To the Graduate Council:

I am submitting herewith a dissertation written by Kimberly L. Collins entitled "Influence of Pragmatic Performance on Functional Communication in Aphasic Adults." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Hearing and Speech Science.

Gary H. McCullough, Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

Associate Vice Chancellor and
Dean of The Graduate School

Influence of Pragmatic Performance on Functional Communication in Aphasic Adults

A Dissertation
Presented for the
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Kimberly L. Collins
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Dedication

This paper is dedicated to the memory of my grandmother, Helen Strong. She is greatly missed.

Acknowledgments

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Abstract

The purpose of this study was to determine the relationship between pragmatic performance and functional communication. Twenty-seven aphasic subjects, fourteen fluent and thirteen non-fluent, who had suffered a single left hemisphere stroke participated in the study. Subjects were divided into groups according to aphasia type (fluent and non-fluent), as well as, severity level (mild, moderate, or severe). Language impairment was determined with the *Western Aphasia Battery*. Pragmatic performance was assessed during conversation with the *Pragmatic Protocol*. Information gathered from two additional observation sessions was used to determine functional communicative ability as defined by overall independence and qualitative scores from the *ASHA FACS*. In addition, this study examined the relationship between objective measures (*WAB, Pragmatic Protocol*,& *ASHA FACS*), unfamiliar listeners' judgements, and caregivers' perception (*CETI*) of functional communication.

Results from this investigation indicate pragmatic performance is a better predictor of functional communication than linguistic competence. No significant differences between type of aphasia (fluent and non-fluent)

with respect to pragmatic performance and functional communication were found. The results did indicate severity of aphasia, regardless of type, was an important indicator of pragmatic performance and functional communication. Significant differences were found between the mild and severe groups, however, no significant differences were found between the moderate group when compare with the mild and severe groups.

Strong correlations were found between the *CETI*, the *Pragmatic Protocol* and the *ASHA FACS*. This finding indicates pragmatic and functional communication assessments correlate better with caregivers' perception of communication abilities than traditional language assessments. In addition, the unfamiliar listeners' judgements were found to correlate better with the *WAB*, *Pragmatic Protocol*, and the *ASHA FACS* quantitative communication independence score than the *CETI* and *ASHA FACS* qualitative score. No significant correlations were found between the unfamiliar listeners' ratings and the *CETI* or the qualitative scores from the *ASHA FACS*. While available measures may help quantify impairment, even in a "functional" context, there are no substitutes for familiarity with the subject and interactions with family and friends.

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Chapter 1

Introduction and Review of Literature

Many researchers (Holland, 1982; Wilcox & Davis, 1979; Prutting & Kirchner, 1987; Avent & Wertz, 1996) have investigated pragmatic performance in individuals with aphasia. Pragmatics is the study of the relationship between language behavior and the contexts in which it is used(Prutting & Kirchner, 1983). Specific pragmatic aspects investigated in adults with aphasia include communication acts (Collins & Wallace, 1997; Gurland, Chwat,& Wollner, 1982; Wambaugh, Thompson, Doyle, & Camarata, 1991), speech acts (Wilcox & Davis, 1979; Prinz, 1980; Doyle, Thompson, Oleyar, Wambaugh,& Jackson, 1994), turn-taking (Coelho, Liles, Duffy,& Clarkson, 1992), topic maintenance (Coelho et al., 1992), context variables (Busch, Brookshire, & Nicholas, 1988; Glosser, Wiener, & Kaplan, 1988; Doyle et al., 1994; Ferguson, 1994; Pierce, 1991) discourse analysis (Coelho, Liles, Duffy, Clarkson, & Elia, 1994; Ulatowska, Allard, Reyes, Ford, & Chapman, 1992; Armstrong, 1987, 1991; Mentis & Prutting, 1987; Bottenberg & Lemme, 1991; Guilford & O'Connor, 1982) and use of nonverbal aspects (Glosser, Weiner, & Kaplan, 1986; Cicone, Wapner, Foldi, Zurif, &

Gardner, 1979; May, David, & Thomas, 1988; Behrmann & Penn, 1984). Research (Avent & Wertz, 1996; Prutting & Kirchner, 1987) has indicated that aphasics maintain a high level of pragmatic performance despite their linguistic deficits.

Although some researchers have made assumptions about communicative effectiveness based on pragmatic analysis of conversation (Wilcox & Davis, 1979; Wambaugh, et al., 1991) there is little research to indicate how pragmatic performance translates into functional communication. Holland (1982) concluded, "Aphasics communicate better than they talk." However, research has not demonstrated how pragmatic performance influences their preserved ability to communicate effectively.

The purpose of this study was to determine the relationship between pragmatic performance and functional communication. In addition, this study examined the influence of type and severity of aphasia on pragmatic performance and functional communication.

Defining Pragmatics and Functional Communication

Chapey (1992) asserts that defining language and communication in terms of measurable surface structures seems to ignore the fact that meaning is the essence of

language. Within a pragmatic framework, communicative competence implies the knowledge of how to converse with different partners and in different contexts, as well as a knowledge of the expectations underlying the maintenance of discourse. Pragmatics involves the acquisition and use of such conversational knowledge and the semantic rules necessary to communicate an intent. Thus, pragmatics involves the interactional aspects of communication, including sensitivity to various aspects of social contexts (Chapey, 1992).

Functional communication is defined as "the ability to receive or convey a message, regardless of the mode, to communicate effectively and independently in a given [natural] environment" (p.2) (ASHA, 1990).

Assessment of Aphasia

It has been postulated that traditional linguistic approaches to assessment are often limited in their ability to predict how aphasia will affect an individual's daily life (Holland, 1982). Assessment batteries designed to classify aphasia utilized predominantly linguistic measures. One's knowledge of conversational rules cannot be assessed in a pure stimulus-response mode, because so little is

required in such interactions. Furthermore, one's ability to communicate novel information cannot be assessed when the examiner knows the exact response the aphasic individual should give. Thus, disregarding pragmatics might limit the range of language behaviors examined and the contexts in which these behaviors are evaluated and treated. If this is true, then including pragmatic assessment could provide valuable prognostic information, which would otherwise be overlooked. Gerber and Gurland (1989) agree and state the complex interaction of pragmatic and linguistic performance requires that we, as clinicians, consider all these factors in treating the "communication" disorder including social mis-perceptions associated with generalized brain damage, depression associated with brain damage and diminished function, and/or reinforced passivity of the aphasic communicator.

Assessments of Functional Communication

Currently used measures (e.g., *Western Aphasia Battery (WAB)* (Kertesz, 1982), *Minnesota Test for Differential Diagnosis of Aphasia (MTDDA)* (Schuell, 1965), *Boston Diagnostic Aphasia Examination (BDAE)* (Goodglass & Kaplan, 1983)) for assessing aphasic individuals appear more

sensitive to speech and language performance changes than changes in functional communication. Given the limitations of standard test batteries, specific assessment of functional communication is required to determine the effect of aphasia on communicative competence (Holland, 1982; Berhmann & Penn, 1984).

Functional communication assessments do exist. As stated earlier, functional communication is defined as the ability to convey or receive information effectively and independently in a natural environment. In reviewing these tests, it is important to consider the following: (1) the types of language behaviors assessed; (2) the contexts in which these behaviors are assessed; and (3) the scoring systems with which these behaviors are quantitatively and qualitatively described (Gerber & Gurland, 1989).

Martha Taylor Sarno is often credited with the first discussion of functional language use relative to adult aphasia. The distinct contribution Sarno made was the differentiation between two kinds of language use:

> *Clinical performance*: Verbal performance under test or other task oriented conditions. A measure is clinical when the conditions or stimuli used to obtain the sample are not representative of natural language usage.

> *Functional performance*: Verbal performance under conditions which stimulate the natural use of language. A measure is functional when the conditions or stimuli used are informal and they sample language usage without task presentation (Sarno, 1972, p.331).

Sarno proposed using informal conversation as the context for assessment of functional communication. Within this natural context, Sarno's *Functional Communication Profile (FCP)* is used to measure 45 communication behaviors typical of everyday language functions. The 45 items fall into five major areas including movement, speaking, understanding, reading, and a miscellaneous category (writing, calculation, and telling time). While the sampling context is considered more functional (i.e., more natural), the dependence on questions and an interview format may limit the range of language use. The content of language behaviors measured range from pragmatically oriented (attempt to communicate, awareness of emotional vocal tone, implementation of greetings, understanding conversations with more than two people) to linguistically oriented (use of nouns, use of verbs, understanding action verbs) to deficit oriented (ability to imitate oral movements, use of writing in lieu of speech).

The *FCP* employs a four-point rating scale to score functional performance: normal, good, fair, and poor. Taking

into account pre-morbid language use, ratings are made based on speed, accuracy, volitional control without use of external cues, and compensatory strategies. In addition to percentages for each of the five modalities, an overall score is obtained which "can be used as a single measure of an individual's communicative effectiveness in everyday life." (p. 333). Despite emphasis on "communication effectiveness in everyday life" and a more natural conversational context, many of the behaviors assessed in the *FCP* are not pragmatic. However, the shift away from "task oriented" contexts was certainly a more functional approach.

The *Communicative Abilities of Daily Living (CADL)* (Holland, 1980)is another functional communication assessment of adult aphasia. Holland suggests "the *CADL* is intended to supply another perspective to the problem aphasic persons face and to furnish information relating to the matter of negotiating in a communicative world in the face of, or even in spite of, language problems that make communication possibly less than normal." (p. vii).

Like the *FCP*, the purpose of the *CADL* is to assess functional communication skills of aphasic adults. As such, Holland proposes the context of assessment should

incorporate "natural language activities" and "a more natural style" to provide for natural communication. The test elicits responses through natural discourse, question-answer interview, response to picture stimuli, and role-playing activities. Role-playing activities, however, may be difficult for aphasic individuals because of the inherent overlap of cognitive and communication abilities being tapped. For example, the ability to think about the expression of speech acts (e.g., Item #22: "You're back in the waiting room. How can you make room to sit down?"), rather than the ability to intentionally express speech acts, is assessed. So, while the *CADL* attempts to provide more functional contexts for assessment, problems exist in a variety of tasks, including traditional picture stimuli tasks and meta-pragmatic role-playing. However, the *CADL* does provide situations typical of the aphasic individual's daily life.

Ten categories of behavior are sampled in the 68 test items of the *CADL*. These categories represent pragmatic abilities such as speech acts, utilizing context, social conventions, and deixis, as well as modality categories (reading and writing), cognitive categories (role-playing and divergences), and meta-linguistic categories (humor,

absurdity, metaphor). Within the category of speech acts, 15 of the 21 items elicit responses in the form of "explaining" or "informing." Speech acts typically used by aphasic individuals, such as requests for clarification, are only sampled once. Furthermore, the majority of the 21 speech act items are elicited as direct requests for information. Responses, therefore, are elicited rather than self-initiated. Finally, because of the above-mentioned limitations, the *CADL* may not indicate whether the aphasic individual is capable of playing an active role in conversational interactions.

The *CADL*'s three point scoring system (correct, incorrect, adequate) differs significantly from more traditional assessments in a very functional way. The usual definition of correct is replaced with one that focuses on whether the "appropriate message is clearly understood by the tester" regardless of the form of the message. For example, a response involving a simple gesture or an incomplete utterance will be scored as correct provided the message is "clearly understood." Emphasis on communication of information regardless of modality or linguistic accuracy is one of the most important contributions of the *CADL* to aphasia assessment. Additionally, allowing a second

opportunity to respond to test items and not penalizing the patient for requests for repetitions, provides a more "normal" model of conversation with aphasic individuals. Aphasic individuals may require more time to respond or may respond more appropriately when given information in a direct manner.

Inter-rater reliability across listeners has not been demonstrated. A listener who is more familiar with the aphasic individual might score his/her communicative success more favorably than an unfamiliar listener. Listener familiarity must be accounted for if the *CADL* is to represent the variety of interactions typical of an individual's daily life.

The *Communicative Effectiveness Index (CETI)* (Lomas, Pickard, Bester, Elbard, Finlayson,& Zoghaib, 1989) is another measure which purports to assess functional communication. A unique feature of the *CETI* is that it is administered by significant others (i.e., spouse, relative, neighbor, or friend). The authors believed these individuals would provide a more accurate assessment of the aphasic's communicative capabilities through their direct observations of typical communication situations. This differs significantly from the role-playing situations of the *CADL*.

The *CETI* focuses on four aspects of communication: 1) communication of basic needs(e.g., toileting, eating, grooming, positioning); 2)communication of health threat (e.g., calling for help, giving or receiving information about one's medical condition); 3) communication for life skills (e.g., shopping, home maintenance, use of telephone, understanding traffic symbols); and 4) communication for social needs (e.g., dinner table conversation, playing cards, writing letters). These aspects of communication were derived from a survey of aphasic individuals which highlighted situations in which communication was most important. Each item of the *CETI* is rated on a continuum from "not at all able" (to communicate) to "as able as before the stroke" (to communicate). A 16-item paper and pencil measure is employed. Raters are explicitly instructed to rate actual performance and not to infer potential performance for unobserved situations. Test-retest reliability and inter-rater reliability of the *CETI* are reportedly good. Additionally, the measure correlates well with global ratings of communication made by spouses and with the *WAB* (Kertesz, 1982).

One limitation of the *CETI*, however, is its lack of clarity as to what is being measured by the individual test

items. For example, some items address situations or contexts (e.g., having coffee-time visits and conversations with friends and neighbors; participating in conversations with strangers), whereas other items address communication behaviors within context (e.g., giving yes/no answers appropriately). Also, the psychometric properties of the measure are documented on the basis of a small sample size (N= 22). Therefore, the measure's generalizability to the aphasic population has not been established. Finally, the *CETI* does not discriminate between aphasia types, and the authors report no attempt was made to relate *CETI* scores to linguistic deficits.

The *American Speech-Language-Hearing Association Functional Assessment of Communication Skills* (*ASHA FACS*) (Frattali, Thompson, Holland, Wohl, & Ferketic, 1995) represents an attempt to correct the limitations of previous functional communication assessments. The *ASHA FACS* measures one's ability to receive and convey messages effectively and independently, regardless of the mode of communication, in natural contexts. The *ASHA FACS* provides both a quantitative and qualitative means of measuring functional abilities across four domains: Social Communication; Communication of Basic Needs; Reading, Writing, and Number Concepts; and

Daily Planning. Like the *CETI*, test items were derived from a list of communication abilities deemed important by individuals with aphasia, as well as family members and rehabilitation professionals. The *ASHA FACS* scoring system differs from the dichotomous scoring systems of previously discussed assessments. A 7-point Scale of Communication Independence measures functional communication performance along a continuum of independence, rated in terms of level of assistance and/or prompting. In addition, a 5-point Scale of Qualitative Dimensions of Communication measures the adequacy, appropriateness, promptness, and communication sharing abilities of the individual with aphasia for each assessment domain addressed. The assessment of both independence of communication as well as qualitative aspects allows for a more complete description of functional communication.

The *ASHA FACS* employs an observation format, in which ratings are based on either the clinician's direct observations or observations made by others who are familiar with the patient. Observation allows the clinician to make judgements based on interactions that take place in the patient's daily life rather than artificial testing situations set up by the clinician.

Assessments of Pragmatic Performance

Attempts to devise tools to assess specific pragmatic abilities have resulted in the development of two pragmatic profiles. The *Pragmatic Protocol* (Prutting & Kirchner, 1987) and the *Profile of Communicative Appropriateness* (Penn, 1988) are examples of procedures which examine language in context. Both sample a variety of language abilities using pragmatic models. Both protocols employ observations of unstructured, conversational performance.

The *Pragmatic Protocol* contains thirty pragmatic parameters, divided into seven groups. Each of the seven groups is then assigned to one of three "aspects": verbal; paralinguistic; or nonverbal. Verbal aspects include speech acts, turn taking, and stylistic variation; paralinguistic aspects include prosody and fluency; and nonverbal aspects include gestures and facial expression. The authors provide specific instruction on assigning behaviors to either of the two main scoring categories: appropriate or inappropriate (a "no opportunity to observe" category is also available). The instructions are as follows:

> *Appropriate.* Parameters are marked appropriate if they are judged to facilitate the communicative interaction or are neutral.

> *Inappropriate*. Parameters are marked inappropriate if they are judged to detract from the communicative exchange and penalize the individual (Prutting & Kirchner, 1987, p.108).

The *Profile of Communicative Appropriateness* (Penn, 1988) measures control of discourse, fluency, sociolinguistic sensitivity, and non-verbal communication. Appropriateness is judged on a 5-point rating scale employed to describe each behavior's enhancement of, or interference with, conversational flow. Despite some differences between these two profiles (e.g., unit of analysis and scoring system) the categories surveyed overlap considerably.

Influence of Type of Aphasia on Functional Communication and Pragmatic Performance

Holland (1982) used field observation to examine the ability of individuals with aphasia to functionally use a variety of communication acts in naturalistic settings. "Functional" was defined by Holland as the ability to effectively communicate messages through a variety of means, both verbal and nonverbal. Observational categories included verbal and nonverbal output. Verbal output features included the following: form; style; conversational dominance; correctional strategies; and metalinguistics. Form included

communication acts, such as volunteering information and making requests. Style included use of humor and metaphors. Conversational dominance was defined as interruptions or changes in topic. Nonverbal output features included spatial indicators, direct verbal referents, gestures to maintain conversation, humor, and affect. Spatial indicators referred to gestures or movements that indicated locations of objects or people. Verbal referents were gestures used to indicate understanding of a verbal utterance. Additional observational categories included reading, writing, and math.

Subjects in this study represented a variety of aphasia subtypes, including 22 with Broca's aphasia and 8 with Wernicke's aphasia. Aphasia subtypes were determined by the *BDAE* (Goodglass & Kaplan, 1983). The most communicative aphasic subjects differed from non-impaired subjects only in their ability to produce well-formed utterances. Communicative successes were described as responses that communicated an aphasic subject's message to a listener, regardless of the mode. Failures were described as responses, regardless of the mode, that did not succeed in communicating an aphasic subject's message. While communicative performance was distributed across aphasia

subtypes, the majority of subjects fell into two patterns. Wernicke's subjects were typically judged to be more talkative (secondary to poor comprehension)but demonstrated more communicative failures. Broca's, mixed non-fluent/mixed anterior (moderate difficulties with both comprehension and production of language), and anomic aphasics were observed to display more frequent communicative successes and fewer failures. This group was judged to be most functionally communicative and displayed the most "normal" pattern of communication. In spite of severe limitations in the expression of propositional content, Holland observed individuals with aphasia in relatively natural settings using a variety of communication acts. Holland suggested that formal diagnostic assessments limit the aphasic individual's opportunity to reveal these communicative assets. She also suggested that the traditional treatment setting appears to limit the range of communication acts the patient may be required to comprehend and produce. The patient is usually only required to comprehend requests and to produce assertions. For this reason, the treatment setting does not seem to facilitate the skills necessary to function in a communicative setting with people other than the clinician.

A review of the data collected for standardization of the *ASHA FACS* (Frattali, Thompson, Holland, Wohl, & Ferketic, 1995) revealed a significant difference in performance between fluent and non-fluent aphasics. Subjects with fluent aphasia scored consistently higher than subjects with non-fluent aphasia across both qualitative and quantitative domains. The authors note that this finding may be a function of small sample size as well as grouping of the subjects. Subjects with global aphasia were placed in the non-fluent group and would, as a result of severity of impairment, receive lower scores. Significant differences were also observed in the severity of impairment. Subjects with mild-moderate aphasia demonstrated higher scores than subjects with moderate-severe impairment.

A review of the data collected for standardization of the *CADL* (Holland, 1980) also revealed differences in type of aphasia. As opposed to the data collected for the *ASHA FACS*, the non-fluent group was noted to perform significantly better across tasks than the fluent group. However, the authors caution that factors such as age and institutionalization, along with aphasia type and severity, may have affected the outcome of scores.

Prutting & Kirchner (1987) developed the *Pragmatic Protocol* in an attempt to derive profiles of pragmatic performance for fluent and non-fluent aphasic individuals. Eleven aphasic subjects participated in the study. An average of 82% of all behaviors exhibited by the subjects were judged to be appropriate with a range of 63%-93%. Subjects produced a profile of linguistic deficits including specificity and accuracy of expression, pause time in turn taking, quantity and conciseness of the message, fluency, and variety of speech acts produced. Further examination of the data revealed that the fluent subjects' speech was plentiful but deficient in content and intelligibility due to high proportions of paraphasias (literal and verbal) and deficits in lexical access. In contrast, non-fluent subjects produced speech that was limited to a few words, characterized by agrammatical structure, and often contained high proportions of apraxic errors with increased response latency. For both groups, successful communication was dependent on the subjects' available linguistic productions. Additionally, for both groups the burden of communication was primarily on the listener.

Avent and Wertz (1996) investigated the influence of type of aphasia and treatment on pragmatic performance. The

authors investigated the change in aphasic subjects' pragmatic performance in conversation between four and forty-eight weeks post-onset. Ten subjects with fluent aphasia and ten with non-fluent aphasia participated. All subjects received six to eight hours of treatment each week for 44 weeks. Ten subjects (five from each subject group) received group treatment with no direct manipulation of language impairment, and ten subjects (five from each group) received individual, stimulus-response treatment for language deficits. The mean conversational pragmatic ability, as measured by the *Pragmatic Protocol* (Prutting & Kirchner, 1987), was 85% appropriate at four weeks post-onset. Mean performance after 44 weeks of treatment was 92% appropriate. Although there were no statistically significant differences between pragmatic performance of fluent and non-fluent subjects, fluent subjects were noted to perform slightly better than non-fluent subjects. Additionally, fluent subjects entered treatment pragmatically more appropriate than non-fluent subjects. Overall improvement in pragmatic abilities was not influenced by type of treatment - group or individual. However, group-treated subjects did show significant change in pragmatic abilities during the first eleven weeks of

treatment; whereas, individually treated patients did not.

Guilford and O'Connor (1982) analyzed the expressive language of aphasics to determine the presence of pragmatic functions. Pragmatic functions in the expressive speech of two fluent and four non-fluent aphasic subjects under the conditions of elicited conversation, picture stimulation, and spontaneous conversation were analyzed. Each elicitation condition was videotaped. During analysis, the utterance, nonverbal behaviors such as gesture and intonation, examiner's response, and contextual features were considered during the assignment of pragmatic functions. Pragmatic, mathetic, and informative functions were found in all subjects. In this study, "pragmatic" was defined as language to satisfy one's own needs, to control and interact; "mathetic" was defined as language to ask for names, to explore the environment, and/or verbally recall information; and "informative" was defined as language relating to experiences not shared by the listener. Results indicated these pragmatic behaviors were not directly influenced by type or severity of aphasia. Data analysis further revealed that less impaired subjects had performance means which were more evenly distributed among the three pragmatic behaviors. In contrast, more severely impaired subjects demonstrated a

smaller distribution of these pragmatic behaviors, clustering performance means for a particular pragmatic behavior. The predominate pragmatic behavior - whether pragmatic, mathetic, or informative - for more severely impaired subjects was not the same and appeared to be reflective of each subject's communication strategies. For example, the most severely impaired subject produced a high percentage of mathetic behaviors, consistently employing repetitive, stereotypical, or imitative speech.

Busch, Brookshire, and Nichols (1988) studied aphasic individuals communication and their responses to perceived communication failure. The experiment was designed to assess an aphasic individual's ability to determine crucial information for discriminating a target stimulus(a referent) from among a group of stimuli(non-referents), to communicate that information efficiently and accurately to a listener, and to correct misunderstandings indicated by the listener. Aphasic subjects were classified into groups representing non-fluent (Broca's), anomic, and mixed aphasia (fluent speech with literal and verbal paraphasias). Severity of aphasia was estimated using the 6-point (0-5) Aphasia Severity Rating Scale from the *BDAE* (Goodglass & Kaplan, 1983). The seven non-fluent aphasic subjects had a mean

severity rating of 3.1. The seven anomic aphasic subjects had a mean severity rating of 4.6. Results indicated that aphasic subjects did not differ significantly from non-impaired subjects in ability to convey crucial information. However, the aphasic subjects' efficiency in communicating crucial information was affected by aphasia subtype. Non-fluent aphasic subjects were found to be more efficient in communicating crucial information than anomic or mixed aphasic subjects.

Other Pragmatic Performance Variables

Individuals with aphasia are capable of expressing communicative intent utilizing both verbal and nonverbal strategies (Behrmann & Penn, 1984; Herrmann et al., 1989; Prinz, 1980). The communicative value of the nonverbal strategies employed by individuals with aphasia should not be underestimated. Individuals with aphasia are frequently able to use nonverbal strategies to substitute for the linguistic utterances they cannot produce (Herrmann et al., 1989).

Just as the types of nonverbal behaviors differ, so do their functions in relation to the verbal components of communication. Several functions have been identified. For

example, nonverbal strategies may be substituted for linguistic output; and they may serve as a complementary device by paralleling the verbal output. Likewise, nonverbal strategies may extend beyond the verbal aspect, thus providing additional information for the listener. Nonverbal communication is important to consider when characterizing a patient's overall communicative competence from a pragmatic perspective.

Behrmann and Penn (1984) investigated the nonverbal communication of individuals with aphasia. The authors determined the most relevant context in which to observe and describe nonverbal behavior in aphasia is the conversational setting. This setting provides a natural opportunity to observe the patient's adaptation to his or her problem and to the communication task. Furthermore, it was concluded that the conversational setting enables the investigator to observe the types and functions of nonverbal skills used in relation to verbal abilities. Types of nonverbal behaviors, as well as the appropriateness and function of these behaviors in conveying verbal messages were examined. Eleven individuals with aphasia served as subjects. According to the *BDAE* (Goodglass & Kaplan, 1983), four fluent aphasics, four non-fluent aphasics, and three mixed aphasics were

represented among the eleven subjects. Nonverbal behaviors were collected by means of a 20 minute interactional language sample between the subject and examiner. Nonverbal communication behaviors were analyzed using two scales. Scale A identified twelve behaviors belonging to the paralinguistic, kinesic, and proxemic classes. Paralinguistic behaviors included prosodic features such as pitch, intensity, rate, and intonation. The second component, kinesics, referred to communication through body movement. Kinesics included behaviors such as gesture, facial expression, and body posture. Proxemics was defined as communication through the use and structuring of space (e.g., social distance from the interlocutor). Scale B was designed to assess the function of nonverbal behaviors in relation to verbal output. Such functions included supporting, providing additional information, substituting, and interfering with or aiding production of verbal output.

Results revealed that the appropriate usage of nonverbal behaviors in conversation did not correlate closely with other measures of functional communication (i.e., *FCP* and *CADL*) nor with traditional language assessments (i.e., *BDAE*). On the functional communication measures (*FCP* and *CADL*), the mixed and fluent aphasics

obtained higher scores compared to those of the non-fluent aphasics. However, the non-fluent aphasics demonstrated relatively superior nonverbal skills when compared to their scores on the FCP and CADL. A possible explanation for this discrepancy is that the conversational context allows for a more direct measurement of the conversational interaction versus the global communicative capacities measured by the *FCP* and *CADL*. In addition, the authors hypothesized that the non-fluent aphasics' scores on the sub-tests of reading and writing on the functional communication measures accounted for the differences between the aphasia subtypes. Reading and writing impairments are characteristic of individuals with non-fluent aphasia.

Differences were also found to occur in type, function, and appropriateness of nonverbal behaviors across the different subtypes of aphasia. Fluent aphasics often demonstrate receptive difficulties and poor self-monitoring of verbal output. This was also observed in the fluent subjects' nonverbal behaviors, which were characterized by a lack of awareness of the listener's needs and of their own communicative effectiveness. By contrast, non-fluent subjects seemed acutely aware of the situational demands, their listeners needs, and the shortcomings of their own

verbal abilities. Their nonverbal communication was judged to be more appropriate as well as more functional. For example, non-fluent subjects often used gesture, pantomime, and facial expression as compensatory strategies. In contrast, fluent subjects demonstrated these behaviors as incidental accompaniments of the verbal message. The focus on the nonverbal communication scales placed emphasis on the dyadic transmission of the message and the individual's effectiveness in communicating the message. The authors suggest that the nonverbal communication scales reveal competencies in areas which traditional language assessments rarely identify.

An investigation by Prinz (1980) represents an attempt to describe the communication acts used by individuals with aphasia. This investigation focused on the communication act of requesting, because it is the primary means by which individuals are able to manipulate the environment to respond to their needs. Three individuals with aphasia and one non-impaired adult served as subjects. The aphasic subtypes were diverse including Broca's, Wernicke's and global - as determined by scores on the *BDAE* (Goodglass & Kaplan, 1983). The experiment consisted of a 20-minute videotaped conversation with the investigator. Specific

conversational situations were constructed to elicit 10 requests, presented randomly throughout the conversation. For example, the investigator would offer the subject a broken pencil and ask him to sign his name. The data were transcribed from videotapes, and the verbal and nonverbal strategies employed by each subject were coded according to speech and gestural act categories. Speech act categories included: imperative, declarative, interrogative, and ellipsis. An ellipsis is defined as an utterance which can be totally understood despite the fact that parts of the utterance are missing. For example, "No pencil....pencil broke." Gestural acts were coded as follows: simple pointing gesture to referent, pantomime, and a gesture used in combination with a verbal component.

Communication acts used by all subjects, regardless of type or severity of aphasia, were always identified as requests. However, the adequacy of the propositional content of each request was not 100% in all cases. The breakdown for adequacy of request, including both verbal and gestural strategies by subject type was as follows: 90% adequacy for the subject with Wernicke's aphasia; 70% adequacy for the subject with Broca's aphasia; and 30% adequacy for the subject with global aphasia. Examination of the overall

proportion of verbal to nonverbal requesting strategies revealed that 46.7% of the aphasic's strategies were verbal, 6.7% were solely nonverbal, and 46.6% constituted a combination of both verbal and nonverbal strategies. Aphasia subtype appeared to have a direct influence on the type of communicative strategy used. For example, the global aphasic relied more on gesture and contextual information, whereas the Broca's aphasic depended more on verbal strategies.

Influence of Context on Performance

Glosser, Wiener, and Kaplan (1988) examined whether the complexity of the language produced by aphasic subjects increased in response to manipulations of the social context for communication. Experimental tasks included conditions in which familiarity, contextual redundancy, and access to nonlinguistic context and pragmatic devices were markedly reduced. The authors hypothesized these conditions would increase the requirements of linguistic information and complexity used by the subjects. This investigation focused on language production rather than auditory comprehension, and the dependent variables were measures of semantic and syntactic complexity known to be impaired in aphasia. Ten subjects with aphasia were divided into two subgroups. The

first subgroup consisted of five subjects with mild anomia, as reflected in severity ratings of 4 or 5 on the *BDAE*, characterized by fluent speech production. The second subgroup consisted of five subjects with moderate aphasia, as reflected in the *BDAE* severity ratings of 2 or 3, and non-fluent speech output with some degree of auditory comprehension disturbance. Subjects were interviewed for 5-10 minutes in each of four communication conditions: (a) face to face conversation between subject and interviewer; (b) conversation over the telephone where the subject and interviewer had no visual contact; (c) conversation through a two-way video system where the subject and interviewer were permitted audio and visual contact only through their respective television monitors; and (d) conversation through a barrier.

Within each communication condition two conversational situations were developed: narration of a personal experience in an unstructured interview format and a picture description task. Findings from this study revealed the picture description task did not elicit the same contextual variations in the aphasics' language as were observed in the narration condition. In this study, the picture description task (a prototypical naming task) elicited less complex

verbal productions and more verbal disruptions than did the task which entailed spontaneous narration of a personal experience. Subjects were also found to produce more complex language when speaking about work or a major illness than when speaking about family or education. Despite their linguistic impairments, aphasic subjects demonstrated appropriate and predictable linguistic changes in response to nonlinguistic social contextual variables. These results illustrate that individuals with aphasia, despite their linguistic deficits, still retain competence in pragmatic aspects of communication. The authors indicate that pragmatic elements may be used to enhance the quality of language produced by aphasic individuals.

Williams (1994) investigated the effects of topic and listener familiarity on verbal communication. Subjects included five Broca's, seven conduction, and ten anomic aphasics. These specific subtypes were chosen because of their relatively good auditory comprehension. All subjects were required to score above the 50th percentile on the Complex Ideational Materials subtest of the *BDAE*. Subjects performed story retell and procedural discourse tasks containing familiar and unfamiliar topics in the presence of one familiar and one unfamiliar listener. Verbal complexity

was measured using the T-unit, which has been defined as one independent clause plus the dependent modifiers of that clause. Results indicated that listener familiarity was not a significant variable. Topic familiarity, however, significantly influenced verbal output of both aphasic and non-impaired subjects. Specific findings differed depending on the type of task. Subtype of aphasia did not appear to have a differential effect on task performance in this study. Although this study focused primarily on syntactic parameters, the author suggests that pragmatic parameters may be more sensitive to listener differences than formal syntactic measures.

Contextual influences of prior linguistic predictive and non-predictive variables were investigated by Hough, Pierce, and Cannito (1989). Comprehension levels for aphasic subjects were determined using subtests of the *BDAE*. The investigators chose to use subjects with a combined score of 22 or less on these subtests because previous research indicated that aphasics with relatively intact comprehension do not benefit from prior contextual knowledge. Results suggested that fluent and non-fluent aphasic subjects benefitted significantly from prior contextual narratives regardless of whether or not the paragraphs were predictive

or non-predictive. Results also indicated that redundancy of information played a significant role in comprehension; however, two Wernicke's subjects did not benefit from contextual condition or redundancy. The lack of a significant relationship between auditory comprehension performance on the *BDAE* subtests and tasks used in this study indicates that degree of contextual benefit is not related to comprehension level as measured by standard batteries. These batteries appear to provide a measure of breakdown for aphasic subject's linguistic processing but do not adequately reflect these individuals receptive abilities in more natural contextual settings.

Doyle, Thompson, Oleyar, Wambaugh, and Jackson (1994) examined the effects of setting on conversation in individuals with aphasia and non-impaired individuals. The purpose of this investigation was to describe distribution of communicative functions in the conversations of aphasic and non-impaired adults and to examine the effects of familiarity of conversational partner (i.e., familiar vs. unfamiliar), sampling procedure (i.e., topic-open vs. topic constrained), number of conversational participants (i.e., dyad vs. triad) and physical environment (i.e., subjects' homes vs. simulated home environments) on the dependent

variables. Dependent variables included the communicative function categories of statements, requests, answers, and ambiguous communicative attempts. Twelve non-impaired adults and 13 individuals with aphasia participated. All of the experimental subjects had Broca's aphasia except for one individual with conduction aphasia. Six minute samples of conversation were obtained in a counterbalanced order across subjects within each group by holding the number of conversational participants and the physical environment constant and manipulating familiarity of conversational partner and topic-open versus topic-constrained sampling procedures. In topic-constrained sampling conditions, subjects viewed and then discussed a 4-minute videotaped news segment. In topic-open conditions, subjects were instructed to talk about anything they chose.

Results revealed that aphasic and non-impaired subject groups differed significantly in their use of communicative functions measured across categories. Non-impaired subjects primarily used statements. In contrast, aphasic subjects used a higher percentage of answers to direct requests. Aphasic subjects were asked many more direct questions by their partners during the conversation than were non-impaired subjects. The authors suggest this pattern of

interaction may be accounted for by a number of factors, including (a) differences in conversational participants' perceived roles when conversing with aphasic subjects as compared to non-impaired language users, (b) reduced efficiency with which aphasic subjects were able to initiate substantive turns, (c) aphasic subjects' use of conversational regulators as an active strategy to shift the communicative burden to their conversational partner, and (d) interactions of all these factors. According to these results individuals with aphasia appear to demonstrate a full range of communication functions in their conversations, although they tend to assume a passive communicative role when compared to non-impaired subjects. Results demonstrated no difference in the aphasic subjects' performance as a function of different communication partners or different contextual settings. These findings suggest it is possible to observe a representative conversational sample when data is collected in day-to-day contextual settings where they are interacting with familiar partners.

Summary

Research has indicated that individuals with aphasia maintain a high level of pragmatic appropriateness despite their linguistic deficits. Avent and Wertz (1996) reported that fluent aphasics demonstrated a slightly higher level of pragmatic appropriateness than did non-fluent aphasics. However, Holland (1980; 1982) reported that non-fluent aphasics demonstrated the most "normal" pattern and were believed to be the most functionally communicative. These findings raise questions regarding the relationship between pragmatic performance and functional communication. An individual with aphasia may demonstrate appropriate pragmatic skills. Whether this assists the aphasic individual in successfully communicating a message has not been demonstrated.

Purpose

Research in the area of pragmatic performance and functional communication has produced conflicting results regarding the performance of individuals with aphasia. Holland (1980) reported that non-fluent aphasics performed better across functional communication tasks than fluent aphasics. Holland (1982) went on to report that subjects

with non-fluent aphasia demonstrated a more "normal" pattern of communication as opposed to subjects with fluent aphasia. Non-fluent subjects were found to produce a high number of successful communication attempts and a low number of communication failures. Fluent subjects produced a high number of both communication successes and failures. Busch, Brookshire, and Nicholas (1988) also found that non-fluent aphasics were more efficient in communicating crucial information than fluent aphasics. Although the non-fluent aphasics were found to be more efficient, both groups succeeded in communicating essential information. Prutting and Kircher (1987) investigated pragmatic performance of aphasic individuals and found that the profile of deficits for fluent and non-fluent groups were related to the linguistic constraints characteristic of each subtype. Avent and Wertz (1996) reported no significant differences between fluent and non-fluent aphasics with regard to pragmatic performance. However, the authors do note that fluent aphasics performed slightly better than non-fluent aphasics. In addition, fluent aphasics entered therapy with a higher level of pragmatic performance. An investigation of nonverbal behaviors (Berhmann & Penn, 1984) employed by aphasic individuals also revealed differences with regard to

type of aphasia. Non-fluent aphasics demonstrated more functionally appropriate use of gestures. For example, gestures used by non-fluent aphasics would often supplement or support the linguistic message. In contrast, the fluent aphasics' use of gestures was found to be incidental and not necessarily related to the linguistic message. Finally, standardization data of the *ASHA FACS* (1995) revealed that fluent aphasics demonstrated a higher level of functional communication than non-fluent aphasics.

Although some of the disagreement between the research reported above can be attributed to differences in subject selection and grouping (severity and type), this does not completely account for the conflicting results. The purpose of this study was to determine the relationship between pragmatic performance and functional communicative ability. For the purpose of this study, pragmatic performance was defined by an overall percentage of pragmatically "appropriate" behavior according to the *Pragmatic Protocol* (Prutting & Kirchner, 1987; see Appendix C). Functional communicative ability was defined by overall independence and qualitative scores from the *ASHA FACS* (Frattali et. al, 1995; see Appendix D). In addition, this study examined the influence that type and severity of aphasia may have on

pragmatic performance and functional communicative ability. In an effort to avoid the conflicting results of previous investigations, subjects representing mild, moderate and severe levels of aphasia were included. Type of aphasia was classified according to the classification categories provided by the *WAB*. In addition, severity of aphasia was determined by the aphasia quotient provided by the WAB. Subjects receiving a score of 65 and above were considered mildly impaired. Subjects receiving a score between 64 and 40 were considered moderately impaired. Subjects receiving a score of 39 or below were considered severely impaired.

Specific Research Questions

Experiment #1

1) Does pragmatic performance predict functional communicative ability?

2) Does type of aphasia (fluent or non-fluent) influence functional communicative ability?

3) Does type of aphasia (fluent or non-fluent) influence pragmatic performance?

4) Does the severity of aphasia (mild, moderate, or severe) influence functional communicative ability?

5) Does the severity of aphasia (mild, moderate, or severe) influence pragmatic performance?

Experiment #2

1) Do objective measures accurately predict unfamiliar listeners' perception of functional communicative ability?

Chapter 2

Method

Experiment #1

Subjects

Twenty-seven individuals with aphasia (fourteen fluent and thirteen non-fluent) participated in this study. Participants were recruited throughout the Middle and East Tennessee region from rehabilitation units, outpatient clinics, nursing homes, stroke clubs, and The University of Tennessee Hearing and Speech Center.

Individuals with aphasia were invited to participate in this investigation if they met the following inclusion criteria: 1)English speaker; 2)at least two months post-onset to insure medical stability and to allow for adjustment to the aphasia; 3)no evidence of additional neurologic disorders (e.g., dementia, Parkinson's disease); 4) no evidence of psychiatric disorder (as reported by caregiver); and 5)completion of the audiometric screening.

Aphasic individuals did not participate in this study if they presented with either of the following exclusion criteria: 1)unable or unwilling to provide informed consent; or 2)did not meet the inclusion criteria stated above.

Experimental Session and Observations

Participation involved one experimental session lasting approximately 1-1 ½ hours and two additional observation sessions lasting approximately 1-1 ½ hours each. The experimental and observation sessions were conducted in the subjects' homes and during activities such as church, therapy, going to the grocery store, and swimming class. Observation of the subjects during their everyday activities allowed the principal investigator to see a representative sample of the aphasic individuals' communicative abilities in typical interactions. The initial experimental session included administration of the *WAB* (Kertesz, 1982)(see Appendix A), an audiometric screening (see Appendix A), and an informal 15-20 minute conversation between the subject and principal investigator. Conversational samples were analyzed using the *Pragmatic Protocol* (see Appendix B). Experimental sessions were videotaped for data analysis. The additional observation sessions were necessary to accurately complete the *ASHA FACS* (see Appendix C) and were not videotaped. The *Pragmatic Protocol* and the *ASHA FACS* were used to determine the relationship between pragmatic performance and functional communication.

Preliminary Testing

Scores from the *WAB* provided an aphasia subtype classification and a severity rating. Descriptive information for individual subjects is presented in Table 1. Table 2 provides descriptive data for subjects classified by type of aphasia (fluent and non-fluent) and Table 3 provides descriptive data for subjects classified by degree of impairment (mild, moderate, or severe).

Audiometric screenings were conducted with a portable audiometer (Maico audiometer, Model number TDH-391) at 30 dB HL (ANSI, 1989) at 500, 1000, 2000, and 4000 Hz in the better ear, in accordance with ASHA guidelines for identification audiometry (ASHA, 1985). Thirteen subjects either did not pass the audiometric screening or were unable to be conditioned for the screening. For those subjects, behavioral observations indicated adequate hearing for everyday conversation. Threshold results are reported in Table 4.

A case history (see Appendix D) was collected for each subject, providing information regarding subjects' education level, occupation, family history, and medical data. This information helped determine eligibility for participation

Table 1

Descriptive Information of Subjects

Subject	Gender	Age	Education	MPO	AQ	WAB Type	Fluency
1	M	76	16	114.0	45.3	Broca	NF
2	F	65	16	202.0	73.4	Broca	NF
3	M	60	16	3.5	82.4	Anomia	F
4	F	78	12	2.5	64.6	Transcortical Sensory	F
5	M	46	12	59.0	68.5	Anomia	F
6	M	69	14	7.0	88.5	Anomia	F
7	F	39	13	131.0	88.9	Anomia	F
8	F	38	12	120.0	67.7	Broca	NF
9	M	76	12	6.0	78.7	Anomia	F
10	M	54	12	108.0	15.3	Broca	NF
11	F	70	15	91.0	57.6	Broca	NF
12	F	79	12	3.0	35.6	Wernicke	F
13	F	79	12	15.0	27.4	Broca	NF
14	M	66	8	8.0	16.6	Wernicke	F
15	F	65	6	10.0	12.4	Global	NF
16	M	68	16	60.0	7.7	Global	NF
17	F	83	18	24.0	58.9	Wernicke	F
18	M	64	9	9.0	10.4	Global	NF
19	F	70	12	2.5	20.3	Broca	NF
20	F	57	18	87.0	20.6	Broca	NF
21	M	77	14	7.0	89.3	Anomia	F
22	M	65	12	23.0	72.9	Anomia	F
23	F	74	13	72.0	39.4	Wernicke	F
24	M	61	9	7.0	45.0	Wernicke	F
25	M	72	11	2.5	81.1	Anomia	F
26	F	56	16	26.0	61.4	Broca	NF
27	M	48	12	4.0	69.0	Broca	NF

Note. Age and Education are reported in years. MPO = months post onset. AQ= Western Aphasia Battery Aphasia Quotient. NF= Non-fluent. F= Fluent.

Table 2

Descriptive Data of Subjects Classified by Type of Aphasia

Variable	Type of Aphasia: Fluent (n = 14)	Type of Aphasia: Non-Fluent (n = 13)
Age (years)		
Mean	67.5	62.3
Standard deviation	12.7	11.43
Range	39.0-83.0	38.0-79.0
MPO (months)		
Mean	25.4	65.3
Standard deviation	37.4	61.3
Range	2.5-131.11	2.5-202.0
WAB AQ		
Mean	64.64	37.57
Standard deviation	22.51	25.26
Range	16.60-89.30	7.70-73.40

Note. MPO = months post onset. WAB AQ = *Western Aphasia Battery* Aphasia Quotient.

Table 3

Descriptive Data of Subjects Classified by Degree of Impairment

Variable	Severity Grouping: Mild (n = 11)	Mod (n = 6)	Severe (n = 10)
Age (years)			
Mean	59.5	70.7	67.6
Standard deviation	14.4	10.4	8.3
Range	38-77	56-83	54-79
MPO (months)			
Mean	51.4	44.1	37.5
Standard deviation	68.9	46.7	40.1
Range	2.5-202	2.5-114	2.5-108
WAB AQ			
Mean	78.22	55.47	20.03
Standard deviation	8.43	8.34	9.83
Range	67.70-89.30	45.00-86.20	7.70-39.40

Note. MPO = months post onset. WAB AQ = *Western Aphasia Battery* Aphasia Quotient.

Table 4

Audiometric Screening Results

Subject	500 Hz	1000 Hz	2000 Hz	4000 Hz
1	R 30 L 30	R 20 L 20	R 40 L 35	R 55 L 70
2	R 25 L 25	R 25 L 25	R 30 L 60	R 60 L 80
3	R 25 L 40	R 25 L 25	R 30 L 25	R 30 L 50
4	R 25 L 35	R 25 L 25	R 25 L 25	R 25 L 25
5	R 25 L 35	R 35 L 40	R 50 L 25	R 35 L 25
6	R 20 L 20	R 20 L 20	R 20 L 20	R 50 L 30
7	R 20 L 20	R 20 L 20	R 20 L 20	R 20 L 50
8	R 30 L 20	R 30 L 20	R 25 L 20	R 20 L 20
9	R 30 L 25	R 30 L 30	R 60 L 70	R 60 L 80
10	R 35 L 30	R 20 L 25	R 20 L 20	R 50 L 65
11	R 25 L 35	R 25 L 30	R 25 L 30	R 35 L 25
12	R 30 L 30	R 30 L 30	R 30 L 30	R 30 L 35
13	R 40 L 40	R 40 L 35	R 35 L 55	R 65 L 40
14	R * L *	R * L *	R * L *	R * L *
15	R 30 L 30	R 30 L 25	R 30 L 30	R 30 L 25
16	R 30 L 30	R 20 L 20	R 35 L 25	R 45 L 50
17	R 25 L 25	R 25 L 25	R 30 L 25	R 25 L 25
18	R 25 L 30	R 30 L 25	R 30 L 25	R 60 L 40
19	R 25 L 25	R 25 L 25	R 25 L 25	R 25 L 25
20	R 25 L 25	R 25 L 25	R 25 L 25	R 25 L 25
21	R 20 L 25	R 20 L 20	R 20 L 20	R 20 L 20
22	R 30 L 25	R 20 L 20	R 20 L 20	R 35 L 45
23	R 40 L 30	R 25 L 30	R 25 L 30	R 25 L 45
24	R 35 L 35	R 25 L 25	R 25 L 25	R 45 L 35
25	R 25 L 25	R 25 L 25	R 25 L 40	R 30 L 50
26	R * L 30	R * L 25	R * L 25	R * L 25
27	R 30 L 25	R 25 L 25	R 25 L 25	R 25 L 35

Note. Thresholds are reported in decibels (dB). R= Right ear. L= Left ear. Subject 14 could not be conditioned to hearing screening. Subject 26 is deaf in the right ear since birth.

based on the established inclusion/exclusion criteria. For most subjects the caregiver provided the necessary information to complete the case history form; however, some aphasic subjects were able to provide this information on their own.

Experimental Session

The principal investigator, a certified speech-language pathologist with five years experience working with aphasic individuals, conducted all sessions. The experimental session lasted approximately 1-1 ½ hours. This session took place in the subjects' home with the participants seated across from one another. The primary objective of the experimental task was to elicit a spontaneous communication sample in which pragmatic performance could be analyzed using the *Pragmatic Protocol*. To ensure the conversation sample was representative of each subjects ability to communicate, regardless of modality, it was necessary to embed this portion in such a way that subjects were not self-conscious or poised for the communication sample. Consistent with previous investigations (Ripich, Vertes, Whitehouse, Fulton, & Ekelman, 1991) formal assessments were administered first, followed by a "break" from testing.

During the break, a spontaneous communication sample was elicited. Subjects agreed, with full understanding, that the entire session would be videotaped - including formal testing and informal conversation. The statement of purpose provided for subjects and their caregivers was as follows:

> "The purpose of this study is to examine the ability of individuals with aphasia to communicate a variety of messages. All portions of the experimental task will be videotaped and used for analysis."

The *WAB* (see Appendix A) was the formal, standardized language assessment employed. During the "break" the principal investigator engaged the subject in a 15-20 minute unstructured conversational exchange. This conversation was used for analysis with the *Pragmatic Protocol* (Prutting & Kircher, 1987)(see Appendix B). Interactions were videotaped using a Panasonic VHS Omni Movie Camcorder PV-950. Work history and illness were the targeted topics for conversation because they have been found to yield the most complex language (Glosser et al., 1988). Alternative conversational topics included recent activities, interests, recent life changes, education, and family. Open-ended requests (Terrell & Ripich, 1989)(e.g., "Tell me about your family."), as opposed to yes-no questions, were employed.

The principal investigator attempted to keep the topics and the form of the conversations similar for all subjects; however, the exact content of the conversation depended largely on the subject. Following the conversation an audiometric screening was administered (see Appendix A).

Observation Sessions

Two observation sessions lasting approximately one hour each were conducted within two to three weeks of the experimental session. These sessions were scheduled based on subject availability and allowed the principal investigator an opportunity to observe a representative sample of aphasic individuals' communicative abilities during interactions with friends and family. Information obtained from the observation sessions was necessary for completing the *ASHA FACS* (Frattali et al., 1995)(see Appendix C). A systematic observation procedure developed by Holland (1982) was also employed during the observation sessions. The purpose of this procedure was to allow the observer a systematic means of observation. It was believed that using this procedure provided a richer description of the aphasic subject's communicative abilities. The procedure is primarily concerned with the frequency and form of successful and

unsuccessful verbal and nonverbal communicative acts. For example, any observed response that communicates an aphasic subject's message was considered successful, regardless of the means used to convey it. Any response that was not successful in communicating an aphasic subject's message was considered a failure. The principal investigator counted the communicative interactions and entered them as successful or unsuccessful on a tally sheet (see Appendix E). After each observation, the principal investigator also completed a summary form (in Appendix E). This summary included information about the quality of interactions as well as strategies used by the aphasic subject to communicate his/her intentions.

Data Collection and Analysis

Pragmatic Performance

Pragmatic aspects of language were analyzed for each subject with the *Pragmatic Protocol* (Prutting & Kirchner, 1987). The *Pragmatic Protocol* assesses verbal, paralinguistic, and non-verbal aspects of language use. It consists of 30 pragmatic aspects of language derived from normative data on children and adults. According to Prutting and Kirchner (1987), the *Pragmatic Protocol* should be

completed after viewing an unstructured, spontaneous conversational interaction between the subject and his/her partner. Each of the protocol behaviors is scored as appropriate, inappropriate, or no opportunity to observe. All conversation samples were elicited between the subject and principal investigator.

Functional Communication

Functional communication abilities were assessed using the *ASHA FACS* (Frattali et al., 1995). This assessment evaluates how a deficit (e.g., aphasia) affects one's ability to communicate in daily life activities. Four assessment domains constitute the measure: Social Communication; Communication of Basic Needs; Reading, Writing, and Number Concepts; and Daily Planning. Within each domain, specific functional behaviors are rated. The *ASHA FACS* provides a quantitative as well as a qualitative means to rate functional communication. The 7-point Scale of Communication Independence measures functional communication performance along a continuum of independence relating to levels of assistance and/or prompting needed to communicate. The 5-point Scale of Qualitative Dimensions of Communication measures a range of response dimensions (i.e., adequacy,

appropriateness, promptness, and communication sharing) that characterize the subject's communication abilities for each assessment domain addressed. When completing the *ASHA FACS*, ratings were based on observations as well as information obtained from therapists, family, and friends.

Reliability

Intra- and inter-judge reliability were assessed for both the *Pragmatic Protocol* and the *ASHA FACS*. Intra-judge reliability was determined by having the principal investigator re-assess the *Pragmatic Protocol* and the *ASHA FACS* for five of the twenty-seven subjects selected randomly. The principal investigator viewed the videotapes of the communication samples and completed a second *Pragmatic Protocol* without access to the original ratings. Percent agreement between the principal investigator's first and second ratings was 95.5%. A second *ASHA FACS* was completed by the principal investigator within two weeks of the original scoring. Percent agreement between the principal investigator's first and second ratings was 95.7%. Pearson product moment correlations between first and second ratings ranged from .919 to .988. See Table 5 for statistical results and p values.

Inter-judge reliability measurements were completed for the *Pragmatic Protocol*, the *ASHA FACS* and the observation summaries for six of the twenty-seven subjects. These six subjects were selected randomly, but the subjects' and the second judge's schedules of availability influenced selection in some instances. The second judge was a graduate student in speech-language pathology and had experience

Table 5

Intra- and Inter-judge Reliability for Pragmatic Protocol and ASHA FACS.

	Pragmatic Protocol	CIDS	QDSC
Intra-judge			
Pearson Correlation	.919	.998	.966
Sig. (2-tailed)	.027	.002	.008
N	5	5	5
Inter-judge			
Pearson Correlation	.916	.969	.981
Sig. (2-tailed)	.002	.001	.001
N	6	6	6

Note. CIDS = Overall Communication Independence Score. QDSC = Overall Qualitative Dimension Score. All correlations are significant at the .05 level (2-tailed).

working with aphasic individuals. The second judge trained to criterion for all measures prior to the initiation of this study.(see Appendix G for training procedures). The second judge viewed the videotapes of all six samples and completed an independent *Pragmatic Protocol* for each. Comparisons were then made between these ratings and the original ratings made by the principal investigator. Inter-judge percent agreement for the *Pragmatic Protocol* was 92.1%. The second judge also observed the six subjects during the three scheduled sessions in order to complete the *ASHA FACS*. Inter-judge percent agreement for the *ASHA FACS* was 92.4%. Pearson product-moment correlations ranged from .916 to .981. See Table 5 for the statistical results and p values.

For the purposes of inter-judge reliability of the observation summary (see Appendix D), the second judge, in conjunction with the principal investigator, observed the subjects in real-life situations. Observation summaries were completed independently. Agreement between observers was calculated several ways: 1) observer agreement for category usage during the observation period (25 possible categories); 2) observer agreement on the total number of acts observed during the period of observation; 3) observer

agreement for usage of appropriate and inappropriate categories. Agreement between observers was between 80% and 100% for most ratings. Results are reported in Table 6.

Table 6

Inter-judge Percent Agreement for Observation Summary

Subject	Category Usage	Total # of Acts used	Approp. Usage	Inapprop. Usage
8	89.5%	83.0%	81.5%	35.5%
10	100.0%	89.5%	87.0%	81.0%
12	94.5%	99.0%	93.4%	91.0%
13	100.0%	92.8%	93.5%	90.8%
15	100.0%	86.5%	88.0%	66.5%
23	100.0%	90.0%	87.0%	89.0%
Total % Agreement	97.3%	90.0%	88.4%	75.3%

Statistical Analysis

Statistical analyses were performed using SPSS statistical analysis software. Pearson product-moment correlation coefficients were computed to determine the relationship between scores on the *Pragmatic Protocol* (Prutting & Kirchner, 1987) and the *ASHA FACS* (Frattali et al., 1995). For the purpose of this study, pragmatic performance was defined by an overall percentage of pragmatically "appropriate" behavior according to the

Pragmatic Protocol (Prutting & Kirchner, 1987; see Appendix C). Functional communicative ability was defined by overall independence and qualitative scores from the *ASHA FACS* (Frattali et. al, 1995; see Appendix D). The correlation was tested for significant departure from zero using the significance level of .05.

A multivariate analysis of variance (MANOVA) was computed to determine differences between groups (fluent and non-fluent) on the experimental tasks (*Pragmatic Protocol* and *ASHA FACS*). The MANOVA had two factors (group and severity); the factor of group had two levels (fluent and non-fluent); and the factor of severity had three levels (mild, moderate, and severe) and two dependent variables (*Pragmatic Protocol* and *ASHA FACS*). In addition, Post Hoc analyses were conducted using the Tukey HSD procedure to determine differences between degrees of impairment (mild, moderate and severe). For this analysis, the Bonferroni method, a procedure that decreases the alpha level, was calculated to reduce the risk of a Type I error.

Experiment #2

The objective of this experiment was to determine the relationship between objective measures (*Pragmatic Protocol*,

ASHA FACS, & CETI) and unfamiliar listeners' judgements of functional communication for individuals with aphasia.

Caregivers were asked to complete *Communicative Effectiveness Index (CETI)*(Lomas, Pickard, Bester, Elbard, Finlayson, & Zoghaib, 1989)(see Appendix F). This provided descriptive information regarding the aphasic subjects' communicative abilities and was used to make comparisons of functional communication ratings between the principal investigator, caregivers, and unfamiliar listeners.

Listeners

For Experiment #2, thirty-five undergraduate students from The University of Tennessee served as the unfamiliar listeners. All listeners were native English speakers and passed a pure-tone audiometric screening at 25 dB HL at 500, 1000, 2000, and 4000 Hz in the better ear.

Rating Procedure

The unfamiliar listeners were asked to rate each conversation on the dimension of "functionality," which was defined as "how well the individual gets the message across regardless of the means." The listeners were asked to make a rating on a five point scale with 5 being good and 1 being

poor(see Appendix H) for the following five items:

1)Ability to participate in the conversation.
2)Ability to get his/her message across.
3)Ability to indicate understanding of what is being said.
4)Ability to describe or discuss a topic in depth (e.g., by providing new information, elaborating or expanding the discussion).
5) Overall, rate the aphasic subject as a communicator.

Listener/Rating Sessions

The unfamiliar listeners participated in one viewing session lasting approximately 1 ½ hours. Video review sessions took place in a quiet room with video-recorded conversational samples played through a Panasonic VCR into a Sony TV monitor. They met in groups of five to ten to view the videotapes. Listeners were divided into two groups for a total of eight rated video samples (eighteen listeners in one group and seventeen listeners in the other), with each group rating four videos. Ratings were made individually with no discussion among the listeners.

Each listener rated the four randomly selected subjects' "functional" communication abilities from the videotaped conversational samples. They were provided with written and verbal instructions to rate each conversation on the dimension of "functionality," which was defined as "how well the individual gets the message across regardless of

the means." Following these instructions, the principal investigator played the videotape; and the listener assigned a rating he/she felt was appropriate.

Reliability of Listeners

Six listeners (three from each group) were randomly selected (based on willingness) to return one week following the first listening session to rate the same four samples a second time. Pearson product-moment correlation coefficients were computed for Time 1 and Time 2 ratings across the samples for each listener. The alpha level for significance was set at $p = 0.05$. Correlations for each question ranged from .58 to .84. The correlations were significant and considered moderate in strength. Examination of individual scores indicated that the listeners tended to rate subjects' abilities higher at the second viewing. See Table 7 for statistical results and p values.

Table 7

Reliability of Unfamiliar Listeners

	Quest #1	Quest #2	Quest #3	Quest #4	Quest #5
Pearson Correlation	.843	.580	.665	.717	.781
Sig. (2-tailed)	<.001	.001	<.001	<.001	<.001
N	30	30	30	30	30

Correlations are significant at the 0.01 level (2-tailed).

Statistical Analysis

"Functionality" ratings obtained from unfamiliar listeners were paired with subjects' corresponding scores on the *Pragmatic Protocol*(Prutting & Kirchner, 1995) and the *ASHA FACS* (Frattali et al.,1995). Pearson product-moment correlation coefficients were computed to determine the strength of the relationship between objective measures (*Pragmatic Protocol*, *ASHA FACS*, *WAB*,& *CETI*) and unfamiliar listeners' ratings of "functionality." In addition, Pearson product-moment correlation coefficients were computed to determine the strength of the relationship between the caregiver's rating of functional communication (*CETI*) and the objective measures used by the principal investigator (*WAB*, *Pragmatic Protocol* and *ASHA FACS*).

Pilot Data

Pilot data were collected to determine if differences in performance between fluent aphasics and non-fluent aphasics for pragmatic performance and functional communication could be demonstrated prior to conducting the investigation. Three aphasic subjects (two non-fluent and one fluent) were used for the piloting procedures. Videotaped conversations of the aphasic subjects were

analyzed using the *Pragmatic Protocol*. The *ASHA FACS* protocols were completed by a speech-language pathologist who had known and worked with the subjects for at least two years. Results from the pilot data revealed no differences on the *Pragmatic Protocol* between the fluent and non-fluent subjects who had similar *WAB* aphasia quotients. Although it was difficult to predict if there would be differences given a larger population, there did appear to be some differences on the independent sub-tests of the *ASHA FACS*. Scores for the pilot data are listed in Tables 8, 9 and 10.

Table 8

Descriptive Information of Pilot Subjects

Subject	Gender	Age	Education	MPO
1	M	74	14	36
2	M	76	14	108
3	F	73	13	60

Note. Age and Education are reported in years. MPO = months post onset.

Table 9

WAB Aphasia Quotient and Pragmatic Protocol Score

Subject	WAB AQ	Pragmatic Protocol
1	24.9	73%
2	42.4	83%
3	47.4	83%

Table 10

Pilot Data Results for the ASHA FACS

Subject	SC	BN	R&W	DP	AD	AP	PR	CS	CIS	QDCS
1	4.8	5.6	2.8	3.4	3.3	3.3	3.3	2.0	4.2	3.0
2	5.2	6.7	3.0	5.0	3.8	5.0	3.8	3.0	5.0	3.9
3	4.1	7.0	5.5	5.8	3.8	3.8	3.8	4.0	5.6	3.9

Note. SC = social communication; BN = communication of basic needs; RW = reading, writing and number concepts; DP = daily planning; AD = adequacy; AP = appropriateness; PR = promptness; CS = communication sharing; CIS = communication independence score; QDCS = qualitative dimensions of communication scores.

Chapter 3

Results

Experiment #1

As stated earlier, the purpose of this study was to determine the relationship between pragmatic performance and functional communication. For the purpose of this study, pragmatic performance was defined by an overall percentage of pragmatically "appropriate" behaviors according to the *Pragmatic Protocol* (Prutting & Kirchner, 1987; see Appendix C). Functional communication was defined by overall independence and qualitative scores from the *ASHA FACS* (Frattali et. al, 1995; see Appendix D). In addition, this study examined the influence of type and severity of aphasia on pragmatic performance and functional communication. Type of aphasia was classified according to the categories provided by the *WAB*, and severity of aphasia was determined by the *WAB* aphasia quotient. Subjects receiving a score of 65 and above were considered mildly impaired; subjects receiving a score between 64 and 40 were considered moderately impaired; and subjects receiving a score of 39 or below were considered severely impaired. Specific research questions for Experiment #1 were as follows:

1)Does pragmatic performance predict functional communicative ability?
2)Does type of aphasia (fluent or non-fluent) influence functional communicative ability?
3)Does type of aphasia (fluent or non-fluent) influence pragmatic performance?
4)Does the severity of aphasia (mild, moderate, or severe) influence functional communicative ability?
5)Does the severity of aphasia (mild, moderate, or severe) influence pragmatic performance?

Subjects' mean *Pragmatic Protocol* and *ASHA FACS* scores, divided into fluent and non-fluent groups as well as by degree of impairment, are shown in Table 11. The *ASHA FACS* provides a quantitative score (CIDS) as well as a qualitative score (QDSC).

Pragmatics and Functional Communication

To answer the primary research question ("Does pragmatic performance predict functional communication?") Pearson Product Moment Correlations were computed between scores of the *Pragmatic Protocol*, *ASHA FACS* and *WAB*. See Table 12 for Results are located in Table 12. All correlations were significant ($p < .001$) indicating a strong relationship between the assessments ($r = .78$ to $.95$). Based on the results, pragmatic performance does appear to predict functional communication. Figures 1a through 1c show data points for individual subjects.

Table 11

Descriptive Data for Subjects' Objective Measures

	Degree	Fluency	N	Min	Max	Mean	SD
PP	Mild	Non-fluent	3	86.0	93.0	88.4	3.98
		Fluent	8	86.2	100.0	93.1	5.52
	Mod	Non-fluent	3	45.3	82.8	77.0	7.19
		Fluent	3	45.0	86.2	70.4	22.21
	Severe	Non-fluent	7	41.4	75.7	55.7	12.31
		Fluent	3	41.4	89.7	66.6	24.21
CIDS	Mild	Non-fluent	3	5.78	6.70	6.19	.467
		Fluent	8	5.73	6.91	6.33	.396
	Mod	Non-fluent	3	4.28	6.54	5.31	1.14
		Fluent	3	2.90	5.21	4.03	1.16
	Severe	Non-fluent	7	2.55	5.92	3.69	1.27
		Fluent	3	2.67	5.64	3.89	1.55
QDCS	Mild	Non-fluent	3	3.94	4.38	4.15	.218
		Fluent	8	3.80	4.88	4.41	.345
	Mod	Non-fluent	3	3.13	4.44	3.75	.659
		Fluent	3	2.40	3.88	2.93	.824
	Severe	Non-fluent	7	2.13	4.06	2.97	.635
		Fluent	3	1.73	3.69	2.59	.996

Note. PP = Pragmatic Protocol. CIDS = Quantitative Communication Independence Score of ASHA FACS. QDSC = Qualitative Score of ASHA FACS.

Table 12

Correlation Results for Objective Measures

		WAB	PP	CIDS	QDSC
WAB					
	Pearson Correlation	1.000	.864	.810	.781
	Sig. (2-tailed)	.	<.001	<.001	<.001
	N	27	27	27	27
PP					
	Pearson Correlation	.864	1.000	.916	.838
	Sig. (2-tailed)	<.001	.	<.001	<.001
	N	27	27	27	27
CIDS					
	Pearson Correlation	.810	.916	1.000	.948
	Sig. (2-tailed)	<.001	<.001	.	<.001
	N	27	27	27	27
QDSC					
	Pearson Correlation	.781	.838	.948	1.000
	Sig. (2-tailed)	<.001	<.001	<.001	.
	N	27	27	27	27

Note. WAB = Western Aphasia Battery. PP = Pragmatic Protocol. CIDS = Quantitative Communication Independence Score of ASHA FACS. QDSC = Qualitative Score of ASHA FACS. Correlations are significant at the 0.01 level (2-tailed).

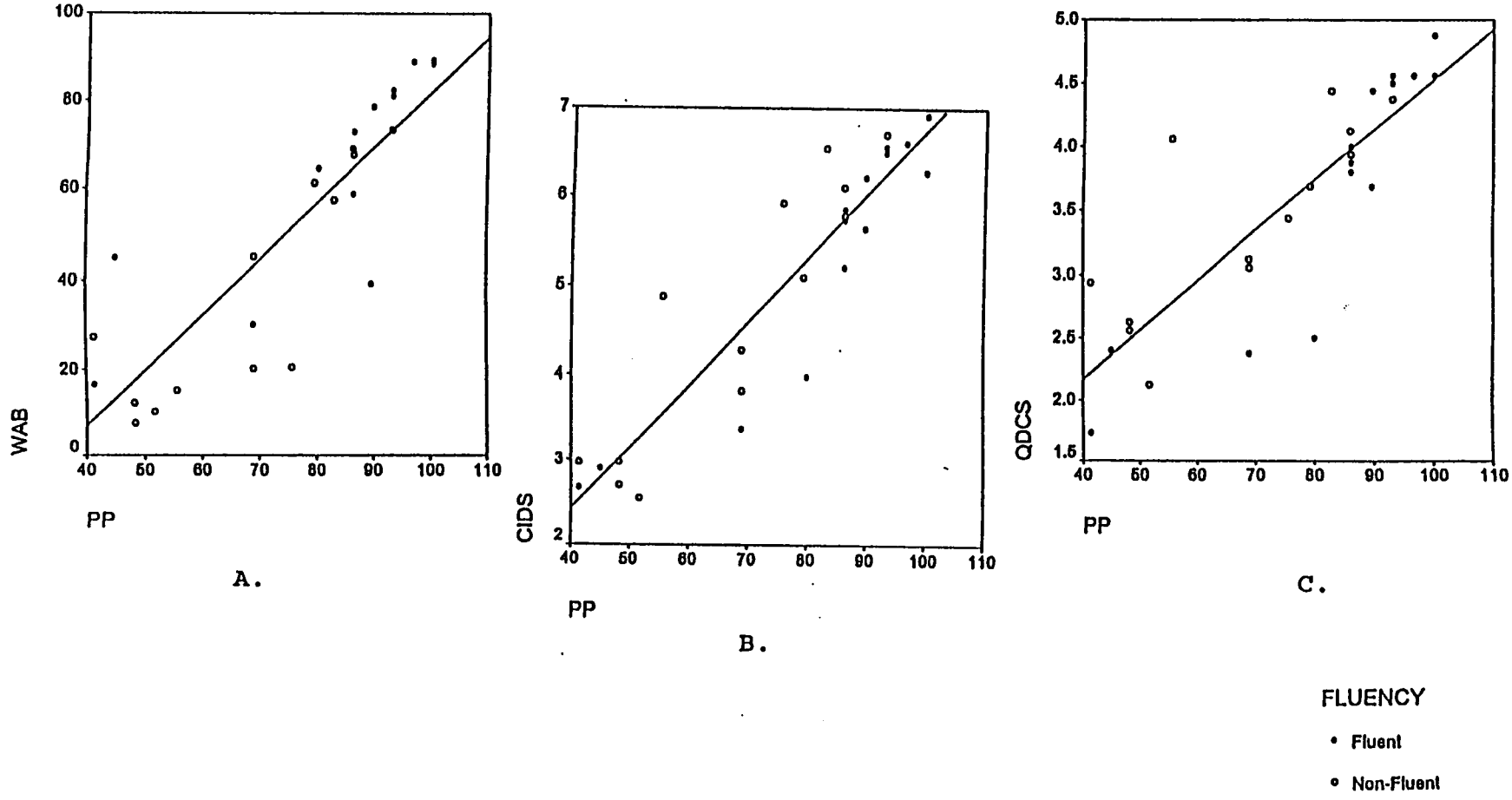

Figure 1. Correlations between the Pragmatic Protocol and the (A) WAB, (B) CIDS, and (C) QDSC.

Differences between Type of Aphasia and Degree of Impairment

To determine whether type of aphasia (fluent or non-fluent) and/or degree of impairment (mild, moderate, or severe) influence pragmatic performance and/or functional communication, a multivariate analysis of variance (MANOVA)was computed. The MANOVA had two factors (fluency and degree). The factor of fluency had two levels (fluent and non-fluent) and the factor of degree had three levels (mild, moderate, and severe). The significance level for the MANOVA was set at an alpha level of .05.

Type of Aphasia

No significant differences were found between the fluency groups ($p = .197$) (fluent and non-fluent). Based on these results, type of aphasia does not appear to influence pragmatic performance or functional communication. Results are presented in Table 13.

Degree of Impairment

Significant differences ($p = .006$) were found between the impairment groups (mild, moderate, and severe). Because the MANOVA indicated significant differences for degree of

impairment, individual ANOVAs were computed to determine if there were differences between impairment groups on the objective measures (*Pragmatic Protocol* and *ASHA FACS)*. Significant differences (p = <.001) were found in the performance of the impairment groups (mild, moderate, and severe) for each of the measures. Based on these results, severity of aphasia does influence pragmatic performance and functional communication. Results are presented in Table 13.

Table 13

Summary of Analysis of Variance for Pragmatic Protocol and ASHA FACS

		df	F	Sig.
PP				
	Degree	2	11.580	<.001
	Fluency	1	.311	.583
	Degree*Fluency	2	.834	.448
CIDS	Degree	2	13.161	<.001
	Fluency	1	.540	.471
	Degree*Fluency	2	1.164	.338
QDCS	Degree	1	13.526	<.001
	Fluency	1	1.521	.231
	Degree*Fluency	2	1.524	.237

Significance level set at .05 (2-tailed).

To further examine the differences between degree of impairment, Post Hoc analyses were conducted using the Tukey HSD method. To avoid the possibility of a Type I error, a Bonferroni reduction was used. Since there were three

comparisons, the critical comparison alpha level was reduced to .017. Significant differences (p = <.001) were found between the mild and severe groups. No significant differences (p = .028, .088) were found between the mild and moderate groups or the moderate and severe groups. Results are presented in Table 14.

Table 14

Differences between Degree of Impairment

Groups	Mean Diff.	Sig.
Mild - Moderate	18.0855	.028
Moderate - Severe	14.7320	.088
Mild - Severe	32.8175	<.001

Significance level set at .017 (2-tailed).

In addition, correlations were computed between the objective measures (*WAB*, *Pragmatic Protocol*, and *ASHA FACS*) and the variables of age, education and months post onset. Correlations between education, the Pragmatic Protocol, and the ASHA FACS were significant (p = .043, .026, .045) but weak (r= .39, .43, .39). No significant correlations were found for age and months post onset(p = -.113 to .473).

Experiment #2

The objective of this experiment was to determine the relationship between objective measures (*Pragmatic Protocol, ASHA FACS, & CETI*) and unfamiliar listeners' judgements of functional communication for individuals with aphasia. The specific research question was as follows: Do objective measures accurately predict unfamiliar listeners' perception of functional communicative ability?

Listeners' Judgements and Objective Measures

Pearson product-moment correlation coefficients were computed to determine if there was a relationship between the objective measures (*Pragmatic Protocol, ASHA FACS, CETI* and *WAB*) and the ratings made by the unfamiliar listeners. Statistical results and p values are located in Table 15. Moderate correlations were found between all questions (1-5), the *WAB*, and the *Pragmatic Protocol* (r = .76 to .87). Question #1 was also moderately correlated with the Qualitative *ASHA FACS* score (r = .81). Questions #3, #4, and #5 were moderately correlated (r = .66 to .77) with the Quantitative communication independence score of the *ASHA FACS*.

Table 15

Correlations for Unfamiliar Listeners and Objective Measures

	WAB	PP	CIDS	QDSC	CETI
QUES1					
Pearson Correlation	.812*	.861*	.714*	.807*	.548
Sig. (2-tailed)	.014	.006	.047	.047	.160
QUES2					
Pearson Correlation	.775*	.758	.663	.588	.462
Sig. (2-tailed)	.024	.029	.057	.125	.249
QUES3					
Pearson Correlation	.795*	.871*	.758	.663	.567
Sig. (2-tailed)	.018	.005	.029	.073	.143
QUES4					
Pearson Correlation	.788*	.780*	.762*	.687	.501
Sig. (2-tailed)	.020	.023	.028	.060	.206
QUES5					
Pearson Correlation	.794*	.830*	.772*	.678	.516
Sig. (2-tailed)	.019	.011	.025	.066	.191

Note. WAB = Western Aphasia Battery. PP = Pragmatic Protocol. CIDS = Quantitative Communication Independence Score for ASHA FACS. QDSC = Qualitative Score of ASHA FACS. CETI = Communicative Effectiveness Index.*Correlations are significant at the 0.05 level (2-tailed).

CETI and Objective Measures

Correlations were also computed to determine the strength of the relationship between the *CETI* (caregiver ratings) and the objective measures (*Pragmatic Protocol*, *ASHA FACS*, and *WAB*). Results are presented in Table 16. Significant correlations were observed indicating a moderate relationship between the measures. The strongest correlation was observed between the *CETI* and the QDSC (qualitative score of ASHA FACS).

Table 16

Correlations between the CETI and Objective Measures

	WAB	PP	CIDS	QDCS
Pearson Correlation	.583*	.715*	.784*	.813*
Sig. (2-tailed)	.018	.002	<.001	<.001

Note. WAB = Western Aphasia Battery. PP = Pragmatic Protocol. CIDS = Quantitative Communication Independence Score for ASHA FACS. QDSC = Qualitative Score of ASHA FACS. Correlations are significant at the .05 level (2-tailed).

Chapter 4

Discussion

Experiment #1

The purpose of the present study was to investigate the relationship between pragmatic performance and functional communication. Additionally, this study examined the influence that type of aphasia (fluent or non-fluent) and severity of aphasia (mild, moderate, or severe) may have on pragmatic performance and functional communication ability.

Pragmatic Performance and Functional Communication

Pragmatic performance as measured by the *Pragmatic Protocol* (Prutting & Kirchner, 1987) was found to have a strong, positive correlation with functional communication as measured by the *ASHA FACS* (Frattali et al., 1995). Pragmatic performance was most highly correlated with the quantitative communication independence score of the *ASHA FACS* ($r = .92$, $p<.001$).

The quantitative score of the *ASHA FACS* is based on the level of assistance needed by the aphasic individual to perform in a typical communicative interaction (e.g., answering yes/no questions). Pragmatics includes the

intentions and attitudes conveyed by speech as well as the gestural and prosodic elements that accompany speech. Based on these results, it appears that ability to convey intentions and attitudes does assist in successful functional communication (i.e., the ability to express or understand a message, regardless of mode, effectively and independently). In other words, pragmatic performance does appear to predict functional communicative ability.

Correlations between the qualitative scores of the *ASHA FACS* and pragmatic performance were significant ($p<.001$) but slightly more moderate ($r = .84$). Glosser et al.(1988) investigated variations in language behaviors in different communicative contexts (e.g., face-to-face, through a barrier) and found not only quantitative but qualitative variations in aphasic language. Our results, as well, demonstrate pragmatic abilities may be used interactively to modify and augment the quality of communication. Thus, therapy focusing on pragmatic aspects of communication should enhance the quality of one's functional communicative ability.

Additionally, observations and conversations with caregivers were invaluable in determining the quality of the subjects' communication as well as the strategies each

subject used to circumvent their linguistic deficits. Observing the presence or absence of certain pragmatic aspects such as speech act usage, topic initiation, repair/revision and use of gestures in subjects' conversation helped identify communication strengths. Traditional language testing (e.g., WAB) did not capture the communicative competencies observed. This supports the notion of "evaluation in natural contexts" (Holland, 1982; Ferguson, 1994) and using measurements such as the *Pragmatic Protocol* and the *ASHA FACS* in assessing quality of communication. Pragmatic assessment guides pragmatic treatment, which appears to be more closely related to functional communication than traditional stimulus-response treatment.

The *Pragmatic Protocol* and the *ASHA FACS* were also moderately correlated with the *WAB* ($r = .86, .81, .78$). The higher the *WAB* aphasia quotient, the higher the pragmatic performance and functional communication scores. Based on these results linguistic competence, as well as pragmatic performance, appears to contribute to one's ability to convey and receive messages. This result supports the findings of some previous investigations (Frattali et al. 1995; Avent et al., 1998) in which communicative performance

(i.e., *Pragmatic Protocol*, *ASHA FACS*) correlated well with traditional language measures. Other investigations (Guilford & O'Connor (1982); Holland (1980, 1982); Penn (1983); Goldblum (1985)) have demonstrated relatively preserved pragmatic abilities with little correlation between traditional language measures (e.g., *BDAE*) and communicative performance (e.g., *CADL*). Despite these discrepancies, interpretation of pragmatic performance independent of linguistic ability is difficult. It is evident from these data that some overlap exists between areas of communicative competence and pragmatic performance that is not easily explained apart from the aphasic individuals' linguistic limitations.

Although the *WAB* aphasia quotients were strongly correlated with the *Pragmatic Protocol* and the quantitative score of the *ASHA FACS*, there was a weaker correlation (.78) with the qualitative score of the *ASHA FACS* (i.e., adequacy, appropriateness, promptness, and communication sharing). In other words, the quality of the aphasic individual's communication could not necessarily be predicted from the *WAB*.

Avent et.al (1998) report that although there is a relationship between language impairment and pragmatic

behavior, improvement in pragmatic performance is not related to improvement in language impairment. Our results support this finding. For the most part, subjects with greater linguistic skills performed better pragmatically. However, in subjects with similar linguistic ability (i.e., similar *WAB* aphasia quotient) variances in pragmatic performance appear to correlate better with variances in functional communication. For example, Subject #1 presented with an aphasia quotient of 45.3, a score of 68.96 on the *Pragmatic Protocol*, a 4.28 quantitative score and a 3.13 qualitative score on the *ASHA FACS*. In contrast, Subject #24 presented with an aphasia quotient of 45, a score of 45 on the *Pragmatic Protocol*, a 2.9 quantitative score and a 2.4 qualitative score on the *ASHA FACS*. Subject #1's superior ability to convey intentions and attitudes appears to influence his communicative effectiveness and independence in the absence of linguistic competence. This is what Holland (1977) meant when she observed "aphasics communicate better than they talk". Despite the strong correlations between measures of linguistic severity, pragmatics, and functional communication in this study, it is apparent that traditional measures do not tell the whole story for many aphasics.

Although time-post onset was not significantly correlated with pragmatic performance or functional communication (r= .02, .14,.12), it is important to note that Subject #1 was approximately eight years and five months further post-onset than Subject #24. Thus, aphasic individuals may continue to develop pragmatic abilities and acquire strategies necessary for successful functional communication despite relatively little improvement in linguistic skills over time.

The close alignment of pragmatics and functional communication in the absence of linguistic competence could also be influenced by several other factors including: 1) age; 2) communicative environment; and 3) ability to read and write. For example, Subject #13 presented with an aphasia quotient that was 7 points higher than Subject #20 but performed much worse on the *Pragmatic Protocol* and the *ASHA FACS*. Upon further examination of the data, several potential factors were discovered that could enhance Subject #20's communication abilities. First, Subject #20 was 22 years younger than Subject #13. Although no significant correlations were found between age and the measures employed, this is worthy of noting. Second, Subject #13 was essentially confined to bed due to physical limitations

while Subject #24 was able to drive a car (with modifications) and do some light shopping on her own. Thus, Subject #24 had the opportunity for a variety of communicative interactions with a variety of people while Subject #13's communicative environment was limited to two aides that stayed with her in her home. Finally, Subject #24's reading and writing skills were far superior to Subject #13's, allowing her to use a communication notebook independently.

Some researchers (Lyons, 1988; Holland, 1991; Ferguson, 1994) have stressed the importance of situational context (the physical environment, communication partners, sociolinguistic considerations, etc.) and it does appear to be relevant to the example above. However, for other subjects in this study (#16 and #18) good environments for promoting communication (i.e, strong family support, ongoing language therapy, opportunities for varied communicative experiences) were not sufficient to overcome severe linguistic deficits. Although pragmatic performance for these subjects was much better than their linguistic skills, their functional communication was severely limited.

Thus, while there is a relationship between *WAB* scores and pragmatic and functional communicative abilities, the

Pragmatic Protocol appears to be a more accurate predictor of functional communication. The *Pragmatic Protocol* and the *ASHA FACS* appear to be more sensitive to changes in communicative competence that occur over time as the result of treatment, environment, or time itself. Using pragmatic performance, rather than traditional linguistic performance measures, to guide treatment should produce more "functional" results.

Influence of Type of Aphasia

Avent and Wertz (1996) reported that fluent aphasics in their investigation demonstrated a slightly higher level of pragmatic appropriateness than did non-fluent aphasics. Although the differences in fluent and non-fluent subjects were minimal and no differences were observed between more specific types of aphasia, it is interesting to compare their observations to those of Holland (1980; 1982). Holland and her colleagues reported that non-fluent aphasics demonstrated the most "normal" pattern and were believed to be the most functionally communicative. One might then speculate there are gaps between pragmatic knowledge for interactions and ability to communicate well. Results for this investigation, however, would not support such

speculation. In fact, no significant differences were found between fluent and non-fluent groups for pragmatic performance or functional communication. This study attempted to control for type of aphasia by having an even number of both groups divided between three severity levels (mild, moderate, and severe). The observed power of .91 indicates the probable replicability of these results with other samples. When controlling for severity, significant differences ($p < .001$) were found in pragmatic performance, as well as, functional communication skills. These results are consistent with those of Prutting and Kirchner (1987), who reported considerable overlap in individual pragmatic profiles of subjects with no distinct profile emerging based on type of aphasia.

Influence of Degree of Impairment

Penn (1988) observed distinct differences based on type of aphasia using the *Profile of Communicative Appropriateness* (*PCA*), a measure of pragmatic appropriateness similar to the *Pragmatic Protocol*. However, Penn postulated severity was more closely related to pragmatic performance than type of aphasia as predicted by traditional tests. This is also consistent with our results

and others (Goldblum, 1985).

In this study, degree of impairment was controlled to avoid finding differences in type of aphasia based on severity. The subjects were divided into three levels - mild, moderate, and severe. Degree of impairment was found to be a stronger predictor of performance than type of aphasia. Significant differences were found between the mild and severe groups, however, no significant differences were found between the moderate group when compared with the mild and severe groups. There are several possible reasons for this result. First, there were fewer subjects in the moderate group. Second, because a range of 25 points (40-64) was allowed for the aphasia quotient, more room was available for subject variability. Third, there were individual differences in subject performance that may have contributed to these results. Factors such as age, communicative environment, and reading/writing ability were mentioned earlier as potential variables. Although no single factor was significant for producing variability, different factors could produce changes in communicative competence for different individuals without showing statistical significance.

As evidenced from the above results, pragmatic

performance does predict functional communication. Communication includes both linguistic competence and pragmatic competence. The use of pragmatics in compensating for linguistic deficits is apparent, and much more research is needed to determine factors that can enhance aphasic patients functional communicative abilities.

Areas of Further Investigation

Although the principal goal of this study was achieved and pragmatic performance was shown to predict functional communication, questions remain. Further investigation is needed to determine whether the *Pragmatic Protocol* and the *ASHA FACS* are more sensitive to changes over time in communication skills than traditional standardized measures (e.g., WAB). Avent and Wertz (1996) report that pragmatic performance does improve. It is yet to be determined if aphasic individuals can be taught to utilize preserved pragmatic performance to improve functional communication or whether time and/or environment may, alone, be the true therapists. In addition, further investigations with other clinical populations (right-hemisphere and traumatic brain injury) are needed to determine how pragmatic performance affects functional communication.

Experiment #2

The objective of this experiment was to determine the relationship between objective measures (*Pragmatic Protocol, ASHA FACS, & CETI*) and unfamiliar listeners' judgements of functional communication for individuals with aphasia.

Listeners' Judgements and Objective Measures

The strongest correlations for the judgements (1-5) were found between the *WAB* (r = .78 to .81) and the *Pragmatic Protocol* (r = .76 to .87). Judgements #3, #4, and #5 were moderately correlated with the quantitative Communication Independence Score of the *ASHA FACS*. Judgement #1 (Ability to participate in the conversation.) was the only judgement that correlated with the qualitative score of the *ASHA FACS*. Judgement #2 was only correlated with the *WAB* and *Pragmatic Protocol*. The strongest correlations were found for judgements #1 (Ability to participate in the conversation.) and #5 (Overall, rate the aphasic subject as a communicator.).

Interestingly, no significant correlations were found between the unfamiliar listeners' ratings (judgements 2-5), the *CETI*, and the qualitative scores from the *ASHA FACS*. Other investigations (Frattalli et. al, 1995) have shown

that, relative to clinicians, family members' overestimate the aphasic person's communication abilities. In contrast, closer examination of the data in this study revealed the unfamiliar listener ratings were overestimated relative to family members. Of the eight videos rated by the listeners, six ratings were higher when compared with the *CETI*. This finding highlights the subjective nature of communication and the importance of observing the aphasic in a variety of contexts. It may be that 15-minute segments of conversation were not enough to make accurate judgements about communicative abilities. So, while available measures may help quantify the impairment even in a "functional" context, there are no substitutes for familiarity with the subject and interactions with family and friends.

CETI and Objective Measures

Stronger correlations between the *CETI*, the *Pragmatic Protocol* and the *ASHA FACS* (r = .57, .65, .78) than the *WAB* (r = .28) provide additional support for the concept that caregivers do provide reliable information regarding a subjects' functional communication. The *Pragmatic Protocol* and the *ASHA FACS* correlate better with caregivers' perception of communication abilities. This again,

emphasizes the benefit of obtaining pragmatic and functional communication measures in addition to standard linguistic measures. Since our major goal as clinicians is to provide opportunities for communication with loved ones, improvement on the *Pragmatic Protocol* or the *ASHA FACS* may be better "clinical" indices of improvement than the *WAB*.

Areas of Further Investigation

These results conflict with results from an investigation by Frattali et al.(1995), who did not find correlations between the *CETI* and *ASHA FACS*. Hence, further research is needed, but it appears that caregivers play an important role in evaluation and treatment. Regardless of future research with the *CETI*, caregivers must be included to develop appropriate treatments and place evaluations into appropriate contexts.

Chapter 5

Summary and Conclusions

Summary

The purpose of the present study was to investigate the relationship between pragmatic performance and functional communication. Additionally, this study examined the influence that type of aphasia (fluent or non-fluent) and severity of aphasia (mild, moderate, or severe) may have on pragmatic performance and functional communication ability. Results from this investigation indicate that pragmatic performance is a better predictor of functional communication than traditional language measures. No significant differences between type of aphasia (fluent and non-fluent) with respect to pragmatic performance and functional communication were found. The results did indicate that severity of aphasia, regardless of type, was a significant determiner of pragmatic performance and functional communication.

In addition, correlations were found between the unfamiliar listeners' judgements, *WAB*, *Pragmatic Protocol*, and the quantitative score of the *ASHA FACS*. No significant correlations were found between the unfamiliar listeners'

ratings the *CETI*, and the qualitative scores from the *ASHA FACS*. This finding highlights the subjective nature of communication and the importance of observing the aphasic in a variety of contexts.

The *Pragmatic Protocol* and the *ASHA FACS* did correlate better with caregivers' perception of communication abilities. This again, emphasizes the benefit of obtaining pragmatic and functional communication measures in addition to standard linguistic measures. Since our major goal as clinicians is to provide opportunities for communication with loved ones, improvement on the *Pragmatic Protocol* or the *ASHA FACS* may be better "clinical" indices of improvement than the *WAB*.

Conclusions

The findings of this study clearly demonstrated that while there is a relationship between *WAB* scores and pragmatic and functional communicative abilities, the *Pragmatic Protocol* appears to be a better predictor of functional communication. Data indicated that despite linguistic limitations, relatively intact pragmatic abilities facilitated functional communication within the reality of the subjects' limitations. The *Pragmatic Protocol*

and the *ASHA FACS* appear to be more sensitive to changes in communicative competence that occur over time as the result of treatment, environment, or time itself. Using pragmatic performance, rather than traditional linguistic performance measures, to guide treatment should produce more "functional" results. Additionally, while available measures may help quantify the impairment even in a "functional" context, there are no substitutes for familiarity with the subject and interactions with family and friends.

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APPENDICES

Appendix A

Western Aphasia Battery
Audiometric Screening Form

WESTERN APHASIA BATTERY

TEST BOOKLET

ANDREW KERTESZ

DEPARTMENT OF CLINICAL NEUROLOGICAL SCIENCES
THE UNIVERSITY OF WESTERN ONTARIO
ST. JOSEPH'S HOSPITAL
LONDON, ONTARIO, CANADA
N6A 4V2

PATIENT DATA

Name _____ Age _____ Birthdate _____

Address _____

Languages _____

Handedness Writing Throwing Cutting Drawing Spoon Brush

Education (Number of Grades) _____

Occupation _____

Present Illness _____

_____

_____

Signs Hemiplegia: Severe, Moderate, Mild; Side: Recovered; Hemianopia; Sensory Loss

Investigations:	Date	*Lesion* Size	Side	Location
E.E.G.				
Isotope Scan				
C.T. Scan				
Arteriograms				
Operative Data				
Autopsy Data				

Date _____ File Number _____

Institution _____

Examiner _____

Referred By _____

I. Spontaneous Speech

Record patient's speech on paper and tape. Substitute similar questions if necessary or appropriate. Score fluency and information content according to criteria on page 3.

1. How Are You Today?

2. Have You Been Here Before?

3. What Is Your Name?

4. What Is Your Address?

5. What Is Your Occupation?

6. Tell Me A Little About Why You Are Here? or What Seems To Be The Trouble?

7. Description Of Picture.
   Present test picture (Card 1) and say: "Tell me what you see. Try to talk in sentences." Encourage the patient to pay attention to all aspects of the picture. Move the picture towards the patient's intact visual field. Ask for more complete response if only a few words are produced.

Maximum Score 20
Patient's Score _____

SCORING OF SPONTANEOUS SPEECH

A. *Information Content*

(0) No information.

(1) Incomplete responses only, e.g., first name or last name only.

(2) Correct response to any 1 item.

(3) Correct responses to any 2 items.

(4) Correct responses to any 3 items.

(5) Correct responses to any 3 of the first 6 items plus some response to the picture.

(6) Correct responses to any 4 of the first 6 items plus some response to the picture.

(7) Correct responses to 4 of the first 6 items on page 2 and a mention of at least 6 of the items in the picture.

(8) Correct responses to 5 of the first 6 items, and an incomplete description of the picture. Recognizable phonemic paraphasias are to be counted as correct.

(9) Correct responses to all 6 items on page 2. An almost complete description of the picture: at least 10 people, objects, or actions should be named. Circumlocution may be present.

(10) Correct responses to all 6 items on page 2 and to the picture. Sentences of normal length and complexity, referring to most of the items and activities. A reasonably complete description of the picture.

B. *Fluency, Grammatical Competence, and Paraphasias*

(0) No words or short, meaningless utterances.

(1) Recurrent stereotypic utterances with varied intonation, conveying some meaning.

(2) Single words, often paraphasias, effortful and hesitant.

(3) Fluent recurrent utterances or mumbling, very low volume jargon.

(4) Halting, telegraphic speech. Mostly single words, often paraphasic but with occasional verbs or prepositional phrases. Automatic sentences only, e.g., "Oh I don't know."

(5) Often telegraphic but more fluent speech with some grammatical organization. Paraphasias may be prominent. Few propositional sentences.

(6) More complete propositional sentences. Normal syntactic pattern may be present. Paraphasias may be present.

(7) Phonemic jargon with semblance to English syntax and rhythm with varied phonemes and neologisms. May be voluble; must be fluent.

(8) Circumlocutory, fluent speech. Marked word finding difficulty. Verbal paraphasias. May have semantic jargon. The sentences are often complete but may be irrelevant.

(9) Mostly complete, relevant sentences; occasional hesitation and/or paraphasias. Some word finding difficulty. May have some articulatory errors.

(10) Sentences of normal length and complexity, without definite slowing, halting, or articulatory difficulty. No paraphasias.

4

II. Auditory Verbal Comprehension

A. Yes/No Questions

Explain to the patient that you are going to ask some questions and that the answers should be either "yes" or "no." If it is difficult to establish a consistent verbal or gestural yes/no response, then eye closure for "yes" should be established. The instructions should be repeated, if necessary, during the test. Reinforce the patient when he or she gets into the set of answering as requested, but avoid nodding or commenting on specific items! If the patient self-corrects, the last answer is scored. If a patient gives an ambiguous or confabulatory response, repeat the instructions and the question and score accordingly. If the response is still ambiguous, score 0. Score 3 points for each correct answer. Record responses in the appropriate column: verbal, gestural, or eye blink.

	Verbal	*Gestural*	*Eye Blink*
1. Is Your Name Smith? ("no" should be correct)	☐	☐	☐
2. Is Your Name Brown? ("no" should be correct)	☐	☐	☐
3. Is Your Name ____(real name)____ ?	☐	☐	☐
4. Do You Live In Toronto? (no should be correct)	☐	☐	☐
5. Do You Live In ____(real residence)____ ?	☐	☐	☐
6. Do You Live In Windsor? ("no" should be correct)	☐	☐	☐
7. Are You A Man/Woman? ("yes" should be correct)	☐	☐	☐
8. Are You A Doctor? ("no" should be correct)	☐	☐	☐
9. Am I A Man/Woman? ("yes" should be correct)	☐	☐	☐
10. Are The Lights On In This Room? ("yes" should be correct)	☐	☐	☐
11. Is The Door Closed? ("yes" should be correct)	☐	☐	☐
12. Is This A Hotel?	☐	☐	☐
13. Is This ____(real test location)____ ?	☐	☐	☐
14. Are You Wearing Red Pyjamas? ("no" should be correct)	☐	☐	☐
15. Will Paper Burn In Fire?	☐	☐	☐
16. Does March Come Before June?	☐	☐	☐
17. Do You Eat A Banana Before You Peel It?	☐	☐	☐
18. Does't Snow In July?	☐	☐	☐
19. Is A Horse Larger Than A Dog?	☐	☐	☐
20. Do You Cut The Grass With An Ax?	☐	☐	☐

Maximum Score 60
Patient's Score ____

B. *Auditory Word Recognition*

Place the real objects in a random cluster making sure that they are within the patient's intact field if hemianopsia is present. Present cards of the pictured objects, forms, letters, numbers, and colors. Ask the patient to point to the furniture, his or her body parts, and fingers, in the order listed. Ask the patient to point to each item, by saying, "Point to the _____," or, "Show me the _____." One repetition of each command is allowed. If the patient points to more than one item, score 0, unless it is clear that the patient recognizes his or her error and corrects it. For the seven items requiring left–right discrimination, the patient must get both the side and body part correct to receive credit. If the room does not have certain furniture, substitute comparable items.

Real Objects	*Drawn Objects*	*Forms*	*Letters*	*Numbers*
Cup	Matches	Square	J	5
Matches	Cup	Triangle	F	61
Pencil	Comb	Circle	B	500
Flower	Screwdriver	Arrow	K	1867
Comb	Pencil	Cross	M	32
Screwdriver	Flower	Cylinder	D	5000

Colors	*Furniture*	*Body Parts*	*Fingers*	*Right–Left*
Blue	Window	Ear	Thumb	Right Shoulder
Brown	Chair	Nose	Ring Finger	Left Knee
Red	Desk	Eye	Index Finger	Left Ankle
Green	Light	Chest	Little Finger	Right Wrist
Yellow	Door	Neck	Middle Finger	Left Elbow
Black	Ceiling	Chin	Right Ear	Right Cheek

Maximum Score 60
Patient's Score _____

6

C. *Sequential Commands*

Score for partial execution of the commands according to the numbers above each segment that is correctly executed. If the patient requests repetition or looks confused, repeat the command as a full sentence. On the table before the patient line up the pen, comb, and book in this respective order and label each, verbally: "See the pen, the comb, and the book? I will ask you to point to them and do things with them, just as I say. Are you ready?" If the patient does not seem to understand the task, point with the comb to the pen to demonstrate, and start again.

	Scores
Raise your hand.	2
Shut your eyes.	2
Point to the chair.	2
Point to the window, then to the door.	4
Point to the pen and the book.	4
Point with the pen to the book.	8
Point to the pen with the book.	8
Point to the comb with the pen.	8
With the book point to the comb.	8
Put the pen on top of the book then give it to me.	14
Put the comb on the other side of the pen and turn over the book.	20

Maximum Score 80
Patient's Score ____

III. Repetition

Ask the patient to repeat the words listed below; then record the responses. You may repeat items once, if the patient asks or does not seem to hear. If incompletely repeated, score 2 points for each recognizable word. Minor dysarthric errors or colloquial pronunciation are scored as correct. Take 1 point off for errors in order of word sequence or for each literal paraphasia (phonemic errors).

	Maximum Score
1. Bed	2
2. Nose	2
3. Pipe	2
4. Window	2
5. Banana	2
6. Snowball	4
7. Forty-five	4
8. Ninety-five percent	6
9. Sixty-two and a half	10
10. The telephone is ringing	8
11. He is not coming back	10
12. The pastry cook was elated	10
13. First British Field Artillery	8
14. No ifs, ands or buts	10
15. Pack my box with five dozen jugs of liquid veneer	20

Maximum Score 100
Patient's Score _____

IV. Naming

A. Object Naming

Present objects in the order listed below. If no or incorrect responses to visual stimulus, let the patient touch the stimulus. If still no or incorrect responses, present a phonemic or, if a composite word, a semantic cue (the first half of the word). Allow a maximum of 20 seconds for each item. Score 3 points if named correctly or with minor articulatory error, 2 points for a recognizable phonemic paraphasia, and 1 point if a phonemic or tactile cue is required.

Stimulus	*Response*	*Tactile Cue*	*Phonemic Cue*	*Score*
Gun				
Ball				
Knife				
Cup				
Safety pin				
Hammer				
Toothbrush				
Eraser				
Padlock				
Pencil				
Screwdriver				
Key				
Paperclip				
Pipe				
Comb				
Elastic				
Spoon				
Scotchtape				
Fork				
Matches				

Maximum Score 60
Patient's Score ____

B. Word Fluency

Ask the patient to name as many animals as he or she can in 1 minute. The patient may be helped if hesitant: "Think of a domestic animal, like the horse, or a wild animal, like the tiger." The patient may be prompted at 30 seconds. Score 1 point for each animal named (except for those in the example), even if distorted by literal paraphasia.

Maximum Score 20
Patient's Score ____

C. Sentence Completion

Ask patient to complete what you say. Provide an example, such as "ice is (cold)." *Score 2 points for correct response and 1 point for phonemic paraphasias. Accept reasonable alternatives, e.g., sugar is . . . (fattening) but not grass is . . . (brown).*

1. The grass is _____ (green).
2. Sugar is _____ (sweet or white).
3. Roses are red, violets are _____ (blue).
4. They fought like cats and _____ (dogs).
5. Christmas is in the month of _____ (December).

Maximum Score 10
Patient's Score ____

D. Responsive Speech

Score 2 points for acceptable responses, 1 point for phonemic paraphasias.

1. What do you write with? (pen, pencil)
2. What color is snow? (white)
3. How many days are in a week? (seven)
4. Where do nurses work? (hospital)
5. Where can you get stamps? (post office, variety store)

Maximum Score 10
Patient's Score ____

SCORE SHEET

	Maximum	Patient's Subscores	Total For AQ
Spontaneous Speech			
Information Content	10		
Fluency	10		
Total	20		
Comprehension			
Yes/No Questions	60		
Auditory Word Recognition	60		
Sequential Commands	80		
Total			
(Divide By 20 For AQ)	10		
(Divide By 10 For CQ)	20		
Repetition	100		
Total			
(Divide By 10)	10		
Naming			
Object Naming	60		
Word Fluency	20		
Sentence Completion	10		
Responsive Speech	10		
Total			
(Divide By 10)	10		
Aphasia Quotient			
(Add Totals And Multiply By 2 For AQ)			
Reading And Writing			
Reading	100		
Writing	100		
Total			
(Divide By 10)	20		
Praxis	60		
Total			
(Divide By 6)	10		
Construction			
Drawing	30		
Block Design	9		
Calculation	24		
Raven's Score	37		
Total			
(Divide By 10)	10		
Cortical Quotient			
Add Totals	100		

University of Tennessee Hearing and Speech Center

Hearing Screening

Name _____ Center File No _____

Birth Date _____ Age _____ Sex _____ Date Screened _____

Screening conducted at _____ dB

Right Ear	Left Ear
500 Hz _____	500 Hz _____
1000 Hz _____	1000 Hz _____
2000 Hz _____	2000 Hz _____
4000 Hz _____	4000 Hz _____

(+ pass, - fail)

Comments: _____

_____ _____

Signature

Appendix B
Pragmatic Protocol

Pragmatic Protocol

Name:_____ Date:_____

Communicative Act	Appropriate	Inappropriate	No Opportunity to observe	Examples & Comments
Verbal Aspects				
A. Speech Acts				
1. Speech Act Pair analysis				
2. Variety of Speech Acts				
B. Topic				
3. Selection				
4. Introduction				
5. Maintenance				
6. Change				
C. Turn taking				
7. Initiation				
8. Response				
9. Repair/revision				
10. Pause time				
11. Interruption/overlap				
12. Feedback to speakers				
13. Adjacency				
14. Contingency				
15. Quantity/conciseness				
D. Lexical selection/use across speech acts				
16. Specificity/accuracy				
17. Cohesion				
E. Stylistic variations				
18. The varying of communicative style				
Paralinguistic aspects				
F. Intelligibility & prosodics				
19. Intelligibility				
20. Vocal Intensity				
21. Vocal quality				
22. Prosody				
23. Fluency				
Nonverbal Aspects				
G. Kenesics & proxemics				
24. Physical proximity				
25. Physical contacts				
26. Body posture				
27. Foot/leg & hand/arm movements				
28. Gestures				
29. Facial expression				
30. Eye gaze				

Appendix C
ASHA FACS

AMERICAN SPEECH-LANGUAGE-HEARING ASSOCIATION

Functional Assessment of Communication Skills for Adults

ASHA FACS

Carol M. Frattali
Cynthia K. Thompson
Audrey L. Holland
Cheryl B. Wohl
Michelle M. Ferketic

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Social Communication

Given the opportunity, _____ (client's name):

	Does	Does with Minimal Assistance	Does with Minimal to Moderate Assistance	Does with Moderate Assistance	Does with Moderate to Maximal Assistance	Does with Maximal Assistance	Does Not	No Basis for Rating
1. Refers to familiar people by name (e.g., family, friends, colleagues)	7	6	5	4	3	2	1	N
2. Requests information of others (e.g., "What's on TV?" "Where do you live?")	7	6	5	4	3	2	1	N
3. Explains how to do something (e.g., how to make a cup of coffee, set an alarm clock)	7	6	5	4	3	2	1	N
4. Expresses agreement/disagreement (e.g., nods yes, says "Not really")	7	6	5	4	3	2	1	N
5. Exchanges information on the phone (e.g., answers questions, provides information)	7	6	5	4	3	2	1	N
6. Participates in a group conversation (e.g., with family at the dinner table)	7	6	5	4	3	2	1	N
7. Answers yes/no questions (e.g., "Are you cold?")	7	6	5	4	3	2	1	N
8. Follows simple verbal directions (e.g., "Get the mail")	7	6	5	4	3	2	1	N
9. Understands intent (e.g., "It's getting late," implying that it's time to go)	7	6	5	4	3	2	1	N
10. Smiles or laughs at lighthearted comments (e.g., "I'm not getting older, I'm getting better")	7	6	5	4	3	2	1	N
11. Understands non-literal meaning and inference (e.g., "He has a heavy heart," or other culturally appropriate idiom)	7	6	5	4	3	2	1	N
12. Understands conversations when they occur in noisy or distracting situations (e.g., a crowded cafeteria)	7	6	5	4	3	2	1	N
13. Understands what's heard on TV and radio (e.g., news headlines, sports, commercials)	7	6	5	4	3	2	1	N
14. Understands facial expressions (e.g., clenched teeth, smile)	7	6	5	4	3	2	1	N
15. Understands tone of voice (e.g., emphatic tone)	7	6	5	4	3	2	1	N
16. Initiates communication with other people	7	6	5	4	3	2	1	N
17. Adds new information on a topic in a conversation	7	6	5	4	3	2	1	N

Social Communication (cont.)

	Does	Does with Minimal Assistance	Does with Minimal to Moderate Assistance	Does with Moderate Assistance	Does with Moderate to Maximal Assistance	Does with Maximal Assistance	Does Not	No Basis for Rating
18. Changes topics in conversation	7	6	5	4	3	2	1	N
19. Adjusts to a change in topic by conversational partner	7	6	5	4	3	2	1	N
20. Recognizes his/her own communication errors (e.g., shows awareness that he/she used the wrong word)	7	6	5	4	3	2	1	N
21. Corrects his/her own communication errors (e.g., corrects naming errors)	7	6	5	4	3	2	1	N

Qualitative Dimensions of Communication Scores				
Social Communication	Adequacy	Appropriate-ness	Promptness	Communication Sharing

Communication Independence Scores			
Social Communication	Total Score	Total Items Rated (of 21)	Domain Mean Score

Communication of Basic Needs

22. Recognizes familiar faces	7	6	5	4	3	2	1	N
23. Recognizes familiar voices	7	6	5	4	3	2	1	N
24. Makes strong likes or dislikes known (e.g., people, places, foods)	7	6	5	4	3	2	1	N
25. Expresses feelings (e.g., happy, sad)	7	6	5	4	3	2	1	N
26. Requests help when necessary (e.g., gestures that wheelchair is stuck)	7	6	5	4	3	2	1	N
27. Makes needs or wants known (e.g., to eat, to rest)	7	6	5	4	3	2	1	N
28. Responds in an emergency (e.g., calls 911)	7	6	5	4	3	2	1	N

Qualitative Dimensions of Communication Scores				
Communication of Basic Needs	Adequacy	Appropriate-ness	Promptness	Communication Sharing

Communication Independence Scores			
Communication of Basic Needs	Total Score	Total Items Rated (of 7)	Domain Mean Score

Reading, Writing, Number Concepts	Does	Does with Minimal Assistance	Does with Minimal to Moderate Assistance	Does with Moderate Assistance	Does with Moderate to Maximal Assistance	Does with Maximal Assistance	Does Not	No Basis for Rating
29. Understands simple signs (e.g., poison symbol, stop sign)	7	6	5	4	3	2	1	N
30. Uses common reference materials (e.g., telephone book, TV guide)	7	6	5	4	3	2	1	N
31. Follows written directions (e.g., prescriptions, preparing a can of soup)	7	6	5	4	3	2	1	N
32. Understands basic printed material (e.g., menus, headlines)	7	6	5	4	3	2	1	N
33. Prints/writes/types name	7	6	5	4	3	2	1	N
34. Fills out short forms (e.g., for entering a sweepstakes)	7	6	5	4	3	2	1	N
35. Writes messages (e.g., "Call your mother")	7	6	5	4	3	2	1	N
36. Understands signs with numbers (e.g., price tags, speed limit signs)	7	6	5	4	3	2	1	N
37. Makes basic money transactions (e.g., pays for items at grocery store, recognizes when given the wrong change)	7	6	5	4	3	2	1	N
38. Understands simple units of measurement (e.g., weights, distances, quantities in recipes)	7	6	5	4	3	2	1	N

Qualitative Dimensions of Communication Scores				
Reading, Writing, Number Concepts	Adequacy	Appropriateness	Promptness	Communication Sharing

Communication Independence Scores			
Reading, Writing, Number Concepts	Total Score	Total Items Rated (of 10)	Domain Mean Score

Daily Planning

	Does	Does with Minimal Assistance	Does with Minimal to Moderate Assistance	Does with Moderate Assistance	Does with Moderate to Maximal Assistance	Does with Maximal Assistance	Does Not	No Basis for Rating
39. Knows what time it is (i.e., tells time)	7	6	5	4	3	2	1	N
40. Dials telephone numbers (i.e., sequences numbers correctly)	7	6	5	4	3	2	1	N
41. Keeps scheduled appointments (e.g., arrives at doctor's office on time)	7	6	5	4	3	2	1	N
42. Uses a calendar for time-related activities (e.g., scheduling, planning)	7	6	5	4	3	2	1	N
43. Follows a map (e.g., finds a street on a road map)	7	6	5	4	3	2	1	N

Qualitative Dimensions of Communication Scores				
	Adequacy	Appropriateness	Promptness	Communication Sharing
Daily Planning				

Communication Independence Scores			
	Total Score	Total Items Rated (of 5)	Domain Mean Score
Daily Planning			

Information Sources

Information was solicited from the following individuals to complete this ASHA FACS:

☐ Family member, friend, or caregiver of client (e.g., spouse/partner, sibling, parent, child)

☐ Other professionals serving client (e.g., nurse, physical therapist, occupational therapist)

ASHA FACS Communication Independence Scores
Summary Page

Client Name: _____

Client ID#: _____

Facility: _____

Examiner: _____

Evaluation Type: check one; if interim, enter number, e.g., 1, 2, 3)
☐ Admission ☐ Interim _____
☐ Discharge ☐ Follow-up

Date of Evaluation: _____

COMMUNICATION INDEPENDENCE SCORES			
Assessment Domain	Total of Item Scores	Total Items Rated	Domain Mean Score
Social Communication			
Communication of Basic Needs			
Reading, Writing, Number Concepts			
Daily Planning			
Total Domain Mean Score			
Total Number of Domains Rated			
Overall Communication Independence Mean Score			

Notes: _____

ASHA FACS Qualitative Dimensions of Communication Scores
Summary Page

Client Name: _____

Client ID#: _____

Facility: _____

Examiner: _____

Evaluation Type: check one; if interim, enter number, e.g., 1, 2, 3)
☐ Admission ☐ Interim _____
☐ Discharge ☐ Follow-up

Date of Evaluation: _____

QUALITATIVE DIMENSIONS OF COMMUNICATION SCORES

	Communication Dimensions			
Assessment Domain	Adequacy	Appropri-ateness	Prompt-ness	Communi-cation Sharing
Social Communication				
Communication of Basic Needs				
Reading, Writing, Number Concepts				
Daily Planning				
Total Dimension Score				
Total Number of Domains Rated				
Dimension Mean Score				

Total Dim. Mean Score	Total Dim. Rated	Overall Qual. Dim. Mean Score

Notes: _____

Appendix D
Case History Form

A. Basic Identifying Information

Name: _____

Address: _____

Telephone Number: _____

Age: _____ Date of Birth: _____

Handedness: _____

Next of Kin: _____

B. SOCIAL DATA

Education: _____

Occupation: _____

Family:

Wife/Husband: _____

Children: _____

Interests/Hobbies:

_____

_____

C. MEDICAL AND COMMUNICATIVE DATA

Do you or have you had any of the following:

CVA/Stroke_____	Weakness/Paralysis_____
Neurological Disease_____	Coordination Problems_____
Head Injury_____	Substance Abuse_____
Emotional Problems_____	Nervousness_____
Depression_____	Hearing Problems_____
Difficulty Swallowing_____	Speech/Language Problems_____

List all surgeries or serious illnesses Date

_____

_____

_____

If you have had previous speech therapy, please answer the following:

Dates of Therapy:

Describe what you did in therapy:

What were the results of therapy:

Why was it terminated:

Appendix E
Observation Summary and Tally Sheet

Table 1. Observation format

	VERBAL OUTPUT										
	FORM				STYLE			CONVERSATIONAL DOMINANCE	CORRECTIONAL STRATEGIES	METALINGUISTICS	
	verbal lubricant/ social convention	asks questions, makes requests	answers questions/requests	volunteers information	agrees/disagrees	teases, uses humor/sarcasm	metaphor	interrupts/ changes topic	corrects, clarifies, requests	comments on own speaking	responds to phonemic cues
appropriate											
inappropriate											

	NONVERBAL OUTPUT				
	spatial indicators	direct verbal referent	gestures to maintain conversation	humor	affect/state
appropriate					
inappropriate					

	READ/WRITE/MATH/ETC.		
	responds to written material	writing	responds to numbers

	OTHER					
	talks on phone	talks to pets	talks to self	responds to household sounds	sings	speaks in foreign language

OBSERVATION SUMMARY

Where did this observation occur?

When did it occur?

How long was the observation?

Describe the situation(s) below:

1. Conversation
    a. dyadic: with whom? (state relationship to subject)

    b. if more than one dyad included the subject, list separately below
    And state relationship(s)

2. Small group interaction (list participants and state relationship to subject)
3. Indirect interaction (check and describe)
    A. reading
    b. watching TV
    c. phoning
    d. writing
    e. ritualized activity such as a game
    f. other

Does this subject have comprehension difficulty?

If yes, did you observe the subject to:
request message repetition? If yes, how was that request made?
Request that the speaker slow down? If yes, how was this request communicated?
Request that messages be written? If yes, how was this request made?
Other

Self-monitoring and self-correction: cite below at least one example of this aphasic person's self-monitoring and self-correction.
Successful attempts:
Unsuccessful attempts:

Pay particular attention to strategies. Did you observe the aphasic person doing any of the following? If yes, give at least one example.
Word Finding
Did the aphasic person use circumlocution?
Did he use high-association words to help him/herself find the word searched for?
Did s/he request (or find) paper and pencil to attempt to write what s/he was trying to say?
Did s/he consult word lists in an attempt to find a word?
Did s/he search for the object(s) whose name was causing the trouble?
Did s/he request help from an auditor?
Did s/he use gestural description(s)?
Did s/he request the auditor to wait?
Did s/he stop and start over again?
Did s/he spell aloud?
Other

Initiation and topic changing:
Did the subject ever initiate the topic(s) under discussion?
(List the topics below).
Did the aphasic person ever voluntarily change the topic under discussion?
(Sometimes with a fluent aphasic, her/his own verbalizing might inadvertently send an auditor down a different track. This is not the type of behavior described

by "voluntary" above.).
What was the topic under discussion before s/he changed it?
What did s/he change it to?

Use a separate sheet for each conversation. Conversation#_____

Underline the phrase which best describes the aphasic person's role in the conversation you observed:

Was the aphasic person an active or a passive participant in the conversation?

Did the aphasic person function mostly as a sender or as a receiver, or did s/he send and receive relatively equally?

Was the aphasic person mostly a question answerer or a question asker, or did s/he ask and answer both equally?

Did s/he seem to you to be a participant in the conversation, or did s/he seem to be a victim of it?

Comparing the aphasic person to his/her conversational partner, would you describe the aphasic person as leading or as being led, or were they about equal?

Was the aphasic person dominant or submissive, or were both participants in the conversation of about equal (conversational) strength?

Was this person best described as 'talking" or as "talked to"?

In your overall view, was this person a good or poor communicator in the conversation you observed?

Rate the skill of the non-aphasic person in communicating with the aphasic person:

1	2	3	4	5
Demonstrates nominal skill in communicating with aphasic person				Demonstrates competence in communicating with aphasic person

Rate the adequacy of the aphasic person's overall communication on the scale below:

1	2	3	4	5
Minimal Communicative Ability				Normal Communicative Ability

Rank Order this conversation with the other conversations you have observed. Consult your other judgement sheets to do this. Enter new ranking below:

Appendix F
Communicative Effectiveness Index

Communicative Effectiveness Index
Lomas et al.(1989)

Please rate _____'s ability at...

1. Getting somebody's attention.

Not At All Able	**As Able As Before Stroke**

2. Getting involved in group conversations that are about him/her.

Not At All Able	**As Able As Before Stroke**

3.Giving yes and no answers appropriately.

Not At All Able	**As Able As Before Stroke**

4. Communicating his/her emotions.

Not At All Able	**As Able As Before Stroke**

5. Indicating that he/she understands what is being said to him/her.

Not At All Able	**As Able As Before Stroke**

6. Having coffee-time visits and conversations with friends and neighbors (around the bedside or at home).

Not At All Able — **As Able As Before Stroke**

7. Having a one-to-one conversation with you.

Not At All Able — **As Able As Before Stroke**

8. Saying the name of someone whose face is in front of him/her.

Not At All Able — **As Able As Before Stroke**

9. Communicating physical problems such as aches and pains.

Not At All Able — **As Able As Before Stroke**

10. Having a spontaneous conversation (i.e., starting the conversation and/or changing the subject).

Not At All Able — **As Able As Before Stroke**

11. Responding to or communicating anything (including yes or no) without words.

Not At All Able — **As Able As Before Stroke**

12. Starting a conversation with people who are not close family.

Not At All Able — **As Able As Before Stroke**

13. Understanding writing.

Not At All Able — **As Able As Before Stroke**

14. Being part of a conversation when it is fast and there are a number of people involved.

Not At All Able — **As Able As Before Stroke**

15. Participating in conversation with strangers.

Not At All Able — **As Able As Before Stroke**

16. Describing or discussing something in depth.

Not At All Able — **As Able As Before Stroke**

Appendix G
Training Procedures for Second Judge

Training Procedures for the Second Judge

A first year graduate student served as the second judge for this study. This student had one year of experience working with adults in a rehabilitation facility as a speech therapy aide.

The second judge was responsible for the following:

1) Reading the document to become familiar with the literature as well as the procedures for data collection.
2) Reading this packet and participating in a training session.
3) Participation in the experimental session and observation sessions of six subjects. (A commitment of approximately 5 hrs for each subject; 30 hrs total)
4) Participation in reliability procedures for the *Pragmatic Protocol*, *ASHA FACS*, and the observation summary.

Training Session

Training procedures included familiarization, discussion, and clarification of the procedures used during the observation sessions as well as the *Pragmatic Protocol* and the *ASHA FACS*. Training was accomplished using one videotape of an aphasic individual. In addition, the second judge participated in the observation sessions of two subjects as an extension of the training procedures. The observer agreement between the primary investigator and the second judge was at 75% before actual reliability procedures can begin.

1) The second judge read the training manual and discussed it with the primary investigator.

2) The training tape was then viewed, and following each item the video-recorder was stopped and the primary investigator explained why each response was scored. Throughout the training phase, questions and discussion were encouraged.

3) Two days after viewing the video with the primary investigator, the second judge then viewed and scored a second training tape. Upon completion, observer agreement between the primary judge and second judge was at 80% accuracy for the *Pragmatic Protocol* and at 70% accuracy with a mock observation summary.

4)The second judge then participated in experimental and observation sessions for two subjects. Agreement was at least 80% for the *Pragmatic Protocol*, *ASHA FACS*, and observation summary.

5) Reliability procedures began at this point. The second judge

participated in the experimental and observation sessions of six subjects.

Experimental Session

The second judge participated in the experimental session to meet the criteria of the ASHA FACS which requires at least 3 observations. Observation during this session allowed the second judge to become familiar with the subjects' communicative abilities.

Observation Session

Each subject participating in this study was observed for two one-hour sessions during daily activities. During this session the frequency, appropriateness, and type of his/her communicative behaviors were tallied by the second judge and the primary investigator. This observation was scheduled to occur at times when the highest potential for communication was likely.

The observation summary includes the number and types of communicative behaviors used by the subject. The observations were coded independently by the primary investigator and second judge.

Appendix H
Listener Rating Form

Undergraduate Volunteer Information Sheet

Date:_____

Name:_____
Age:_____

Gender: Male Female

Rank: Freshman Sophomore Junior Senior (Circle one)

ASP Courses:_____
_____
_____
_____

Do you have **NORMAL** or **CORRECTED** vision? (Circle one)

Is English your first language? **YES** **NO**
If not please identify your native language._____

Hearing Screening

Conducted at 25 dB

Right Ear	Left Ear
500 Hz_____	500 Hz_____
1000 Hz_____	1000 Hz_____
2000 Hz_____	2000 Hz_____
4000 Hz_____	4000 Hz_____

(+ pass, - fail)

Comments:

Listener Rating Form

VIDEO 1 2 3 4 (Circle One)

You are to rate the functional communication of the aphasic individual. Functional communication is defined as "the ability to receive or convey a message, regardless of the mode, to communicate effectively and independently."

Make your rating on a five point scale with 5 being good and 1 being poor. **Circle** the rating you feel is most appropriate.

Please rate the aphasic subject's:

1)Ability to participate in the conversation.

1	2	3	4	5
poor				**good**

2)Ability to consistently get his/her message across.

1	2	3	4	5
poor				**good**

3)Ability to indicate understanding of what is being said.

1	2	3	4	5
poor				**good**

4)Ability to describe or discuss a topic in depth (e.g., by providing new information, elaborating or expanding the discussion).

1	2	3	4	5
poor				**good**

5) Overall, rate the aphasic subject as a communicator.

1	2	3	4	5
poor				**good**

VITA

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