	10
	Pen	10	9	8
	Rubberband	10	9	10
	Sock	10	10	10
Toothbrush	10	10	10	
Matching to Sample	He saw her reading the newspaper	10	10	10
	One jar is empty but one is full	10	10	10
	She sleeps at her desk	10	10	10
	She slept on the couch	10	10	10
	She realized she was late	10	10	10
	The cats are eating on the porch	10	10	10
	The car is blue	10	10	10
	The girl is studying	10	10	10
	The man wearing the hat waters the plant	10	10	10
	The dark headed girl is taller than the blonde headed girl	10	10	10
Imitating Single Words	Absolutely	10	10	10
	Around	10	10	10
	Coffeetable	10	10	10
	Evacuate	10	10	8
	Head	10	10	10
	However	10	10	10
	Hungry	10	10	10
	More	10	10	10

TABLE VII (Continued)

Task	Item	Subject 1	Subject 2	Subject 3
Imitating Single Words	Scientific	10	10	10
	Shirt	10	10	10
	T.V.	10	10	10
Sentence Completion	Apples grow on . . .	10	10	10
	I want a cup of . . .	9	5	10
	Milk comes from a . . .	10	10	9
	Someone's knocking at the . . .	10	10	10
	You cook on a . . . ¹	9	0	3
	You cut meat with a . . . ¹	10	4	1
	You drive a . . .	10	10	10
	You eat with a . . .	7	0	10
	You shoot with a . . .	9	6	1
	You talk on the . . .	4	8	10
You write with a . . .	9	6	1	
Two-Word Construction	Clean/dirty plate ¹	5	6	2
	Full/empty jars ¹	3	9	1
	Good/bad photo ¹	7	2	0
	Hot/cold day	9	7	6
	Open/closed door	7	10	2
	Sad/happy woman ¹	5	9	2
	Sharpened/unsharpened pencil	0	0	0
	Tall/short candle ¹	4	6	0
	White/black shoe	7	7	1
On/off T.V. ²	2	0	5	
Sentence Formulation	Aspirin ²	0	1	0
	Bandaid ²	0	1	0
	Blank checks ²	0	3	0
	Map ²	3	4	0
	Money ¹	0	8	1
	Paperclip ²	0	0	0
	Pen ²	0	8	0
	Razor ²	0	0	1
	Ruler ²	0	8	0
Screwdriver ²	0	0	0	
Straw ²	0	3	0	
Reading Single Words	Books	10	10	10
	Graduated	10	10	10
	Happy	10	10	10
	In	2	10	8
	Kitchen	10	10	10
	Laughing	10	10	10
	Over	8	9	3
	Parent	10	10	10

TABLE VII (Continued)

Task	Item	Subject 1	Subject 2	Subject 3
Reading Single Words	Reaching	10	10	9
	Stamp	10	10	10
	Surprised	10	0	8
	Suitcase	10	10	10
	Talking	10	10	10
	Wallet	10	10	10
	Winter	10	9	8
	Wreath	10	7	10
Following Written Instructions	Blink your eyes twice	6	6	6
	Hold up four fingers	10	1	10
	Make a fist	10	3	10
	Open your mouth	10	10	9
	Pick up the pencil	8	10	9
	Point to the door	10	10	6
	Put this card face down	10	1	7
	Raise your hand over your head ¹	10	2	2
	Scratch your left cheek	10	0	6
	Show me your thumb	10	5	10
Touch your chin	10	8	9	
Match Sound to Letter	B	10	0	8
	D	10	0	10
	E	10	6	8
	F	10	1	9
	K	10	0	8
	M	10	0	9
	O	10	9	9
	P	10	0	9
	R	10	3	9
	T ²	10	0	5
U	10	0	8	
Write Object's Name	Bottle opener ¹	0	0	0
	Button ¹	10	0	4
	Cornholders ²	3	0	0
	Clothespin ²	3	0	0
	Key	10	2	6
	Nail ¹	10	0	2
	Quarters	7	7	7
	Ring	10	2	7
Soap	9	10	8	

TABLE VII (Continued)

Task	Item	Subject 1	Subject 2	Subject 3
Write Object's Name	Spoon Sucker ¹	10 8	9 1	1 1

¹At least half of the responses were incorrect as measured by Parameter I--Completeness for three subjects.

²At least half of the responses were incorrect as measured by Parameter I--Completeness for two subjects.

During the task "Match Sound to Letter," the focus of difficulty seemed to be on consonants rather than vowels. No vowel evoked a large number of incorrect responses by most of the subjects. However, the consonant "T" resulted in half of the responses being incorrect for two subjects.

Only one item in "Following Written Instructions" was usually missed by most of the subjects. Since the subjects usually utilized their hands in some action near the head, apparently the subject and the direct object of the sentence were comprehended. The preposition "over" seemed to be the focus of difficulty.

Specific items on the "Writing Object's Name" task often evoked errors. Six of the more difficult items for at least two of the subjects included: "bottle opener," "button," "cornholders," "clothespin," "nail," and "sucker." It is likely that compound words (i.e., "bottle opener") often elicited incorrect responses. The items "sucker" and "nail" are more difficult to explain. The former item may merely reflect the word-finding difficulties common to all three subjects, especially on an infrequently used word. Errors on the latter item seemed to involve reversal of the two vowels. Since the written word contains two vowels and the spoken word contains one vowel and a syllabic /z/, the subjects may have become confused as to the correct sequence of the letters.

In general, tasks such as "Answering Questions," "Sentence Completion," "Two Word Construction," "Sentence Formulation," and "Writing Object's Name" were most difficult for most of the subjects to complete, while tasks such as "Pointing to Objects Named," "Match to Sample,"

"Match Sound to Letter," "Imitating Single Words," "Reading Single Words," and "Following Written Instructions" were least difficult to complete.

Patterns of Errors Displayed By Individual Adult Aphasics

The patterns of error types made by each subject will be discussed looking at daily overall scores within tasks which required the same mode of response, between tasks regardless of required mode of response, and between sessions for tasks which required verbal or graphic responses. In addition, the error types for each subject will be discussed according to the category in which they fell. The responses were categorized by the component of the response into one of the following: gestural, graphic, or verbal. Examples of each type of error for each subject can be found in Appendix H.

Subject 1

Patterns of Performance for Overall Daily Scores. As previously mentioned, inconsistencies were observed in this aphasic's overall daily performance. However, specific parameters of the responses revealed more consistency than others (see Figure 3).

It is apparent from the information presented in Figure 3 that Parameter III--Phonological was the area most consistent for Subject 1. The reasons for this have already been discussed in the "Subject's Response Variability Over Ten Sessions" section, and will not be discussed further. The syntactic aspect of this subject's responses appeared to

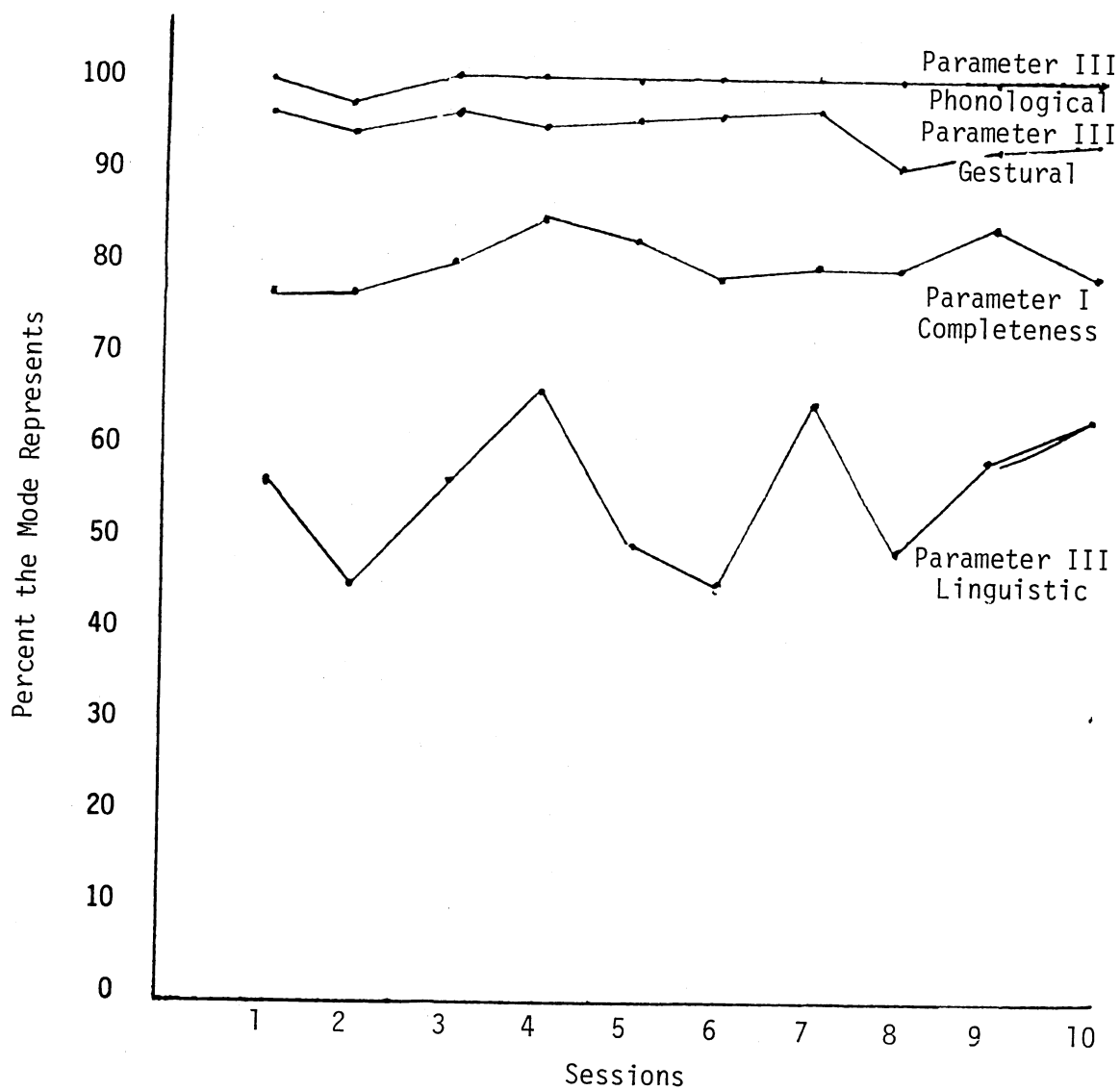


Figure 3. Percent the Mode Represents for Each Parameter for Each Session for Subject 1

be the least reliable. One to two days of decline are followed by one to two days of improvement.

Information regarding the subject's emotional status and medication schedule was obtained from the Daily Case History forms. It was reported that he received medication for depression every day and the medication was administered in equal amounts each day. Written comments suggest that this subject was somewhat depressed during the third and ninth sessions. Previous research (Eisenson, 1973; and Marshall in Chapey, 1981) has indicated that these two factors could influence performance. However, the lowest level of Subject 1's overall scores, as judged by Parameter 1--Completeness, occurred during the first and second sessions. According to the the information in the Daily Case History, the third and ninth sessions could have been days in which performance declined. Yet, as Figure 3 indicates, the third and ninth sessions fell within a period of increasing accuracy of response. It appears that emotional status was not a major factor contributing to this subject's overall performance. It was not possible in this study to determine the effects of the medication.

Patterns of Performance Within Tasks which Require the Same Mode of Response. Only a few different types of errors were observed in gestural responses. The small number of error types may be due to the nature of these tasks (i.e., "Pointing to Objects Named," "Match to Sample," "Reading Single Words," and "Following Written Instructions"). All tasks except "Following Written Instructions" involved a set of two to three given choices.

The most frequent error was "Correct action/incorrect object." It should be noted that this error occurred in response to the same items

in "Following Written Instructions." The subject would always scratch his right cheek when presented with the item "Scratch your left cheek." It appears that this error was the result of a receptive-semantic confusion on the word "left."

Two other types of errors were observed one time each: "Read stimulus item" and "Incorrect action and object."

The two most frequent error types in graphic responses included "Word substitution," occurring 29 times; and "Word addition," occurring 12 times. These two error types are similar to the types observed in verbal responses. Subject 1 substituted or added a word in writing tasks as he did in verbal tasks. The similarity of the errors found in both response components appears to reflect one area of deficit, word-finding.

Among the less frequently occurring errors are "No response," "Part of word omitted," "Letters added," "Category word," "Letters substituted," and "Description." Errors such as "Category word," and "Description" also seem to be the product of word-finding difficulties, similar to those observed in verbal tasks.

Verbal responses displayed a wider assortment of error types. Some of the most frequently occurring included: "Named object," "Word substituted," "Word omitted," "Rejection," "Empty word," "Unrelated response," "Description," and "Phrase substituted."

In an attempt to compensate for the word-finding problem, Subject 1 produced two general types of errors. The first type occurred at the single word level. The desired word was either replaced with another word, empty word, or omitted all together. The second type occurred at the sentence or phrase level. He tended to omit the word, described the word, or produced a response that was semantically not related.

Patterns of Performance Between Tasks Regardless of Required Type of Response. The patterns of performance, frequency of occurrence of these patterns, and tasks manifesting these particular patterns are presented in Table VIII. The patterns reveal the relationship of the level of performance with the degree of variability displayed within a particular task. Subject 1's performance on most tasks is characterized by "High Scores/Low Variability" and "Low Scores/High Variability." A lesser number of tasks evidenced high or moderate scores with moderate variability, while no tasks showed low scores with low variability. It is probable, therefore, that activities which taxed this subject's receptive and/or expressive language skills evoked a larger degree of variability than activities which did not tax those skills.

Patterns of Performance Between Sessions. The error types produced in verbal and graphic responses are listed for each session in Table IX. Types of errors in verbal responses did not exhibit a well defined pattern during any of the 10 sessions. However, sessions 2, 7, 8, 9, and 10 demonstrated a wider variety of error types than other sessions. In addition, this subject appeared to utilize a set of error types, of which some error types occurred with more frequency and consistency. Among these were: "Named object," "Phrase omitted," "Empty word," and "Unrelated response." The errors occurred primarily at the single word level in sessions exhibiting few different error types. On the other hand, the errors occurred primarily at the word and phrase level in sessions 7, 8 and 10.

When the overall performance within Parameter III--Linguistic in Figure 4 is examined, these sessions of large numbers of error types did

TABLE VIII
 THE NUMBER AND TASKS WHICH CONSTITUTE
 EACH PATTERN LISTED FOR SUBJECT 1

Pattern	Frequency of Occurrence	Tasks
High Score/Low Variability	5	Pointing to Objects Named Matching to Sample Imitating Single Words Reading Single Words Matching Sound to Letter
Low Score/High Variability	4	Answering Questions Two-Word Construction Sentence Formulation Writing Object's Name
High Score/Moderate Variability	1	Following Written Instructions
Moderate Score/Moderate Variability	1	Sentence Completion

High scores = 90-100% complete; moderate scores = 70-89% complete; low scores = 0-69% complete.

High variability = 50-100%; moderate variability = 20-49%; low variability = 0-19%.

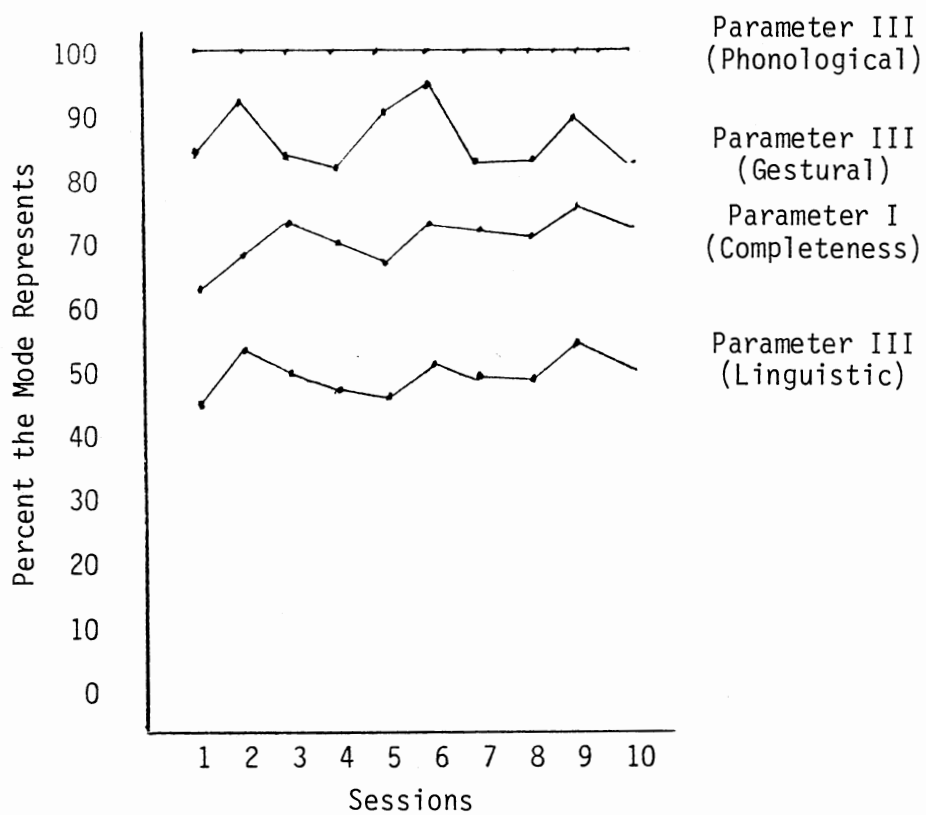


Figure 4. Percent the Mode Represents for Each Parameter for Each Session for Subject 2

not reveal consistent levels of performance. Sessions 7 and 10 display some of the highest levels of performance, while session 8 one of the lowest. The investigator was unable to determine possible explanations for this. No information contained in the Daily Case History from disclosed any possible influences.

Subject 2

Patterns of Performance for Overall Daily Scores. Variability although not pronounced, exists in this subject's overall daily scores. Unlike the previous subject, no one parameter appears more variable than the others (see Figure 4).

Information gleaned from the Daily Case History forms noted that this subject received the same medication in equal amounts every session in which testing was done. She reported that she was particularly displeased with her language impairment during sessions 2, 5, 8, and 10. Declines in overall daily scores were observed in sessions, 5, 8, and 10, while improvement was observed in session 2. The subject's mood may, therefore, have been an influencing factor in her performance during at least three sessions. The investigator, however, was unable to determine the effects of the medication.

Patterns of Performance Within Tasks Which Require the Same Type of Response. Gestural responses demonstrated one frequently occurring error: "Correct action/incorrect object." This error was made on six of 11 stimulus items presented in "Following Written Instructions." For example, when presented with the card that read "Hold up four fingers," she responded by moving her thumb and fingers in a pinching motion. It

seems as though she was unable to interpret the action (verb) to be performed, rather than the objects (nouns) with which to do it.

A second, less frequently occurring error was "Used additional body part to complete gesture." This type of error was observed several times on one particular task item in "Following Written Instructions." In response to "Blink your eyes twice," she would respond by using her fingers to close her eyes.

Graphic responses demonstrated three frequent error types: "Letters added," "Category word," and "No response." The former type of error was observed on all items in "Match Sound to Letter." When presented with a letter to write, she would write the correct letter but then add letters, seemingly in an attempt to construct a word. For example, in response to "Write the letter 'B' or Write the letter 'Y,'" she would write "bee" and "you," respectively. It seems as though she confused the word "letter" in the instructions with the word "word."

The two latter error types occurred in "Writing Object's Name." Subject 2 was consistently able to write "spoon," "soap," and "25¢." However, for the item "sucker," she produced some form of a category word, such as "sweet food" or "food-candy." The remainder of the words--half of which were simple, short words and half of which were compound--elicited a "No response."

Verbal responses encompassed a large number of error types. Among the most frequent and consistently made were: "Word substitution," "Rejection," "Inappropriate description," "Word omitted," "Phrase omitted," "Named object," "Empty word," "Related phrase substituted," "Phrase run-on" and "Stimulus repeated." The following errors occurred with less frequency: "Revision," "Suffix added," "Inappropriate phrase added,"

"Word added," "Part of concept omitted," "Inappropriate phrase added," "Sentence substituted," "Word transposed," "Related but inappropriate response," and "Phrase added."

The types of errors demonstrated seemed to reflect a general word-finding problem. When Subject 2 was unable to produce a word, she tended to use another word in its place, describe it, or discontinue the sentence and attempt a different sentence in order to produce the word. For example, she produced the following utterance when asked to describe the function of an aspirin: "That's Anacin/that what you get when you got a head/ah, when it hurts/you eat that/it's medicine you eat."

Patterns of Performance Between Tasks Regardless of Required Type of Response. As Table X illustrates, the pattern "High Scores/Moderate Variability" occurred in one task. A larger number of tasks showed high scores associated with high variability and an even larger number showed low scores with high variability. Subject 2 exhibited patterns similar to those exhibited by Subject 1. Tasks difficult to perform appeared to be associated with more inconsistency. The opposite also seemed to be true. Infrequent variability occurred in tasks which were not difficult for that subject to complete.

Patterns of Performance Between Sessions. The errors made over the 10 sessions appear to follow a pattern (refer to Table XI). The same errors and types of errors occurred throughout the entire testing period. When in error, subject 2 tended to reject, describe, or name the object. Errors frequently involved inappropriate descriptions or responses and omissions, additions, and substitutions at the word and phrase level.

TABLE X
THE NUMBER AND TASKS WHICH CONSTITUTE EACH
PATTERN LISTED FOR SUBJECT 2

Pattern	Frequency of Occurrence	Tasks
High Scores/Low Variability	3	Pointing to Objects Named Matching to Sample Two-Word Construction
Low Scores/High Variability	7	Answering Questions Two-Word Construction Sentence Completion Sentence Formulation Following Written Instructions Matching Sound to Letter Writing Object's Name
High Scores/Moderate Variability	1	Reading Single Words

High scores = 90-100% complete; moderate scores = 70-89% complete;
low scores = 0-69% complete.

High variability = 50-100%; moderate variability = 20-49%; low variability = 0-19%.

Subject 3

Patterns of Performance for Overall Daily Scores. Subject 3 demonstrated changes in the overall scores for each parameter. A greater degree of inconsistency existed in scores obtained by this subject than any other, as illustrated in Figure 5.

Possible factors that could account for this subject's scores are difficult to specify. Daily Case History forms indicated that this aphasic's emotional status was no different from session to session. It is important to note that Subject 3 appeared to be generally frustrated in regard to his linguistic skills even while reporting good moods each testing day. He also received medication for seizures and circulation on a daily basis. The dosage always remained the same.

Patterns of Performance Within Tasks Which Require the Same Mode of Response. The error in gestural responses which occurred most often was "Incorrect action." When presented with a stimulus card such as "Open your mouth," this subject seemed unable to interpret the message, thus guessing at the response to make. The inaccurate responses for a particular stimulus item were not always consistent across the 10 sessions.

Other error types which were observed less than five times each included: "Performed action incorrect number of times," "Correct action/incorrect object," and "Incorrect action/correct object."

Types of errors predominant in graphic responses included: "Letter substituted," "Word substituted," "Part of word omitted," and "No response." Less frequently occurring error types included: "Letter transposed" and "Letters added."

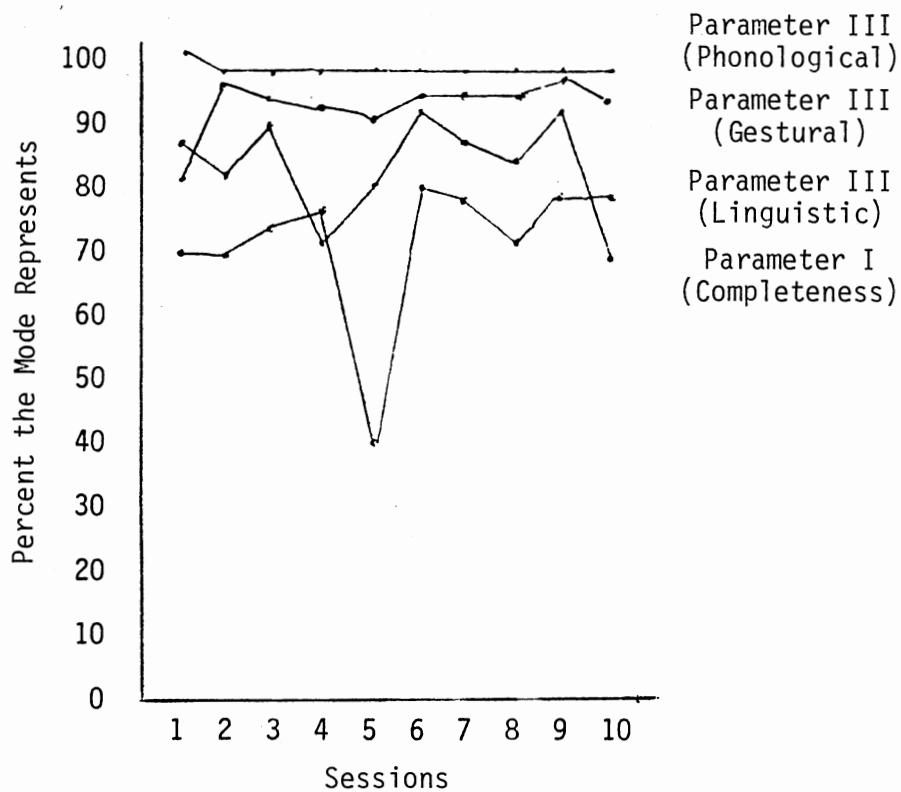


Figure 5. Percent the Mode Represents for Each Parameter for Each Session for Subject 3

Consider the task "Writing Object's Name," for example, short words such as "nail" tended to elicit letter transpositions or omissions; however, when the larger or compound words were presented, the error types were primarily "Part word omitted" or "No responses." More specifically, items "nail," "bottle opener," and "cornholder" tended to elicit "nail," "beer Key," and "corn," respectively.

Subject 3 did not display as many different error types in verbal responses as the other subjects. The types of errors were primarily "No response," "Named object," "Word omitted," "Phrases omitted," and "Word substituted." It is likely that the small variety of error types, compared to the other subjects, can be attributed to the nature of this language impairment. As mentioned before, he communicated primarily in short phrases. Since the length and complexity of his utterances were restricted, so were the number of errors possible.

Patterns of Performance Between Tasks Regardless of the Mode of Response. Table XII presents information regarding the patterns, frequency of occurrence, and tasks evidencing the patterns. It is apparent that the trends in performance displayed by Subject 3 were similar to those displayed by the other two subjects. The two most predominant patterns are "Low Scores/High Variability" and "High Scores/Low Variability." In addition, no relationships existed in which low scores are associated with low variability. It appears that the hypothesis that a greater degree of variability occurs in the face of tasks difficult for that subject to perform, while more reliable responses occur during tasks easy for the subject to perform is confirmed for Subject 3 also.

TABLE XII
 THE NUMBER AND TASKS WHICH CONSTITUTE EACH
 PATTERN LISTED FOR SUBJECT 3

Pattern	Frequency of Occurrence	Tasks
Low Scores/High Variability	4	Answering Questions Two-Word Construction Writing Object's Name Sentence Formulation
High Scores/Low Variability	3	Pointing to Objects Named Matching to Sample Imitating Single Words
Moderate Scores/Low Variability	2	Reading Single Words Matching Sound to Letter
Low Scores/Moderate Variability	1	Following Written Instructions
High Scores/Moderate Variability	1	Sentence Completion

High scores = 90-100% complete; moderate scores = 70-89% complete;
 low scores = 0-69% complete.

High variability = 50-100%; moderate variability = 20-49%; low variability = 0-19%.

Patterns of Performance Between Sessions. The number and types of errors were fairly consistent over the 10 sessions (see Table XIII) for both the verbal and graphic responses. This subject appeared to have a repertoire of error types. The majority were used in almost every session--some more consistently than others.

Differences in the Number and Types of Errors
Among the Individual Aphasics

Number of Errors

Parameter I--Completeness was judged to best reflect the accuracy of the response or the similarity to the target response, regardless of the type of response. Therefore, it was examined to determine the presence of diversity in the number of errors made by the three subjects. In addition, the number of complete responses, total number of responses possible for the 10 sessions, and percentage of complete responses are presented in Table XIV.

As Table XIV suggests, a difference occurred between the subjects in all but one task. The one task in which all responses made by all subjects were rated "complete" was "Imitating Single Words." The level of receptive and expressive language abilities retained by the subjects probably account for the high scores obtained on this task.

Also evident is the fact that certain tasks demonstrated a wider diversity of scores than others. "Match to Sample" and "Reading Single Words" are examples of tasks in which the range of scores differs only slightly. The percentages differed by 1 percent on "Match to Sample," and by 6 percent on "Reading Single Words." It is important to note, also, that all three subjects achieved moderate and high percentages of

TABLE XIV
 NUMBER AND PERCENTAGE OF ERROR RESPONSES
 FOR EACH SUBJECT, ACCORDING TO TASK

Tasks	Number of Erred Responses						Range of Scores
	Subject 1		Subject 2		Subject 3		
	NC/NP	% C	NC/NP	% C	NC/NP	% C	
Pointing to Objects Named	107/110	97	105/110	95	67/110	61	2.00
Matching to Sample	100/100	100	100/100	100	99/100	99	1.00
Answering Questions	16/60	27	33/60	55	20/60	33	28.00
Imitating Single Words	110/110	100	110/110	100	110/110	100	0.00
Sentence Completion	97/110	88	51/110	53	105/110	95	43.00
Two-Word Construction	54/100	54	55/100	55	64/110	64	10.00
Sentence Formulation	11/110	1	53/110	48	6/110	05	47.95
Reading Single Words	150/160	94	144/160	90	140/160	88	6.00
Following Written Instruction	99/110	90	63/110	57	82/110	75	33.00
Matching Sound to Letter	110/110	100	75/110	68	92/110	84	32.00
Writing Object's Name	86/110	78	41/110	37	36/110	33	45.00

NC/NP = number complete/number possible; % C = percent complete.

High scores = 100-90%; moderate scores = 91-80%; low scores = 79-0%.

"complete" responses. Several factors may have contributed to the scores obtained. Both tasks involved a closed set of two to three choices, allowing the subject to guess in the event that he did not know the answer. The limited field also reduced the chances of selecting an inappropriate choice. Finally, the receptive skills necessary to complete these tasks were below their functioning level (as determined in the screening procedures) and required a simple, nonverbal response.

Conversely, scores among the three subjects differed to a greater extent in tasks such as "Sentence Completion," "Sentence Formulation," and "Writing Object's Name." The highest and lowest percentage of variability ranged from 49 percent on "Sentence Completion" to 43 percent on "Sentence Formulation." These tasks displayed a general tendency for the percentage correct to be low with the exception of "Sentence Completion."

Several factors may have influenced the occurrence of these scores. Consider first the "Sentence Completion" task. The task offered no given set of choices but required a single, specific response. The process involved in providing an answer taxed an area of deficit common to all three subjects: word-finding. Yet, as Table XIV illustrates, Subject 2 achieved 95 percent correct. His success in this task may have been because this subject communicated predominately in short phrases and his word-finding ability was improved by contextual information. The same was true for Subject 1 who achieved 88 percent correct. Subject 2 performed no better when cueing was provided and achieved a score of 46 percent correct.

Table XIV shows that performance on "Sentence Formulation" resulted in particularly low scores for all three subjects. Again, no choices

were supplied. In this task, no contextual information was given. The linguistic complexity had also increased. Since a one-word response was no longer appropriate, additional linguistic processes were exercised. It was not only necessary for subjects to utilize their ability to select the appropriate words but also the ability to select the appropriate articulatory postures, morphological endings, and syntactical structures. Even though Subject 2 achieved a higher score than the other two, all scores were low and probably reflected the combined effects of each subject's areas of deficit.

The scores obtained by the three subjects on the "Writing Object's Name" task have less definable influencing factors. No choices or cues were available but a specific answer was required. Like the task, "Sentence Formulation," this task also involved greater linguistic complexity but of a different type. The subject first had to select the appropriate word, then apply the correct spelling in order to write the target word. These factors explain the lower scores obtained on this task than a similar task, "Sentence Completion" (in which the subject had to verbally, instead of graphically, produce a single word). However, it is more difficult to ascertain the reasons why Subject 1 scored higher than the other two subjects (even though his score is considered low).

For a given task, the more restricted the range of possible responses, the larger the number of correct items (as rated by "3" on Parameter I--Completeness). This may indicate that the large degree of accuracy with which all subjects completed those tasks led to decreased variability. The opposite also appears to be true. The tasks which were more difficult for the subjects tended to evoke low and variable

scores. It may be that difficult tasks, or tasks that tax a subject's weakest linguistic processes, elicit more inconsistent responses.

Types of Errors

All subjects displayed: (1) errors common to all three subjects, (2) errors common to one other subject, and (3) errors not common to any other subject (see Table XV).

Nearly half (45%) of the total number of errors made were unique to one of the three subjects, 31 percent were made by all three subjects, and 24 percent were made by two subjects.

The error types exhibited by all three subjects can be considered common errors. Consider a few of the types of responses that fell into the categories "Errors Common to all Subjects" and "Errors Common to Two Subjects." Among these responses are "Pointing to Other Choice" (gestural), "Letters Added" and "Letters Substituted" (written), and "Rejection," "Word Omitted" or "Phrase Omitted," "Appropriate Description," and "Empty Words" (verbal). All of these types of errors would be regarded as ordinary or likely to occur. However, some errors could be considered irregular. For example, responding to the written stimulus "Blink your eyes twice," Subject 2 used her fingers to close her eyelids. Subject 1 read the label on the aspirin container aloud when asked to "Tell me what you do with this."

The errors common to all three subjects constituted the largest percentage of each individual's total number of error types. The smallest percentage of error types are errors displayed exclusively by that subject. Table XV summarized this information.

TABLE XV

PERCENTAGES OF DISTRIBUTION OF EACH SUBJECT'S ERROR TYPES
 INTO ONE OF THREE CATEGORIES: ERRORS COMMON TO ALL
 SUBJECTS, ERRORS COMMON TO TWO SUBJECTS,
 AND ERRORS UNIQUE TO THAT SUBJECT

Mode of Response	Errors Common to All Subjects	Errors Common to Two Subjects	Subject #1's Errors	Subject #2's Errors	Subject #3's Errors
Gestural	No response		Read stimulus only	Used additional body parts to complete gesture	Incorrect action/correct object
	Pointed to other choice Correct action/incorrect object			Performed action too many times	Incorrect action and object
Written	Letters added	Letters omitted	Description		Letters transposed
	Letters substituted	Word added			
	Word substituted	Category word			
Verbal	Rejection	Appropriate description	Read label	Part of concept omitted	Automatic speech
	Named object	Related but inappropriate response	Personal comment	Revision	Appropriate aspect omitted
	Suffix Added	Word added	Named aspects of unrelated responses	Repetition of stimulus	
	Part of word omitted	Phrase added	Stimulus into question	Inappropriate description	
	Word omitted	Sentence substituted		Inappropriate phrase added	
	Phrase omitted	Empty Word		Inappropriate phrase substituted	
	Word substituted	Word transposed			

TABLE XV (Continued)

Mode of Response	Errors Common to All Subjects	Errors Common to Two Subjects	Subject #1's Errors	Subject #2's Errors	Subject #3's Errors
Verbal	Related phrase substituted	Phrase run-on			
Total	14 (31% of total number of different error types)	11 (24% of total number of different error types)	7 (22% of total number of different error types)	8 (24% of total number of different error types)	5 (17% of total number of different error types)
Total number of different error types made by that subject:			32	33	30

This information indicates that although the subjects all demonstrated some unique types of errors, similar types are observed in all subjects.

CHAPTER IV

CONCLUSIONS

The purpose of this present study was to determine whether: (1) an individual adult aphasic demonstrated variability of response on a series of tasks repeated over 10 sessions; (2) a difference in the number of correct responses existed for individual task items for the members of the aphasic group; (3) an individual adult aphasic displayed a pattern of patterns of errors; and (4) differences existed in the number and types of errors among the individual aphasics. The results of the investigation indicated that all aphasics did perform inconsistently on the 11 tasks presented over 10 sessions. Second, incorrect responses (made by at least two of the subjects) were observed on certain task items. At the same time, other items elicited only correct responses from the subjects. For example, when asked to write "clothespin," most of the subjects erred. Yet, when asked to write "pen", most subjects produced a correct response. Third, although there was some scatter in errors displayed, each subject appeared to have some predominant types of errors. Fourth, some individual differences existed in frequency and patterns of errors among all three subjects; yet there was also substantial overlap in types of errors displayed and tasks which produced increased errors. Finally, the number and types of errors differed between the individual subjects.

The information obtained cannot be generalized to the aphasic population due to the small sample size. However, some objective data have been obtained to document inconsistencies in each subject's performance between days and within tasks and task items. Further research concerning this topic should utilize a larger number of subjects so inferences to the general aphasic population can be made and should determine whether or not the variability observed is significant.

Some of the previous authors (Schuell, 1964; Porch, 1971; and Davis and Leach, 1972) who explored the possibility of variability in an aphasic's performance over time utilized an empirical approach, while others (Head, 1963; Kriendler and Fradis, 1968; Sarno, Silverman, and Sands, 1970; Brookshire, 1973; Darley, 1978; and Marshall, in Chapey, 1981) merely made an anecdotal reference with no supporting evidence. This investigation was similar in methodology to those studies which offered data to support their theory. When looking solely at modal scores, the results of this investigation did not differ significantly from those of Schuell (1964), Porch (1971), and Darley (1978). Even though Schuell and Porch maintain that an aphasic's performance is consistent, both nevertheless reported that inconsistencies had occurred.

In addition, Schuell stated that while variability on individual responses did occur, the types and percentages of errors remained consistent. This study's findings revealed that the types of errors were fairly consistent, but the percentage of those errors in overall daily performance was not consistent.

The results of this investigation were in general agreement with Head (1963), Kriendler and Fradis (1968), Sarno, Silverman, and Sands (1970), Davis and Leach (1972), Brookshire (1973), and Marshall (in

Chapey, 1981) when the nature of the response was probed in greater depth. More specifically, all subjects exhibited inconsistencies from day to day and from task to task. The method of the investigation did not allow comparison of performance on the same items within the same day, since the aphasics were seen only once a day.

Previous studies (Schuell, 1964; and Davis and Leach, 1972) discussed forms the variability takes. This investigation found similar forms which the variability assumed. Particular subjects were found to exhibit patterns of errors (Schuell, 1964). Yet, Davis and Leach (1972) found inconsistencies in the components of responses. The present study disclosed data supporting both notions. All subjects were observed to display patterns of error responses and variations in the accuracy of specific parameters of the responses.

The group of aphasics displayed variability in specific parameters of their response but not in others, as Davis and Leach (1972) suggested. For example, Subject 3 demonstrated a larger degree of inconsistency in the linguistic component than the phonological or gestural components.

Several studies have also cited factors which influence the incidence of variability. The methods used in this study allowed control for four of these factors. Environmental noise (Eisenson, 1973) was reduced, as each subject was seen in a quiet room (usually in his/her home or clinic therapy room) with less than 40 dB signal-to-noise ratio. Since the subject, independent observer, and examiner were the only persons present during the sessions, the size of the audience (Schuell, 1964) was small.

Because some aphasic patients may function better at certain times of the day than others (Marshall, in Chapey, 1981), the times the

subjects were seen were randomized between morning and afternoon. The order in which the tasks were presented was randomized to control for the possibility of fatigue (Schuell, 1964; Eisenson, 1973; and Marshall, in Chapey, 1981).

Several factors were impossible to control for, such as medication, illness, or mood. However, the Daily Case History forms provided documentation of any of these factors when they occurred. After each subject's scores were tabulated, this information allowed comparison of the lower levels of performance with the subject's level of medication, wellness, or mood. In most cases, the lower levels of performance did not occur on the subjects' "off days," as suggested by the Daily Case History forms.

Previous research discussed the sources of variability (Goldstein, 1948; Head, 1964; Schuell, 1964; and Kriendler and Fradis, 1968). The scope of this investigation did not permit examination of the possible source(s) of the inconsistencies. However, all subjects must have been at least six months post-onset from the day of the injury. So it is unlikely that spontaneous recovery accounted for the variability observed.

The results of the present study provide descriptive but nevertheless objective data supporting the theory that inconsistencies exist in and are a characteristic of some aphasics.

The findings imply that variability does exist in aphasic patients' responses. This information can be useful when counseling with family members or care-providers. Explaining that the aphasic patient may be able to respond to or verbally produce a word or phrase on one occasion

but is unable to respond to or produce the same thing on another occasion may help reduce frustration or anxiety.

Variability of response should also be considered during the therapeutic process. Speech-language pathologists might wish to determine if a client follows a predictable cycle or pattern of responding. Therapy tasks could then be adjusted accordingly and possible compensatory strategies could be developed.

BIBLIOGRAPHY

- Agronowitz, A., and McKeown, M. R. Aphasia Handbook for Adults and Children. Springfield, Ill.: Chas. C. Thomas, 1964.
- Benson, F. D. Aphasia, Alexia and Agraphia. New York: Churchill Livingstone, Inc., 1979.
- Beorn-Hansen, M. Social and emotional aspects of aphasia. Journal of Speech and Hearing Disorders, 1957, 22, 53-59.
- Brookshire, R. An Introduction to Aphasia. Minneapolis: BRK Publishers, 1973.
- Brown, J. W. Aphasia, Apraxia and Agnosia, Clinical and Theoretical Aspects. Springfield, Ill.: Chas. C. Thomas, 1979.
- Buck, M. Adjustment during recovery from stroke. American Journal of Nursing, October, 1964, 64, 92-95.
- Buck, M. The language disorder: A personal and professional account of aphasia. Journal of Rehabilitation, 1963, 29 (6), 37-38.
- Darley, F. Appraisal of acquired language disorders. In F. Darley and D. C. Spriestersbach, Diagnostic Methods in Speech Pathology. 2nd ed. Hagerstown, Md.: Harper & Row, 1978.
- Davis, N., and Leach, E. Scaling aphasics' error responses. Journal of Speech and Hearing Disorders, 1972, 37, 305-313.
- Eisenson, J. Adult Aphasia, Assessment and Treatment. Englewood Cliffs, N.J.: Prentice Hall, 1973.
- Ferguson, G. Statistical Analysis in Psychology and Education. 4th ed. New York: McGraw-Hill Book Co., 1976.
- Fletcher, S. G. Time-by-count measurement of diadochokinetic syllable rate. Journal of Speech and Hearing Research, 1972, 15, 763-770.
- Goldstein, K. Language and Language Disturbances: Aphasic Symptom Complexes and Their Significance for Medicine and Theory of Language. New York: Grune and Stratton, 1948.
- Goodglass, H., and Kaplan, E. The Assessment of Aphasia and Related Disorders. Philadelphia: Lea and Febiger, 1972.

- Goodglass, H., Quadfasel, F. A., and Timberlake, W. H. Phrase length and the type and severity of aphasia. Cortex, 1964, 1, 133-153.
- Head, H. Aphasia and Kindred Disorders of Speech. Vols. I and II. New York: Hafner, 1963.
- Hecaen, H., and Albert, M. Human Neuropsychology. New York: John Wiley and Sons, 1978.
- Jenkins, J., Jimenez-Pabon, E., Shaw, R., and Sefer, J. W. Schuell's Aphasia in Adults: Diagnosis, Prognosis and Treatment. 2nd ed. Hagerstown, Md.: Harper and Row, 1975.
- Kreindler, A., and Fradis, A. Performances in Aphasia: A Neurodynamical Diagnostic and Psychological Study. Paris: Gauthier-Villars, 1968.
- Marshall, R. C. The assessment of language disorders in adults. In C. E. Chapey (Ed.), Language Intervention Strategies in Adult Aphasia. Baltimore: Williams and Wilkins, 1981.
- Penfield, W., and Roberts, L. Speech and Brain Mechanisms. Princeton, N.J.: Princeton University Press, 1959.
- Porch, B. E. The Porch Index of Communicative Ability. Palo Alto, Calif.: Consulting Psychologists Press, 1967.
- Rodrian, J. L., and Weissenfluh, B. Counseling the family of the aphasic adult. In R. E. Hartbauer, Counseling in Communicative Disorders. Springfield, Ill.: Chas. C. Thomas, 1978.
- Sarno, M., Silverman, M., and Sands, E. Speech therapy and language recovery in severe aphasia. Journal of Speech and Hearing Research, 1970, 13, 607-623.
- Schuell, H. Differential Diagnosis of Aphasia With the Minnesota Test. Minneapolis: University of Minnesota Press, 1965.
- Schuell, H., Jenkins, J., and Jimenez-Pabon, E. Aphasia in Adults: Diagnosis, Prognosis, and Treatment. New York: Harper and Row, 1964.
- Sies, L. (Ed.). Aphasia Theory and Therapy: Selected Lectures and Papers of Hildred Schuell. Baltimore: University Park Press, 1974.
- Wepman, J. Recovery From Aphasia. New York: Ronald Press, 1951.
- Wertz, R. Appraisal and diagnosis in aphasia: Evaluating the effects of treatment. In M. Sullivan and M. Kommers (Eds.), Rationale for Adult Aphasia Therapy. Proceedings of a conference held at the University of Nebraska Medical Center, 1976.

APPENDIX A

VISUAL SCREENING PROCEDURE

1. Confrontation Fields

The investigator tested both eyes, one at a time while covering the opposite eye. The investigator put her index finger on her nose and said to the subject, "I'm going to test your side vision. I want you to watch my nose and tell me when you see my pen." The investigator held the pen level with and behind the ear on the temporal side of the head of the subject and slowly brought the pen forward, around to the front of the head until the subject said he/she had seen the pen. This same procedure was used to test the vision on the superior, inferior and nasal sides of the head. If the subject moved his/her head to the side in an attempt to see the pen, the investigator said, "Remember to look at my nose." If the subject failed to see the pen under one of the following conditions, he/she was excluded from the study:

- a. Testing the right eye with the left eye covered:
 1. at a 90° angle on the nasal side of the head;
 2. at a 70° angle on the temporal side of the head;
 3. at 60° angle on the superior side of the head;
 4. at a 60° angle on the inferior side of the head.
- b. Testing the left eye with the right eye covered:
 1. at a 90° angle on the nasal side of the head;
 2. at a 70° angle on the temporal side of the head;

3. at a 60° angle on the superior side of the head;
4. at a 60° angle on the inferior side of the head.

2. Near Point Visual Acuities

The investigator tested the subject both monocularly and binocularly. A Snellen chart was held at a distance of 16 inches from the subject's eyes. The subject was then asked to read the top line. If the subject was successful in reading this line, then he was asked to proceed to the next line and read it until he reached the last line or was unsuccessful in reading a line. If any subject was unable to read below the "P T E Q" line binocularly, indicating an acuity level of below normal, he/she was excluded from the study.

APPENDIX B

MOTOR SPEECH SCREENING

1. Diadochokinetic rate (single syllable).

Instructions: When I say "go", I want you to say /pʌ/ as many times as you can until I say "stop". Like this, /pʌpʌpʌpʌpʌ/. You try it once for practice.

Minimum score: three syllables per second.

2. Diadochokinetic rate (single syllable).

Instructions: When I say "go", I want you to say /tʌ/ as many times as you can until I say "stop". Like this, /tʌtʌtʌtʌtʌ/. You try it once for practice.

Minimum score: three syllables per second.

3. Diadochokinetic rate (single syllable).

Instructions: When I say "go", I want you to say /kʌ/ as many times as you can until I say "stop". Like this, /kʌkʌkʌkʌkʌ/. You try it once for practice.

Minimum score: three syllables per second.

4. Diadochokinetic rate (multisyllable).

Instructions: When I say "go", I want you to say /pʌtʌ/ as many times as you can until I say "stop". Like this, /pʌtʌpʌtʌpʌtʌ/. You try it once for practice.

Minimum score: one /pʌtʌ/ per second.

5. Diadochokinetic rate (multisyllable).

Instructions: When I say "go", I want you to say /pʌtʌkʌ/ as many times as you can until I say "stop". Like this, /pʌtʌkʌpʌtʌkʌ/. You try it once for practice.

Minimum score: one /pʌtʌkʌ/ per second.

6. Imitation of one-syllable words.

Instructions: I'm going to say a word. You say it after me.

Minimum score: 90% correct articulation.

Stimulus words:

house	get
cub	sing
leg	put
man	quick
the	five

7. Count to twenty.

Instructions: Now I want you to count to twenty. (If the subject seemed unable to begin, the investigator said "Start with one.")

Minimum score: 90% correct articulation.

8. Sustain "ah" until I say "stop".

Minimum score: continuously sustaining "ah" for 10 seconds.

APPENDIX C

SCREENING INFORMATION SHEET

Name: _____ Number: _____

Address _____

Phone: _____ Age: _____

Group Assignment: _____

Time Post Onset: _____

Educational level: _____

Illnesses prior to or at time of brain injury: _____

Site, size and type of lesion: _____

Severity and type of aphasia: _____

Length and intensity of treatment: _____

Languages spoken: _____

Results of audiometric tests: _____

Results of ALPS: _____

Results of motor speech screening: _____

Paralysis/Paresis: _____

Comments:

APPENDIX D

DAILY CASE HISTORY

Date: _____ Session: _____

Name: _____ Number: _____

1. Has he/she taken any medication in the last 24 hours? If so, what was it for? _____

2. Has it effected him/her? If so, in what way? _____

3. Has he/she heard any upsetting news or experienced any upsetting events in the last 24 hours? _____

4. Has he/she been ill in the last 24 hours? _____

5. What is his/her mood today? _____

6. What is his/her attitude toward this session today? _____

Comments:

APPENDIX E

SAMPLE DATA SHEET

Subject's Number: _____ Date: _____

Session: _____ Time: _____

S/N Ratio: _____ Location: _____

Task	Trial	Parameter I	Parameter II	Parameter III
Auditory Comprehension	--	---	---	G_L_P__
Verbal Expression	--	---	---	G_L_P__
Reading	--	---	---	G_L_P__
Writing	--	---	---	G_L_P__
OVERALL TOTAL	--	---	---	G_L_P__

Task	Trial	Parameter I	Parameter II	Parameter III
Auditory Comprehension				
Pointing to Objects Named				
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4

Task	Trial	Parameter I	Parameter II	Parameter III
	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
ITEM TOTAL	- -	- - -	- - -	G <u> </u> L <u> </u> P <u> </u>

Task	Trial	Parameter I	Parameter II	Parameter III
Auditory Comprehension				
Match to Sample				
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4

Task	Trial	Parameter I	Parameter II	Parameter III
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
ITEM TOTAL	- -	- - -	- - -	G _ L _ P _

Task	Trial	Parameter I	Parameter II	Parameter III
Auditory Comprehension				
Answering Questions about a Passage Read				
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
ITEM TOTAL	- -	- - -	- - -	G _ L _ P _

Task	Trial	Parameter I	Parameter II	Parameter III
Verbal Expression				
Imitation of Single Functional Words				
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4

Task	Trial	Parameter I	Parameter II	Parameter III
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
ITEM TOTAL	--	---	---	G__L__P__

Task	Trial	Parameter I	Parameter II	Parameter III
Verbal Expression				
Sentence Completion				
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4

Task	Trial	Parameter I	Parameter II	Parameter III
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
ITEM TOTAL	- -	- - -	- - -	G__L__P__

Task	Trial	Parameter I	Parameter II	Parameter III
Verbal Expression				
Two-Word Construction				
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4

Task	Trial	Parameter I	Parameter II	Parameter III
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
ITEM TOTAL	--	---	---	G _ L _ P _

Task	Trial	Parameter I	Parameter II	Parameter III
Verbal Expression				
Sentence Formulation				
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4

Task	Trial	Parameter I	Parameter II	Parameter III
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
ITEM TOTAL	- -	- - -	- - -	G _ L _ P _

Task	Trial	Parameter I	Parameter II	Parameter III
Verbal Expression				
Narrative				
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4

Task	Trial	Parameter I	Parameter II	Parameter III
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
ITEM TOTAL	- -	- - -	- - -	G _ L _ P _

Task	Trial	Parameter I	Parameter II	Parameter III
Reading				
Reading Single Words				
<hr/>	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
<hr/>	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
<hr/>	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
<hr/>	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
<hr/>	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
<hr/>	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
<hr/>	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
<hr/>	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
<hr/>	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4

Task	Trial	Parameter I	Parameter II	Parameter III
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
ITEM TOTAL	- -	- - -	- - -	G _ L _ P _

Task	Trial	Parameter I	Parameter II	Parameter III
Reading				
Following Written Instructions				
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4

Task	Trial	Parameter I	Parameter II	Parameter III
	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
ITEM TOTAL	--	---	---	G _ L _ P _

Task	Trial	Parameter I	Parameter II	Parameter III
Writing				
Match Sound to Letter				
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4

Task	Trial	Parameter I	Parameter II	Parameter III
<hr/>	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
<hr/>	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
ITEM TOTAL	- -	- - -	- - -	G _ L _ P _

Task	Trial	Parameter I	Parameter II	Parameter III
Writing				
Write Object's Name				
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4

Task	Trial	Parameter I	Parameter II	Parameter III
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
_____	1 2	1 2 3	1 2 3	G 1 2 3 4 5 L 1 2 3 4 5 P 1 2 3 4
ITEM TOTAL	--	---	---	G__L__P__

APPENDIX F

DEFINITIONS

Gesture

Random gesturing is defined as making a gesture or series of gestures, yet not as a response to a stimulus presented by the investigator. The response presents no meaningful connection to the stimulus. For example, the subject may look around the room aimlessly in response to "Point to 'book'".

Nonmeaningful gesturing is defined as making a gesture or series of gestures in response to a stimulus presented by the investigator which is not meaningful to the stimulus. For example, in response to "Point to your leg", the subject may wave his arm in the air.

Meaningful but inappropriate gesturing is defined as making a gesture or series of gestures in response to a stimulus presented by the investigator, which is meaningful but not appropriate to the stimulus. For example, in response to "Close the book" (a printed instruction), the subject may pantomime turning a key in a lock.

Meaningful and appropriate gesturing is defined as making a gesture or series of gestures which is both meaningful and appropriate to the stimulus presented by the investigator. For example, the subject may hold up two fingers in response to "Hold up two fingers" (a printed instruction).

Note: The gestures were scored when produced in conjunction with or as a substitution for a response.

Completeness

"No response" is defined as no response being made either verbally or gesturally.

Incomplete is defined as a word, utterance or response not being completely articulated or performed, some obligatory element being omitted, or the response being irrelevant to the task.

Complete is defined as a word, utterance or response being completely articulated or performed, all obligatory elements being included, and being relevant to the task.

Phonological

Unintelligible with contextual information is defined as a word or utterance that is completely unrecognizable with contextual information. For example, the subject may produce an unintelligible word or utterance in response to "Tell me about this picture" even though part of the utterance is unintelligible or the referent is present.

Severely misarticulated but intelligible with contextual information. For example, the subject may produce a word or utterance in response to "What color is the car?" which is severely misarticulated and is probably unrecognizable without knowledge of the question, referent and expected response.

Mildly misarticulated and intelligible without contextual information. For example, in response to "What have you done today?" the subject may produce a word or utterance that contains misarticulations but

is intelligible without knowledge of the intended word or words of the utterance.

Correct articulation is defined as a word or utterance containing no articulation errors (excluding regional or dialectical differences).

Linguistic

One word response is defined as an utterance being produced which involves only a single word. For example, the subject produces "coffee" in response to "What do you drink for breakfast?"

A response could involve a two to three word response that is not grammatically complete or semantically appropriate. For example, in response to "How do you make a sandwich?", a subject produces "A piece bread . . . mustard."

A response could involve more than three words that may or may not be grammatically complete and semantically appropriate. For example, a subject produces "He's pushing the lawn mower" in response to "What's happening in this picture?" (a picture of a man pushing a lawn mower).

APPENDIX G

ERROR CLASSIFICATION MATRIX

Subject: 2

Task	Item	Rejection	Named Object	Phrase Omitted	Word Substitution	Revision
Sentence formulation	Blank check	"I can't say my word. I knew it. I've always told you before."	"It's a check."	"That's when you write an"	"And here you put (write) your time (name) on."	"This is what you/you write your thing on."

²
VITA

Melissa Myers-Brashear
Candidate for the Degree of
Master of Arts

Thesis: VARIABILITY IN APHASIC PATIENTS' RESPONSES

Major Field: Speech

Biographical:

Personal Data: Born in Bartlesville, Oklahoma, June 6, 1958, the daughter of Mr. and Mrs. Orville Myers.

Education: Graduated from Sooner High School, Bartlesville, Oklahoma, in May, 1976; received the Bachelor of Science degree in Speech Pathology from Phillips University in 1980; enrolled in the master's program at Oklahoma State University in 1980; completed requirements for the Master of Arts degree at Oklahoma State University in May, 1983.

Professional Experience: Substitute Speech Therapist, Dewey Public Schools, Dewey, Oklahoma, 1982; Graduate Assistant, Oklahoma State University, Stillwater, Oklahoma, 1980-1982.