STANDARDIZATION OF WESTERN APHASIA BATTERY-KANNADA (WAB-K)

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INTRODUCTION

Human beings have the most elaborate, sophisticated, versatile and creative means of communications, made possible by their more complex neurophysiologic mechanism. Language is a primary means of communication and is a form of social behavior. Language is a set of symbols and code, employed by human beings who are capable of making association between essential arbitrary representations and events to express their thought, their wishes, and their feelings.

Speech and Language, to man, has assumed an indispensable status, this is acknowledged most readily when, sometimes, there is a breakdown of language, as due to lesion(s) in the regions which form the anatomical bases for their unique endowment.

Aphasia is a loss of the ability to produce and/or comprehend language, due to injury to brain areas specialized for these functions.

At the Mayo clinic nearly 20 years ago, Frederic Darley pointed out the fundamental diagnostic features of aphasia in a relatively long definition as follows:

Impairment, as a result of brain damage, of the capacity for interpretation and formulation of language symbols; multimodality loss or reduction in efficiency of the ability to decode and encode conventional meaningful linguistic units (morphemes and larger syntactic units) ; disproportionate to impairment of the other intellective functions; not attributable to dementia, confusion, sensori-loss, or motor dysfunction; and manifested in reduced availability of vocabulary , reduced efficiency in application of syntactic rules, reduced auditory attention span, and impaired efficiency in input and output channel selection. (Darley, 1982, pp.42).

Aphasia is defined as " the loss or deterioration of verbal communication due to an acquired lesion of the nervous system involving one or more aspects of the processes of comprehending and producing verbal messages"(Basso and Cubelli, 1999). Related disorders of articulation, reading and writing are usually included in the description of aphasia. Furthermore, it is a multimodality disorder (Helm- Estabrooks & Holland, 1998).

On occasion, clinicians of aphasiology will readily claim that there are as many clinical forms of aphasia as there are aphasic patients (or else as many aphasiological terminologies as there are aphasiologists). Experienced clinical aphasiologist will acknowledge, on the one hand, that aphasic semeiology varies widely from one patient to another but on the other, that certain symptom complexes seem to be shared by sub-groups of patients.

A number of methods have been used to classify language deficits of language - impaired groups. Goodglass and Kaplan (1972) outlined the major classification used for assessing adults with aphasia which can be seen in Table 1.

Table- 1: Classification of Aphasia (Goodglass & Kaplan, 1972)

SYNDROME	COMMENT
Broca's Aphasia	Non-fluent aphasia, restricted vocabulary & grammar, articulation affected well-preserved auditory comprehension.
Wernicke's Aphasia	Fluent aphasia, impaired auditory comprehension, paraphasic speech & word-finding difficulty.
Anomia	Severe word-finding problems, Fluent speech with few paraphasias.
Global Aphasia	Severe verbal comprehension deficit, vocabulary & grammar with speech restricted to stereotyped utterances.
Conduction Aphasia	Fluent Aphasia, sentence repetition selectively impaired in relation to auditory comprehension.
Transcortical sensory Aphasia	Severe verbal comprehension deficit, near-normal or normal sentence repetition, impaired naming with paraphasias, perseverations & little extended expressive language
Pure word deafness/ Verbal auditory agnosia	No verbal comprehension.
Mixed non-fluent Aphasia	Non-fluent speech, moderate verbal comprehension problems but some expressive language.

Assessment is defined as an organized, goal-directed evaluation of the variety of cognitive, linguistic and pragmatic components of language. Such an assessment is carried out to determine each patient's language strengths and weaknesses and the degree to which language weaknesses can be modified (Chapey, 1994; Lahey, 1988). Ideally, it explores "the nature of language impairment and indicates what aspects of language performance are most appropriate for treatment" (Byng et al., 1990).

Assessment in aphasia involves three interrelated components: data collection, hypothesis formation, and hypothesis testing (Chapey, 1994). The language assessment is highly structured observation based upon the use of bedside and screening assessment tools, comprehensive aphasia battery, and/or tests of specific language functions.

There are several standardized and frequently used aphasia screening tests such as Acute Aphasia Screening Test (AAST), Aphasia Language Performance Scales (ALPS), Aphasia Screening Test (AST) and Quick Assessment for Aphasia (QAA) But, in many instances, clinicians rely upon comprehensive aphasia batteries to provide their major portion of their highly structured observations. These tests are designed to evaluate specific language functions along a continuum of complexity and to reduce the biasing effects of internal and external factors on language performance (e.g., education, socioeconomic status), and to independently assess each language modality (Listening, speaking, reading, and writing) (Davis, 1993).

There are many comprehensive aphasia batteries, each of which is associated with particular administration and interpretation of strengths and weaknesses. Five tests which are commonly used in both clinical and research settings in United States and Canada include the Minnesota test for Differential Diagnosis of Aphasia (MTDDA; Schuell, 1965b), the Boston Diagnostic Aphasia Examination (BDAE; Goodglass & Kaplan, 1983), the Western Aphasia Battery (WAB; Kertesz, 1982), the Aphasia Diagnostic Profiles (ADP; Helm-Estabrooks, 1992), and the Porch Index of Communicative Ability (PICA; Porch, 1981).

Diagnostic assessment refers to the thorough examination of patient's language performance to arrive at both a diagnostic impression and a detailed description of the areas of the strength and weaknesses. It aims to classify aphasic performance into traditional aphasic syndromes subtypes.

The Western Aphasia Battery (WAB; Kertesz, 1982) is a close relative of Boston Diagnostic Aphasia Examination (BDAE; Goodglass & Kaplan, 1972) and it provides the diagnostic goal of classifying aphasia subtypes and rating the severity of aphasic impairment. This test is designed for clinical and research use, comprises four language and three performance domains. Syndromes classification is determined by the pattern of performances on the four oral/language-domain subtests, which assess spontaneous speech, comprehension, repetition and naming.

The WAB is designed to assess clinical aspects of language function in aphasic patients and to provide the data needed to establish a prognosis for therapy. The procedure is based on the principle of modern neurolinguistics and the neuro-anatomical model. The WAB comprises eight (8) subtests and their scores are:

1.	Spontaneous speech	:	20
2.	Auditory verbal comprehension	:	200
3.	Repetition	:	100
4.	Naming	:	100
5.	Reading	:	100
6.	Writing	:	100
7.	Apraxia	:	60
8.	Constructional, Visio spatial and calculation tasks	:	100

The oral portion of the test can be administered in an hour to most patients or it can be divided into sections and administered on consecutive days. The oral language portion is an independent unit, the reading, writing, calculation and praxis is another one, and the nonverbal tests are optional.

The scoring system provides the following overall measures of severity:

The Aphasia quotient (A.Q) which comprises the Spontaneous speech(S), Auditory verbal Comprehension(C), Repetition(R) and Naming(N) uses the oral portion of the language assessment and the Cortical quotient (C.Q) which includes the Nonverbal Scores. Reading, writing, apraxia and constructional tasks are called as Performance quotient (P.Q)

C.Q. = A.Q. + P.Q.

A.Q. < 93.8 indicates Aphasia which is used in research studies (Kertesz, 1979). In normals, A.Q. is considered as 98.4 (or) 99.6 (mean A.Q). Based on these four parameters: - Spontaneous speech, comprehension, repetition and naming - types of aphasia are recognized. They can be classified under Broca's, Wernicke's, Transcortical sensory (TCS), Transcortical motor (TCM), conduction, Anomic, Isolation and Global aphasia.

The sub-scores allow a classification of the patient according to the taxonomic principles into one of the eight subtypes of aphasia. This classification as shown in Table (1) which is considered as a clinically valid baseline for research, diagnoses and prognosis (Kertesz, 1979):

Types of aphasia	Spontaneous speech	Comprehension	Repetition	Naming
Global	0-4	0-3.9	0-4.9	0-6
Broca's	0-4	4-10	0-7.9	0-8
Isolation	0-4	0-3.9	5-10	0-6
Transcortical motor	0-4	4-10	8-10	0-8
Wernicke's	5-10	0-6.9	0-7.9	0-9
Transcortical sensory	5-10	0-6.9	8-10	0-9
Conduction	5-10	7-10	0-6.9	0-9
Anomic	5-10	7-10	7-10	0-9

Table (1):- Scoring classification of different types of Aphasia.

Language in contact, which is bilingualism, is an integral product of globalization and social mobility. Definition range from a native- like competence in two languages to a minimal proficiency in a second language, raising a number of theoretical and methodological issues. It is essential to note that there are differences in grass-root bilingualism in India when compared to the picture in other western countries. India has been a multilingual country right from earliest times and English bilingualism has become an integral part of an India's consciousness.

Webster's dictionary, (1961) defined a bilingual as having or using two languages especially as spoken with the fluency characteristics of a native speaker; a person using two language habitually; with control like that of a native speaker and bilingualism as the constant oral use of two languages. Bloomfield, (1933) who defined bilingualism as "native-like control of two languages" whereas on the other end Haugen,(1950) takes a lax view by observing that bilingualism begins when the speaker of one language can produce complete meaningful utterances in the other language. In some of the bilingual societies, mixing of language is not considered as strange or idiosyncratic but a norm of verbal interaction. Code mixing and code switching are the two most prominent phenomena, which are seen in bilinguals.

Aphasia in bilinguals can affect their languages equally or differentially. Bilingual aphasia has been a widely researched area as it provides insight into the brain functioning of a bilingual and effect of the lesion on this functioning. Studies on bilingual aphasia are vital and have focused on a number of issues that have proven useful for the understanding of aphasia in monolinguals and the brain processing in general.

*Need of **the** study:* Although there are many tests that assess one or more aspects of language disturbances of brain damaged aphasic individuals, the numbers that have been adequately standardized is relatively few. Based on the major subtests of Western Aphasia Battery (WAB): Spontaneous speech (S), Comprehension (C), Repetition (R), and Naming (N), the types of aphasia is diagnosed, thereby indicating the need for suitable language intervention while the other subtests enable the detailed assessment of associated reading, writing, apraxia and non-verbal functions.

WAB is one of the assessment tool which is most frequently used in the clinics for assessment of aphasia and allied disorders. We are presently following western norms and no Indian norms are obtained so far. However, it is a good test for clinical utility but the results are not valid unless we have our own norms. Hence, the present study was planned.

Aim of the study: The present study was aimed at obtaining norms for WAB-K for monolingual (Kannada) and bilingual (Kannada-English) population which is the most frequently encountered population in a modern clinic of South India (situated in Karnataka) like that of AIISH.

CHAPTER II

REVIEW OF THE LITERATURE

"The silence of speechlessness is never golden. We all need to communicate and connect with each other - not just in one way, but in many ways as possible. It is a basic human need, a basic human right. And much more than, this, it is a basic human power" (Williams, 2000).

As William's statement so eloquently illustrates, communication is essential to attaining quality of life. It is basic a human need to connect with others to touch others lives, and have others touch our lives. It is a basic human right to express ideas, thoughts and feelings freely. Communication is a basic human power that allows people to articulate their personal, educational, vocational, and social goals and to achieve their full potential. As a person develops communicative competence, he or she meets this human need, realizes this human right, and attains this human power (Light, Beukelman & **Reichle,** 2003).

A language is a code whereby ideas about the world are represented through a conventional system of arbitrary signals for communication (Bloom & Lahey, 1978). A code is a means of representing information by forming words or sentences based on a system of rules. The three major components of language are: Content (semantics). Form (phonology, morphology and syntax) and Use (pragmatics). Thus, language consists of some aspects of content or meaning about the world that is coded represented by linguistic form for some purpose or use in a particular context.

Aphasia is a breakdown in the two-way translation process that establishes the relation between thought and language (Damasio. cited in Chapey, 2001). As a consequence, people with aphasia have an inability to translate, with reasonable fidelity, nonverbal sets of images (Thoughts) into linguistic symbols and grammatical relationship (or the inverse problem-translating a received language massage into thought). Rather, aphasia is a defect in aspects of linguistic processing like syntax, lexicon, phonology and morphology of a word.

"Round and round like a stage army moves the procession: the clinical appearances are identical, but each fresh group of observers views them with new eyes and with different perspectives" (Head, 1926, cited in Lecours, Lhermitte, & Brynn, 1983). As Henry Head has stated each group of observers have been viewing 'Aphasia' from their point of view and giving their own explanations of the problem. However, aphasia has remained a challenging field of enquiry.

At a general level, assessment involves forming impressions and making judgments about others. It carries an evaluative flavour while dealing with the whole person (Fiske & Pearson, 1970; cited in Venkateson, 2004). The key element in assessment is "the act of acquiring and analyzing information" (Hammill, 1987). The purpose of assessment varies from screening, identification, classification, placement, and programming to certification and research.

Benton (1967) has pointed out the choice of a model. Language functioning determines what kind of test we construct or use. Two approaches to test construction should be recognized as equally reasonable.

1. To construct tests on the basis of one of the currently accepted conceptions of aphasia. This 'taxonomic' or diagnostic approach ensures that the tests measures all aspects viewed as important in a specific theoretical approach but makes it possible that it will not be widely used as different conceptualization of aphasia as held by other workers in the field.
2. To approach the problem pragmatically, avoid specific conceptualizations, and construct a test that contains a variety probe of all abilities.

Both approaches have been applied in the construction of the currently used tests. Even within these two approaches, specific assessment instrument will show a good deal of variability.

Purpose of Assessment

It is important to consider the purpose for performing an examination when evaluating and choosing specific assessment instruments. Six general types of evaluation purposes may be distinguished in aphasia assessment: a) Screening procedure; b) diagnostic assessment; c) descriptive testing in rehabilitation and counseling; d) progress

evaluation; e) assessment of functional or pragmatic communication; and f) assessment of related disorders (Spreen and Risser, 2003).

Screening procedures

Screening refers to a brief and cursory examination to detect the presence of aphasia, often not exceeding 5 or 10 minutes. The type of screening procedures relevant to aphasia are: a) Bedside clinical examination; b) Screening test per se; c) Standardized test limited to measuring a specific aspect of language functioning, but notably sensitive to the presence of aphasia.

The various screening tests available are Aphasia Language Performance Scale (ALPS; Keenan and Brasell,1975), Aphasia Screening test (AST; Reitan and Wolfson, 1985), Franchay Aphasia Screening Test (FAST; Enderby et a1, 1987), Short Form of the Boston Diagnostic Aphasia Examination-3 (Goodglass et al., 2000) and Shortened version of Minnesota Test for Differential Diagnosis of Aphasia (MTDDA;Schuell,1973).

Diagnostic assessment

This test aims at thorough examination of a patient's language performances to arrive at both a diagnostic impression and a detailed description of areas of associated cognitive strengths and weaknesses. Aphasia test batteries are inevitable choices for clinicians looking for a comprehensive diagnostic instrument. There are a variety of these batteries available to clinicians: Aphasia Diagnostic Profiles (ADP; Helm-Estabrooks,1992), Western Aphasia Battery (WAB, Kertesz,1982), Boston Diagnostic Aphasia Examination-3 (BDAE-3; Goodglass, 2000), Minnesota Test for Differential Diagnosis of Aphasia (MTDA; Schuell, 1973), Porch Index of Communication Ability (PICA; Porch, 1981) and Neurosensory Centre Comprehensive Examination for Aphasia (NCCEA; Spreen et al., 1977).

Descriptive evaluation

For direct purposes of rehabilitation and counseling, a descriptive assessment is usually the most sensible approach. It is important to gain as much information as possible about areas of functional strength. This allows better-reasoned advise on what treatment activities to pursue, what vocational options remain open to the patient and the actual communication level at which the patient is interacting with others.

Progress evaluation

This allows an examination of spontaneous recovery when initial measures are repeated in a follow up fashion. Day to Day or week-to-week progress can be charted in treatment settings. No formal tests have been developed specifically for this purpose, mainly because these assessments have to be tailor-made for each level and his current level and range of deficit.

Related disorders

An examination of articulation is usually included in a full assessment of aphasia. Prosody of speech can be subdivided into affective and non-affective prosody. Dysprosody may be seen in many aphasic syndromes specially the anterior variety. Gestural communication is a significant contributor to the understanding of language and includes indicative, representative and expressive -emblematic signs (Spreen and Risser, 2003).

Construction principles of aphasia test

Tests instruments are essentially refinements and extensions of traditional clinical observations. For language and other aspects of cognition, tests and clinical observation explore the same areas of functioning and, by consequence, of disorders. A test could be considered to be a structured clinical observation that meets a number of additional psychometric requirements.

Standardization

Standardization is an arduous undertaking. Standardization refers first to test structure and administration. A standardized test is one that remains uniform in its important parameters from patient to patient, and from one examiner to another.

These parameters include aspects such as the face-to-face nature of presenting the stimuli, the suggested ambient environment, and the instructions for completing the task that compose the test. Rules as to how the test is to be given are explicitly described in a standardized instrument.

Reliability

It refers to the consistency, stability and accuracy of test's scores (Anastasi and Urbina, 1996). Three types of reliability are relevant for aphasia tests: the internal consistency of the test, test-retest stability, and the inter-rater reliability of the test when administered and scored by different examiners.

Validity

Validity refers to the demonstration that a test actually measures what it claims to measure and that inferences made about performances on that test are appropriate. Of the three forms of the validity, the demonstration that a testis a valid criterion of whether the patient is aphasic is the most popular.

Factor- analytic statistical techniques are used to show whether the tests in a given battery all contribute to one or major factors of common variance that represents language functions.

Content validity refers to the adequacy of sampling for the domain of behaviors to be measured. In case of aphasia testing, for example, it is generally agreed that measuring word fluency alone would not be sufficient, because it does not appear to sample the whole range of language behavior. Test items should be based on sound reasoning and should not be trivial or selectively biased.

Range of item difficulty

Range of item difficulty is usually determined by selecting from a range of "very easy" to "very difficult" items. In a well-constructed test, items should be homogenously distributed. Aphasia tests must shift the difficulty of item distribution towards to easy end to make it possible to between mild, moderate and severe levels of aphasia and to determine aphasia subtypes.

Use in measuring recovery

Aphasia tests are usually performed in the broader clinical context of recovery and therapy and as a result, pose two concerns. The first issue is essentially an additional validity problem. For this, the test may require more items in certain difficulty ranges to allow measurement of small steps in recovery.

The second issue reflects the related question of ability of the test to predict recovery or predict response to therapy, which must be established independently or in addition to other validation procedures.

Clarification of defects

Clarification of defects observed on testing is necessary in many cases. For example, if the patient cannot provide the name of an object, we cannot automatically ascribe this feature to an aphasic disorder.

The presence of any sensory-motor limitations is important to examine in order to clarify the test performance. The problems can be cognitive, psychological, and neuropsychological in nature.

Bi/Multilingualism

A holistic view of bilingualism proposes that the bilingual is an integrated whole which cannot be easily decomposed into two separate parts. The coexistence and constant interaction of two languages in a bilingual produces different but complete linguistic entity. The bilingual uses the two languages separately or together for different purposes, in different domains of life, with different people. Because the needs and uses of two languages are usually quite different, the bilingual is rarely equally or completely fluent

in his two language. Levels of fluency in a language will depend on the need for that language and will be domain specific. Another important factor to be considered is knowledge of more than two languages or multilingualism. Albert and Obler, (1978) reported that there is no difference in cerebral organization of bilinguals and multilingualism. Mackey, (1968) observed that bilingualism far from being exceptional is the problem that affects majority of world's population. He concluded that it is thus monolingualism that represents a special case rather than bilingualism, which is very true in Indian linguistic context.

Bilingualism in India is different in comparison to Western countries. According to Ferguson, (1968) the majority of bilingualism persistent in western world is constituted of the acculturating immigrant and his offsprings, the westernizing native, the struggling foreign language students, the downtrodden but dedicated minority group patriot. Mohanty, (1994) stated that the Indian society is characterized by grass root type of multilingualism in which languages are maintained in a non-competitive and differentiated role relationship and language identities of people are multilayered. He went on to explain the degree of complexity and diversity of the Indian sociolinguistic scene and cautioned against using Western models of bilingualism in explaining bilingualism in India.

According to 1991 census, the national average of bilingualism in India is 19.44 %. As is evident from the figures below, there is a steady increase in the percentage of bilinguals since 1961 (Pattanayak, 1990). This shows the trend towards learning of second language.

1961- 9.70%
1971-13.04%
1981 - 13.34%
1991 -19.44%

According to Srivastava, (1980) there is not a single state in the country which is completely unilingual; not a single major modern Indian language whose speakers don't employ at least three contact languages and not a single speech community which has less than at least three distinct linguistic codes in its verbal repertoire. In the south Indian state of Karnataka where this study was carried out, 1991 census shows English as

second language for 9.44 % and third language for 2.54 % of population showing that English has entered the realm of daily life in this state.

Code mixing and code switching are the two most prominent phenomena, seen in bilinguals. According to Bhatia and Ritchie, (1996) code switching refers to mixing of various linguistic units (words, phrases, clauses and sentences) primarily from two participating grammatical systems across sentence boundaries with in a speech event. In other words, code switching is intersentential and may be subject to some discourse principles. It is motivated by social and psychological motivations.

Code mixing on the other hand, refers to the mixing of the various linguistic units (morphemes, words, modifiers, phrases, clauses and sentences) primarily from two participating grammatical systems with in a sentence. In other words, code mixing is intrasentential, constrained by grammatical principles, and may be motivated by sociopsychological motivations (Bhatia and Ritchie, 1996)

In an actual discourse, the interaction between code mixing and code switching often becomes so complex and fused that it is quite difficult to draw a clear line between them (Bhatia and Ritchie, 1996).

Bhatt and Chengappa, (2002, 2003) looked into aspects of code mixing and code switching in normal Hindi-English and Kannada-English bilinguals. A conversational analysis was carried out using Matrix-Language Frame (MLF, Myers-Scotton, 1993). All the four constituents of MLF were found in the samples of all subjects. Instances of code switching were maximum in the bilingual context and least in monolingual English context that could be attributed to language mode of speakers. Morphological mixing considered as a deficit earlier was evident in both the sets of normal bilingual subjects suggesting that morphological mixing is common across English and Indian languages. MLF appeared as a valid tool to categorize as all the instances of code mixing and code switching in Hindi-English as well as Kannada-English bilinguals could be explained using this framework. They concluded that code mixing and code switching serve important functions and is a part of bilingual repertoire of these two speech communities.

Aphasia in bilinguals

Aphasia in bilinguals can affect their languages. Bilingual aphasia has been a widely researched area as it provides insight into the brain functioning of a bilingual and the effect of a lesion on this functioning.

Karanth, (1981) discussed a case of pure alexia in a Kannada-English bilingual who was a fluent speaker of Telugu, Kannada, Tamil and English. Her subject showed greatest deficit in the area of reading and had more difficulty in Kannada (most fluent language premorbidly) than in English. Results were explained in terms of greater exposure to English during adult life and in terms of the orthographic differences between the two languages.

Stadie, Springer, de Bleser and Burk, (1995) compared oral and written naming in a German, French and English multilingual subject. His spontaneous speech production in native language was fluent and paragrammatic but he was unable to communicate spontaneously in any of the non -native languages. They explained the performance of the subject in terms of spread-activation model. On the similar lines, Kremin and De Agostini, (1995) reported pattern of picture naming in, one Italian-German and another Italian-French bilingual aphasic. One patient showed differential impairment in her three languages and another showed equally preserved picture naming in spite of severe - disturbance at the level of semantic analysis.

One of the largest reports in bilingual aphasics has been that of Junque, Vendrell and Vendrell, (1995) in 50 Spanish-English bilingual aphasics. They studied performance on three linguistic tasks of naming, pointing and word-translation. There was no difference between two languages in tasks of naming and translation but pointing showed differential impairment. Specific phenomenon (shift of dominance, mixing and/or selective loss of access) was also frequently reported. Their results support the idea that each bilingual type may be sustained by a different acquired pattern of cerebral organization.

Munoz, Marquardt, and Copeland studied a comparison of the code switching patterns of aphasic and neurologically normal bilingual speakers of English and Spanish. Conversational discourse samples were obtained from four aphasic and four

neurologically normal Hispanic bilinguals in monolingual English, monolingual Spanish, and bilingual contexts to identify code switching patterns. Analysis of the samples based on the Matrix Language Frame (MLF) Model (Myers-Scotton, 1993) revealed consistent matching of the language context by the aphasic and normal subjects. The aphasic subjects demonstrated a greater frequency of MLF constituents and code switching patterns which is not evident in the speech samples of the normal subjects. Results suggest an increased dependence on both languages for communication following neurological impairment.

Fabbro (2001) investigated the language recovery of 20 bilingual Friulian-Italian aphasics. He reported that thirteen patients (65%) showed a similar impairment in both languages (parallel recovery), four patients (20%) showed a greater impairment in L2, while three patients (15%) showed a greater impairment in LI. He also reported that representation of grammatical aspects of languages seems to be different between two languages if L2 is acquired after the age of 7, with automatic processes and correctness being lower than those of the native language. These results are in line with a greater representation of the two lexicons in the declarative memory systems, whereas morphosyntactic aspects may be organized in different systems according to the acquisition vs. learning modality.

An investigation into naming was carried out by Bose (1997) on Kannada - English bilingual aphasics. There were three naming tasks i.e. confrontation naming, responsive naming and generative naming. Parallel naming deficits were seen in both languages except for confrontation naming where differential impairment was seen with better responses in first language than in second language. Sreedevi, (1999) on similar lines tested comprehension of bilingual aphasics who were fluent speakers of Tamil and English premorbidly. As expected performance was better in first language and she reported of differential recovery in all of her 20 subjects. There was no specific mention with regard to laterality.

Need to assess the Bilinguals

It is estimated that aphasic patients who speak a language other than that of the clinic in which they are assessed is rapidly increasing to the point of becoming common

place. It is therefore more important than ever to become aware of the manifestations of aphasia in languages other than one's own. A number of factors conspire to influence the symptoms in each language, from the phonological and morpho-syntactic structure of the language to the frequency of obligatory contexts, the importance of the form for the derivation of meaning, and the degree of redundancy. Therefore the same underlying deficit may cause different surface manifestations in different languages. It is important to recognize these different manifestations as language - specific instantiations of the same underlying cause rather than symptoms of different types of aphasia. (Paradis, 2001).

The structure of language determines what types of errors may occur. The reason why a certain type of error is salient or conspicuous in given language determines what types of error may occur. The reason why a certain type of error is salient or conspicuous in given language may be due to one or more of several factors: (1) the incidence of obligatory contexts;(2) the importance of the form for the derivation of meaning; (3) the frequency of use of the item in a language or culture; (4) the structural complexity of item (e.g., number of deviances from the canonical form), (5) the presence or absence of a zero morphemes and whether nouns and verbs exists as bare roots or must necessarily be inflected, (6) the presence or absence of redundancy (e.g., word order and agreement vs. either word order or agreement); (7) whether, when inflections are omitted, the remaining form is pronounceable or not; and (8) whether, the form is memorized or derivable by rule, i.e., whether it is regular or irregular. The form of the error will likely depend on the type of aphasia (e.g., omission vs. substitution and/or type of substitution), but the pool of possible errors (i.e., what can be substituted or omitted) is restricted by the grammar of the language.

Cross-linguistic evidence tends to support the notion that the underlying impairment affects the patient's ability to perform certain types of implicit, phonological, morphological and syntactic procedural computation (what linguists attempt to describe as rules). It is therefore possible to predict the form of the surface manifestations of the symptoms, as long as the structure of any language is known.

Reason why the cross linguistic study of symptoms is necessary:

Different languages use different devices to mark certain features (e.g., word order, pre/post positions, affixes, or a combination of these), the same underlying deficit may cause different surface manifestations in different languages (Paradis, 1987). Therefore, it is essential for clinicians and researchers to be aware of cross-linguistic symptoms, for at least three basic reasons: (1) in the countries of the world where English is not a national language, patient ought not to be diagnosed on the basis of data derived from English; (2) or even in the countries where bilingualism and multilingualism is inherent; (3) in order to determine whether one of the languages of a bilingual or polyglot patient is recovered to a greater or lesser extent than the language(s), once one becomes aware that the same underlying deficit may cause different manifestations in different languages, one must be able to interpret the patient's behavior pattern in terms of its significance for each language.

"If therapy is to be principled, then knowledge of the rationale behind what one is doing is an obvious prerequisite. It is important for speech-language pathologists to be familiar with the theoretical foundations of their work, i.e., why they do, what they do, so that they may adapt appropriately to diverse circumstances, as well as what to expect, how to interpret findings (Paradis,2001). The clinician and researcher should therefore be aware that what is generally true in their own language may not be in the language of the patient under assessment.

Aphasia groups in non-English population have to be studied for their language symptoms /deficits and recovery patterns in each bi/multilingual combination in the Indian subcontinent. It is well established now that language specific impairments and recoveries take place as evidenced by growing literature on Agrammatism. For example, agrammatic patients tend to error by omission in English and by substitution in richly inflected languages. As a result, English agrammatics appear much more severely impaired than their non English speaking counterparts. These qualitative and quantitative differences need to be further explored as already glimpsed in several Indian Languages like Telugu (Usharani, 1998), Kannada (Rangamani, 1991), Tamil (Srividya, 1990), Faroqui (1998) etc.

Even in the use of English, there are variations as to how it is spoken in different states of India. So, one can think of having region-based English norms when studies in English are done in India either singly or as a part of bilingual groups. While there may be similarities, there could be variations too, across mono- and bilingual language acquisition/learning/relearning in individuals with or without brain insult. These need to be explored with the help of cross-linguistic studies (Chengappa, 2001).

Comprehensive examinations of the aphasic patient's language ability have a basic goal. Although there are considerable numbers of comprehensive diagnostic tests that assess one or more aspects of the language disturbances of brain-damaged aphasic individuals, the number that have been adequately standardized is relatively few. Benton (1967), recognizing the many problems in constructing an aphasia test battery, nonetheless stressed the need for adequate standardization.

The Western Aphasia Battery (WAB), developed by Kertesz and his associates (Kertesz, 1968; Kertesz and Poole, 1974), currently is being used by many speech and language pathologists to assess aphasia. The earliest (unpublished) version of WAB represented a modification of the Boston Diagnostic Aphasia Examination (BDAE) developed by Goodglass and Kaplan (1972). Initially constructed when the BDAE was yet unpublished, the WAB used the clinical and neurolinguistic principles and some of the subtests developed by Goodglass and Kaplan. The material described here is based on the most recent standardized version of the WAB in Western context as reported by Shewan and Kertesz (1980). The Western Aphasia Battery (WAB; Kertesz, 1982) has become a popular protocol for the clinical evaluation of aphasia. Among its advantages are the test's simple yet quantifiable scoring system and a relatively short administration time (approximately 1 hour). The WAB was designed to evaluate the main clinical aspects of the oral language function: Spontaneous speech, auditory comprehension, repetition and naming, as well as reading writing and calculation (Kertesz and Poole, 1974). Nonverbal skills are also tested, such as drawing, block design and praxis and Raven's Progressive Matrices.

The oral language subtests: (a) Spontaneous speech, (b) Comprehension, (c) Repetition and (d) Naming are used to assess the severity and type of aphasia. The summary of their weighted scores provide the Aphasia Scores (A.Q.)- According to Shewan and Kertesz (1980), "the A.Q. is a functional measure of the severity of the spoken language deficit in aphasia". The oral language portion is an independent unit, the reading, writing, calculation, praxis, drawing, block design and Raven's Progressive Matrices are added, the Performance Quotient (P.Q.) is obtained, and the A.Q. and P.Q. combined provided the Cortical Quotient (C.Q.), a summary of the cognitive function.

The first language parameter assessed is:

(1) Spontaneous speech: Spontaneous speech, measured in terms of fluency and information content. This is tested/designed to elicit conversational speech from the patient in reply to questions asked in the context of an interview and a picture description. The information content measures functional communication and it is relatively easy to score. Correct response is what conveys appropriate information. Phonemic paraphasia are acceptable as long as the content is clear. This portion measures functional communication. The second important aspect of spontaneous speech is fluency. Carefully graded criteria are used to judge fluency of speech in one (1) to ten (10) Scales. The spontaneous speech is scored for information content depending on the number of items answered correctly.

(2) Comprehension: It is measured in three ways. First, the patient responds to 'yes' or 'no' questions of graded complexity involving personal matters as well as abstract relationship. He is then required to point to objects, pictures, body parts, colours, letters, numbers, and shapes. Finally, the patient is asked to perform sequentially ordered auditory commands with three single objects to each other, or placing them in relation to each other.

(3) Repetition: It is tested by high frequency single words of increasing length, composite words, numbers, number-word combinations, high and low probability sentences, and sentences of increasing length and grammatical complexity.

(4) Naming: It is scored by:

a. requiring the patient to identify 20 objects.

b. finding names for an object category.

c. sentence completion.

d. question requiring single word responses.

The subscores of four items of the tests - they are (a) spontaneous speech, (b) comprehension, (c) repetition, and (d) naming allow a classification of the patient according to the taxonomic principle into one of 8 subtypes of aphasia.

Classification:

			Expressive		
SI no.		Fluency	Comprehension	Repetition	Naming
1.	Global	0-4	0-3.9	0-4.9	0-6
2.	Broca's	0-4	4-10	0-7.9	0-8
3.	Isolation	0-4	0-3.9	5-10	0-6
4.	Transcortical motor	0-4	4-10	8-10	0-8
			Receptive		
5.	Wernicke's	5-10	0-6.9	0-7.9	0-9
6.	Transcortical sensory	5-10	0-6.9	8-10	0-9
7..	Conduction	5-10	7-10	0-6.9	0-9
8.	Anomic	5-10	7-10	7-10	0-9

This classification is considered as clinically valid baseline for research, diagnosis and prognosis. Apart from English version, Indian adaptation in Kannada, Hindi, Gujrathi, Marathi, and Tamil are being used extensively for clinical purpose in India.

Kertesz, (1979) stated that the score for information content has the highest correlation with the AQ; however, he presented no data to substantiate this claim. Thus, although the AQ is presented as an index of the severity of aphasic impairment, the relationship between it and the 10 individual subtests of the WAB have not been investigated.

According to Shewan and Kertesz (1980), "the Aphasia Quotient (A.Q.) is a functional measure of severity of the spoken language deficit in aphasia." Each individual subtest contributes different percentage to the calculation of the A.Q. Information

content, fluency and repetition each contribute 20%. Object naming contributes 12%, Sequential commands contribute 8%, Yes-No Questions and auditory word recognition each contributes 6%. Word-fluency contributes 4%. Finally, sentence completion and responsive speech each contributes 2%. These percentages demonstrate that the WAB aphasia quotient is weighted heavily towards expressive tasks (80% of the A.Q.). Because the A.Q. is weighted heavily by scores from expressive tasks, it might predominantly represent a patient's expressive language ability. This weightage question about the relative contributions of the various expressive tasks to the prediction of the A.Q. Given that information content, fluency and repetition scores contribute most of the calculation of the A.Q., they might be expected to be the best predictors of severity as measured by the A.Q.

Caramazza and Zurif (1976) reported that Broca's aphasic had difficulty in comprehending sentences when the crucial cues for comprehension were purely syntactic (for example, grammatical markers and word order). Bradly, Garrett and Zurif (1980) suggested that the normal access route to the functional vocabulary might be absent in the agrammatic. Caramazza and Berndt (1985) called this pattern of performance as 'asyntactic performance'.

Crary and Kertesz (1988) reported changes in expressive language errors in a patient who was followed for 12 months with the WAB. Some patients, specifically those presenting global or severe Broca's aphasia, demonstrated changes in the type of expressive errors noted on naming and repetition tasks in the absence of change in the AQ. Such results suggests that patients' communication abilities and/or the form of language errors may change over time without change in the overall severity of aphasia as measured by a total score like the AQ.

Crary and Rothi (1989) reported that information content was the best predictor of the severity of the aphasic impairment as measured by the AQ. The information content score reflects several dimensions of a patient' communicative abilities and contributes a high percentage to the calculation of the Aphasia Quotient. Time post onset had no influence on the relationships among the subtests or between the 10 subtests and AQ. Kertesz (1979) suggested that the information content score represents a measure of

functional communication means that patient must possess some degree of both comprehension and expression abilities to respond appropriately in the task.

From the above review we can conclude that the language content and expressive ability of an aphasic patient determines the severity of the problem. Thus, structure of different languages and the use of language by the native speakers are crucial in devising a test material for assessment of any language disability, especially in the area of aphasia.

Few studies have been carried out in different languages other than English. Kim & Duk (2004) studied on the Normative Data on the Korean Version of the Western Aphasia Battery which aimed to describe the properties of the Korean version of the Western Aphasia Battery (hereinafter K-WAB). The K-WAB contained the same test contents and structure as the original WAB and the general test administration method was maintained in verifying the data of normal individuals and patients. K-WAB was administered to 224 normal adults in seven age groups (15-24, 25-34, 35-44, 45-54, 55-64, 65-74, and 75 years or older), in five educational levels (0, 1-6, 7-9, 10-12, and 13 years or more) and by gender. The age and educational levels were influential to the K-WAB performance. Accordingly, they formed six subgroups of the normal: two age groups (15-74, and 75 years or older groups) by three educational groups (0, 1-6, and 7 years or more). Two hundred thirty-eight patients were also evaluated using the K-WAB. The highest aphasia quotient (AQ), language quotient (LQ), and cortical quotient (CQ) were achieved by 15-74 age group with 7 or more years of education (M=97.11,-M=95.51, M=95.57, respectively).

McGlone (1977) reported that following left hemisphere damage 14 out of 29 right-handed males (48%) as against only 2 out of 16 right-handed females (13%) were diagnosed as aphasic on the basis of Schuell test, a significant difference was found at the .02 level.

Lomas and Kertesz (1978) reported that most aphasic patients demonstrated change in communication abilities over time. However, in some patients the degree of change was similar across language performance areas, whereas in other patients changes in some areas of performance were disproportionate to changes in others.

Miceli et al. (1981) studied on the influence of age, sex, educational level and pathological lesion on incidence, severity and clinical form of aphasia in 390 right-handed, left brain damaged patients. They reported that sex and educational level were not related to both incidence and type of aphasia. Etiology of lesion and age were related to both incidence and type of aphasia. Incidence of aphasia increased with age, and was higher in patients with cerebrovascular accidents than in subjects with other types of brain lesions. Non-fluent forms of aphasia were more frequent in young patients suffering from acute cerebrovascular accidents, whereas anomia prevailed in neoplastic subjects and Wernicke's aphasia increased regularly in frequency with age.

Bates et al. (1987) noted that grammatical morphology was preserved in Italian and German speaking agrammatics. Miceli and Caramazza (1988) noted derivational errors while repeating derived words; there were no errors while repeating nonderived words. Bates et al. (1991) concluded that overuse of SVO word-order was noted only in languages that permitted pragmatic word-order variations. It could be detected in rigid word-order languages like English. The extent to which noncanonical word-order patterns were impaired depending on the frequency with which these forms appeared in the normal language. Comprehension seems preserved in sentences that can be understood without analysis of the syntactic structure.

Trudeau, Goulet, and Joanetta (1993) investigated the age difference between Broca's and Wernicke's aphasics while achieving better control over potentially confounding variables. The subjects (9 Broca's and 14 Wernicke's) were selected from a data base according to the following selection criteria: aphasia type, handedness, localization of lesion and etiology. The two groups revealed to be equivalent for sex distribution and schooling. Results showed that the distribution of age between Broca's and Wernicke's group was significantly different: there was a small representation of Broca's aphasics in older subjects while Wernicke's aphasia occurred at all ages.

Baldo et al., (2001) investigated on both verbal and nonverbal fluency (e.g., design fluency) in a single group of patients with focal, frontal lobe lesions and age- and

education-matched control participants. In a verbal fluency task, participants generated items belonging to both letter cues (F, A, and S) and category cues (animals and boy's name). In the design fluency tasks, participants generated novel designs by connecting dot arrays with 4 straight lines. A switching condition was included in both verbal and design fluency tasks and required participants to switch back and forth between different sets. (e.g. naming, fruits and furniture). They reported that patients with left frontal lobe performed worse than patients with right frontal lesions on the verbal fluency tasks, but the two groups performed comparably on the design fluency tasks. Their results suggested that verbal fluency is more dependant on left frontal cortex, while nonverbal fluency tasks, such as design fluency, recruit both right and left frontal processes.

Heilman and Scholes (1976) studied on nature of comprehension errors in Broca's, Conduction and Wernicke's aphasics. Twenty-six aphasic patients (nine Broca's, eight conduction, nine Wernikce's) and eight controls were given a test which helped to differentiate comprehension errors caused by syntactic incompetence from those caused by lexical incompetence. They reported that Wernicke's aphasics made significantly more lexical errors than of the other groups and no significant differences were found between the lexical errors made by Broca's, conduction and control groups. They also found that no significant differences between Broca's and conduction aphasics; however both these groups made more syntactic errors than the controls.

Chin Li & Williams (1990) investigated the repetition deficits in 95 subjects in three aphasic syndromes (32 conduction, 38 Broca's, and 25 Wernicke's aphasics). Subjects repeated phrases and sentences from the Repeating Phrases Subtest of the Boson Diagnostic Aphasia Examination. They reported that conduction aphasics exhibited a greater number of phonemic attempts, word revisions, and word and phrase repetitions, Broca's aphasics uses more phonemic errors and omissions and Wernicke's aphasics showed unrelated words and jargon.

Kohn & Goodglass (1985) examined the distribution of error types in picture naming 9 Broca's aphasics, 9 Wernicke's aphasics, 7 frontal anomics, and 9 posterior anomics. The relative distribution of the three most prominent naming errors- phonemic

errors, semantic errors, and multiword circumlocutions tended to distinguish the two anomic subgroups from the other aphasia subgroups. They reported that anomic aphasics produced the fewest phonemic errors, and the most multiword circumlocutions which suggest that minimal word-production difficulty in anomic aphasia relative to other aphasia syndromes.

Paraphasia are defined as erroneous substitution of a target word by another word or nonword, elicited during naming, repetition, spontaneous speech and reading. It is the product of a breakdown at a stage of the word-retrieval process and, as such, is a dominant symptom within the more general category of anomia. Paraphasia is produced unintentionally and are found primarily in fluent aphasics. Different types of paraphasia can be seen: (a) Phonemic paraphasia (e.g. - pike for pipe), (b) Semantic paraphasia (e.g. - chair for sofa, sister for wife). Pauranik (1998) reported that broca's aphasic had mostly phonemic paraphasia while fluent aphasic produced semantic paraphasia. Payne & Cooper (1985) examined paralexic speech errors during the oral reading of sentences for 12 right-handed adults (4 Broca's aphasics, 4 Wernicke's aphasics, and 4 patients with unilateral right-hemisphere lesions). A category system of error types was developed and 129 errors were analyzed in terms of identifiable linguistic components. They reported that Broca's aphasics used more morphological errors than did Wernicke's aphasics whereas Wernicke's aphasic used more graphophonemic-neologistic errors than did Broca's aphasics.

There are four hypotheses that most commonly explain the interaction between age and aphasia type which are: Micogenetic model of progressive lateralization of language, Selection bias hypothesis, Age related changes in vascular distribution, and aging induced continuous cognitive changes.

The microgenetic model of language lateralization proposed By Brown and Jaffe (1975) who proposes that progressive language lateralization throughout the adulthood. Brown and Grober (1983) argued that language lateralization is a dynamic process and therefore it continues over the life span. The association of age and aphasia type in the progressive context of lateralization is confirmed by the fact that lesion in Wernicke's

area would produce a motor aphasia in a child, conduction aphasia in the middle age, and Wemicke's aphasia in the later years. This progressive lateralization within the dominant hemisphere suggests that expressive language lateralizes earlier whereas the lateralization of comprehension occurring later in life increasing the frequency of fluent aphasia in older subjects. Some evidence in support of the progressive lateralization has come from Obler et al. (1978), who noted the frequency curve of Wernicke's aphasics to be higher in later life.

The selection bias hypothesis proposed by Basso and her colleagues (1980) implies that the reason patients with receptive aphasia are older than the ones with expressive aphasia is the lower mortality rate and reduced lesion size. After a careful analysis of the data, they confirmed that the non-fluent aphasia had resulted from a significantly larger lesion than the receptive aphasia. This larger lesion might have caused death or wider cerebral involvement in patients with non-fluent aphasia, resulting in an under representation of patients with non-fluent aphasia and subsequently biasing the clinical picture. Interestingly, they also observed that in a significant number of older fluent aphasics the lesion was located in the anterior cortex. This atypical localization of lesion seemed to support the microgenetic model proposed by Brown and Jaffe (1975), who argue that language areas go through the functional revolution with age. This age dependent deviation of lesion in Wernicke's aphasia seems to be an exception to otherwise established classical classification system.

Age related changes in vascular distribution was proposed by Eslinger and Damasio (1981) suggested that the location of vascular accident gradually moved posteriorly with age producing a greater prevalence of posterior infarcts in older subjects. Basso et al. (1987) tested this hypothesis and found no evidence supporting the posterior shift of the lesion location with increasing age in their patients.

The aging-induced cognitive changes hypotheses proposed by Meceli et al. (1981) suggest that greater frequency of fluent aphasia in elderly subjects results from the integration of brain pathology with normal aging-induced cognitive changes. These

cognitive changes that are commonly seen in aging as well as in subjects with Alzheimer's disease, include reduced processing speed, functionally decreased memory, and inability to process complex syntactic material. Interestingly, Holland and Bartlett (1985) supported this hypothesis where they compared 10 of the youngest with 10 of the oldest patients with aphasia. They noted that the language performance in the older aphasics deteriorated as the task-based cognitive demands increased. However, the increased demand did not affect the performance of younger subjects.

Bhatnager et al. (2002) examined the clinical profile of Hindi-speaking stroke patients with aphasia from northern India. They studied the interactional effect between age and gender with aphasia type in 97 Hindi-speaking right-handed individuals, the majority of them with a confirmed diagnosis of a cerebrovascular accident also evaluating the interaction between literacy and aphasia type since the subjects had varied education (total illiteracy to professional/university education).The subjects included in the study ranged from 3 weeks to two years post - onset with a diagnosis of a common classical aphasia (Broca's, Wernicke's, Anomic, Global, Conduction and Transcortical) types involving both males and females. While the data reported about Hindi-speaking aphasics relatively in agreement with the age-aphasia type patterns discussed in western countries, some differences were also observed. The mean age of Indian patients with aphasia was significantly lower. Also, in addition to some gender and literacy related differences, an outstanding difference was that many clinical symptoms that are known to co-occur with aphasia were not readily reported by subjects with stroke.

CHAPTER III

METHODOLOGY

In the present investigation, an attempt was made to standardize a test in Kannada based on the principles of Western Aphasia Battery (Kertesz, 1979) and to assess the language ability in terms of Aphasia Quotient (A.Q.) in adults with and without language pathology.

The study consisted of two stages:

(1) Test description
(2) Administration of the test

(1) TEST DESCRIPTION :

The following language parameters identified as being important for an aphasia test, are described:

1. Description of Spontaneous or Conversational speech
2. A measure of information value.
3. A measure of fluency
4. Auditory comprehension
5. Repetition
6. Naming

The present test had subtests which are based on similar lines as that of WAB (Kertesz, 1979). Under each subtest, materials were mainly translation of WAB - English (Kertesz, 1979) but some materials were modified keeping in view the linguistic principles of Kannada and the Indian cultural context (Appendix-1).

Thus the subtests of the test description were as follows:

Oral Language Subtests (A.Q.):

(I)Spontaneous speech:

a) Description of tests and materials:

This item was designed to elicit conversational speech from the patient in reply to questions asked in the context of an interview and a picture description. Changing the wording of the questions and few encouraging comments were permitted. The important aspects of spontaneous speech to be examined were the information content and fluency. It consisted of six questions which were mainly the translation of original WAB along with picture card. This picture card had been modified to the Indian culture.

Scoring:

Information content and fluency were scored according to,the set criteria for spontaneous speech (see Appendix 1).

(II) Auditory Verbal Comprehension:

Since patient performance was often complicated by difficulties of verbal expression, apraxia and intellectual functions, comprehension task attempts to cover various aspects of this feature, by using (a) yes-no questions, (b) a pointing task of auditory recognition, and (c) a series of sequential commands.

(a) "Yes-No" Question:

Description of the materials:

The patient was asked to reply or nod "Yes" or "No" to 20 questions. The first nine questions were the most relevant to the patients own person. The next five questions were related to the environment and the last six were more general in their context, yet remain semantically simple and short, although there was an increase in linguistic complexity requiring more comprehension of syntax, such as relational words. The use of Yes/No responses avoid to some extent the pointing difficulty or apraxia that may interfere with the other task of comprehension.

Instruction: The patient should be instructed to answer with yes or no only. If the patient continues to chat or answers in sentences, the instruction should be repeated. 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.

Scoring:

Score 3 points for each correct answer. Recorded responses in appropriate column: Verbal, gestural or eye blink. If the patient self corrects, the last answer was scored. If the response was ambiguous, score 0.

(b) Auditory Word Recognition:

Description of the Test and Materials:

The patient was asked to point to an item, spoken by the examiner, from an array in the same category. Materials of this task were six objects, six line drawing of objects, six letters, six numbers, six geometric forms, six colors, six items of furniture in the room, six body parts of the patient, five items of finger recognition and seven of right and left orientation.

Instructions:

Asked the patient to point to each item, by saying, point to the.....or show me the.....in the order listed. One repetition of each command was allowed.

Scoring:

Score 1 point for each correct response. If the patient points to more than one item, score 0, unless it was clear that the patient recognizes his or her error and corrected. For the seven items requiring left-right discrimination, the patient must get both the side and body part correct to receive credit.

(c) Sequential Commands:

Description of the Test:

This subject was also used to examine the comprehension of syntax consisted of 11 commands. The initial commands and sequences were simple and short to establish rapport, to place the patient in set and to allow the examiner to ascertain that the patient understands that he or she is to perform to the commands and that he or she is to willing to co-operate. Most of the sequential commands involve the manipulation of touching one object with another, using prepositions of "with/to" "on/top" "over" and "other side". The length of the sentences and the number of clauses were also increased.

Instruction:

On the table before the patient line up the pen, comb and book in the 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 doesn't seem to understand the task, point with the comb to the pen to demonstrate and start again.

Scoring:

Scoring was same as given in the original WAB. Credit was given for partial response if the underlined portion of the sentence, representing action or an object, was appropriately performed.

(Ill) Repetition:

Description of the Test:

Repetition was tested by high frequency words by increasing length, composite words, numbers, number-word combinations, high and low probability sentences and sentences of increasing length and grammatical complexity. It included test of oral agility, a test sentence that contained all the letters and a test sentence which consists specifically of short grammatical words.

Instruction:

Ask the patient to repeat the words listed below then record the responses. The stimulus may be repeated once. Only if the patient asks or does not seem to hear, not because the patients response was incorrect.

Scoring:

Scoring two points for each recognizable word. Minor dysarthric errors or colloquial pronunciations were scored as correct. Take 1 point off for errors in order of word sequence or for each literal paraphasias (phonemic error).

(IV) Naming: This task includes:

(a) Object naming:

Naming of objects on visual confrontation constituted 60% of the naming score. Twenty common prototypical objects that were easily available and shown individually. The sample contained various categories, shapes and sizes. The patient first was asked to name the object on visual presentation. In the case of no response or incorrect response, the patient was allowed to palpitate it and if necessary, the phonemic of the word was given as a cue. If it is a composite word, the first half was given as a semantic prompt. A total of 20 second was allowed for all of thee steps for each object.

Scoring:

Scored 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 was required.

(b) Word fluency:

It consisted 20% of the naming score. It is measured by naming as many animals as the patient can in 1 minute. The patient should be prompted by being given examples at the beginning (not to be counted if the patient repeats them) and again at 30 second if no responses were forthcoming.

Scoring:

Scored 1 point for each animal named, even if distorted by literal paraphasia.

(c) Sentence completion:

It consisted 10% of the naming score. Here the patient was asked to complete what the examiner says. There were 5 items here.

Scoring:

Scored 2 points for correct responses and 1 point for phonemic paraphasias.

(d) Responsive speech:

It consisted 10% of the naming score. Here the word finding was facilitated by the context of the preceding sentence. There were 5 items here.

Scoring:

Scored 2 points for acceptable responses, 1 point for phonemic paraphasia.

(2) ADMINISTRATATION OF THE TEST:

Subjects

The present study was a retrospective study which aimed to establish the clinical data on the Kannada Version of Western Aphasia Battery (WAB-K). One hundred and fifty clients with Kannada as mother tongue (monolingual/bilingual/multilingual) with different types of aphasia participated in the study. In order to review the available records, the following procedures were used. The available and obtained clinical data was classified into 7 categories of aphasia: (1) Global aphasia (2) Broca's aphasia (3) Transcortical Motor aphasia (4) Wernicke's aphasia (5) Transcortical Sensory aphasia (6) Conduction aphasia and (7) Anomic aphasia. The present study also aimed to establish normative data on a small sample for Kannada adaptation of WAB. Kannada version of WAB was administered on 30 normal subjects who were native speakers of Kannada with or without the knowledge of English, Hindi or any other language and were able to read and write Kannada. All these subjects also had formal education in English. The scores (AQ) obtained by the subjects on K-WAB and from aphasic case files (administered previously by SLP) were considered for interpretation (see Appendix 2).

Since, there were only one participant each in TMA (Transcortical motor aphasia) & TSA (Transcortical sensory aphasia) categories, these two categories were not included for statistical analysis.

Procedures used for the selection of case records

- The cases who reported to AIISH with the history of loss of language due to brain insult in the age range of 21 - >70 years in different age-groups in the interval of 10 years, registered between 1st January 2003 to 31st December 2007 were reviewed.
- Subjects of all the groups diagnosed as aphasia (of various types) by the neurologists and speech language pathologists at AIISH were considered for the study.

- Each case file was separately analyzed for the demographic information like age, gender^ education/literacy (0 years and 7 years or^ more), language (Monolingual/Bilingual/ Multilingual) with no associated disorders like dementia and other psychological illness.

CHAPTER IV

RESULTS & DISCUSSION

The present study was a retrospective study, which aimed to establish the clinical data on the Kannada Version of Western Aphasia Battery (WAB-K) in which one hundred and fifty clients (monolingual/bilingual/multilingual) with different types of aphasia were reviewed during the period of 1st January 2003 to 31st December 2007. The present study also aimed to establish normative data on WAB (Kannada). Adapted version of Kannada-WAB was also administered on 30 normal subjects who were native speakers of Kannada with or without the knowledge of English, Hindi or any other language in the age range of 21->70 years with different educational backgrounds.

The present study has three main independent variables: client-groups, age-groups, & gender and six parameters (dependent variables) such as information content, fluency, auditory comprehension, repetition, naming, and aphasia quotient (A.Q.). Other variables such as education, language and paraphasia were also considered in the present study. The statistical analyses carried out are presented along with the results of the analysis. The statistical computations were done using the SPSS- Statistical Package for Social Sciences (Version 14). The results are discussed under the following heads:

Subjects/Clients:

Table 1 shows the frequency and percentage of subjects/clients who participated in different groups:

Clients/Subject-groups	**Frequency**	**Percent**
Normal	**30**	16.7
Broca's	**64**	35.6
Anomic	**28**	15.6
Wernicke's	**15**	8.3
Conduction	**9**	5.0
Global	**32**	17.8
Transcortical Motor	**1**	0.6
Transcortical Sensory	**1**	0.6
Total	**180**	100.0

Table 1: Frequency and percentage of Groups

Since, there was only one subject each in TMA (Transcortical motor aphasia) & TSA (Transcortical sensory aphasia) categories, these two categories,were not included for statistical analysis.

Gender:

Table 2: Sex-wise distribution of normal subjects and aphasic groups:

Clients/Subject-groups	**Gender**		**Total**
	Male	**Female**	
Normal	18(60%)	12 (40%)	30 (100%)
Broca's	56 (87.5)	8 (12.5 %)	64 (100%)
Anomic	23 (82.1%)	5(17.9%)	28 (100%)
Wernicke's	13 (86.7%)	2(13.3%)	15 (100%)
Conduction	7 (77.8%)	2 (22.2%)	9(100%)
Global	25(78.1%)	7(21.9%)	32 (100%)
Total	142 (79.8%)	36 (20.2%)	178 (100%)

It is evident from table 2, that male subjects (79.8%) are more in number compared to female subjects (20.2%). Among normal subjects, there were 18(60%) males and 12(40%) females who participated in the study. Among aphasics, more no. of aphasias were seen in males than in females. Conduction aphasia group had lesser no. of subjects compared to all other groups in which seven were males (77.8%) and two were females (22.2%). Broca's aphasia had the highest no. of subjects compared to all other groups, in which 56 were males (87.5%) and 8 were females (12.5%).

Among aphasics, Broca's aphasia had highest no. of clients (64) followed by global (32), anomic (28), wernicke's (15), and conduction aphasia (9), Transcortical motor aphasia (1) and Transcortical sensory aphasia (1).

Gender differences in the performance of Normal subjects on different parameters ofWAB-K:

The table 3 shows the gender differences in the performance of normal subjects on different parameters.

Table 3: Mean and S.D. of gender differences in WAB-K performance of normal clients for different parameters:

Parameters	**Gender**	**N**	**Mean**	S.D.
Information content	**M**	18	10.0000	.0000
	F	12	10.0000	.0000
Fluency	**M**	18	9.5000	1.2948
	F	**12**	9.1667	1.8007
Comprehension	**M**	18	9.7556	.3925
	F	12	9.7542	.4137
Repetition	**M**	18	9.3889	.4185
	F	**12**	9.7000	.4553
Naming	**M**	18	9.8667	.2142
	F	12	9.8750	.1288
A.Q.	**M**	18	97.0222	2.8081
	F	**12**	96.9917	4.9912

Note: t-test can't be computed in information content because the SD of both groups are zero.

Parameters	**t**	df	P
Fluency	.591	28	.559
Comprehension	.009	28	.993
Repetition	1.926	28	.064
Naming	.121	28	.905
A.Q.	.021	28	.983

Independent t- test was administered to check the difference between males (M) and females (F) in normal subjects for the different parameters. Results revealed that there was no significant difference (p>.005) in any parameters between genders. Males and female subjects performed similarly in all parameters.

Gender differences in the performance of aphasic clients on different parameters of WAB:

The table 4 shows the gender differences in the performance of normal subjects on different parameters.

Table 4: Mean and S.D. of gender differences in WAB-K performance of aphasic clients for the different parameters:

Parameters	**Gender**	**N**	**Mean**	S.D.
Information content	**M**	124	3.4032	3.7675
	F	**24**	3.5000	4.0967
Fluency	**M**	124	2.8145	3.1658
	F	24	3.1667	3.8972
Comprehension	**M**	124	6.3199	2.8960
	F	24	5.7104	3.5412
Repetition	**M**	124	2.6435	3.3748
	F	24	2.7625	3.5234
Naming	**M**	124	2.6637	3.2041
	F	**24**	2.8792	3.8297
A.Q.	**M**	124	35.4510	28.8967
	F	24	35.4375	34.7483

Independent t- test was administered to check the difference of males (M) and females (F) in aphasic groups for the different parameters.

Parameters	**t**	Df	p
Information content	.114	146	.910
Fluency	.480	146	.632
Comprehension	.909	146	.365
Repetition	.157	146	.876
Naming	.292	146	.771
A.Q.	.002	146	.998

Results revealed that there was no significant difference ($p>.005$) in any of the parameters which means males and female subjects performed similarly on different parameters.

The present findings are similar to the findings of Miceli et al. (1981) who reported that sex/gender differences were not related to any parameter. But, the present study contradicts the previous similar study in the Indian context. Bhatnager et al. (2002) found the mean age of Indian patients with aphasia was significantly lower and also reported that similar gender related differences found in aphasia(Broca's, Wernicke's, anomic, global, conduction and transcortical) types which were more in males than females.

Literacy:

Table 5: Distribution of literacy among normal subjects and aphasic groups:

Clients/Subject-groups	**Literacy**		**Total**
	Literate	**Illiterate**	
Normal	22 (73.3%)	8 (26.7%)	30(100%)
Broca's	35 (54.7%)	29 (45.3%)	64(100%)
Anomic	21 (75.0%)	7 (25.0%)	28(100%)
Wernicke's	8 (53.3%)	7 (46.7%)	15(100%)
Conduction	8 (88.9%)	1(11.1%)	9(100%)
Global	13 (40.6%)	19 (59.4%)	32(100%)
Total	107(60.1%)	71 (39.9%)	178(100%)

From the table 5, it is evident that among the total 178 subjects, 107(60.1%) were literates and 71(39.9%) were illiterates. Among normal subjects, 22(73.3%) were literates and 8(26.7%) were illiterates. Among 150 aphasics, 86(57.2%) were literates and 64(42.5%) were illiterates.

Literacy related differences in the performance of normal subjects on different parameters of WAB-K:

The table 6 shows the literacy related differences in the performance of normal subjects on different parameters.

Table 6: Mean and S.D. of literacy related differences of normal subjects for different parameters:

Parameters	**Literacy**	**N**	**Mean**	S.D.
Information content	Literate	22	10.0000	.0000
	Illiterate	8	10.0000	.0000
Fluency	Literate	22	9.3182	1.6729
	Illiterate	8	9.5000	.9258
Comprehension	Literate	22	9.9045	.2198
	Illiterate	8	9.3437	.4844
Repetition	Literate	22	9.5682	.4550
	Illiterate	8	9.3625	.4406
Naming	Literate	22	9.9364	9.535
	Illiterate	8	9.6875	.2416
A.Q.	Literate	22	97.4545	4.1288
	Illiterate	8	95.7875	2.1970

Note: t-test can't be computed in information content because the SD of both groups are zero.

Independent t- test was administered to check the difference between literates and illiterates in normal subjects for the different parameters.

Parameters	**t**	df	p
Fluency	.290	28	.774
Comprehension	4.410	28	.000
Repetition	1.104	28	.279
Naming	4.119	28	.000
A.Q.	1.079	28	.290

Results revealed that there was significant difference ($p<.005$) between literates and illiterates in terms of comprehension and naming. Literates performed better than illiterates in comprehension and naming tasks. But, there was no difference ($p>.005$) between literates and illiterates in other parameters: fluency, repetition and aphasia quotient.

Literacy related differences in the performance of aphasic clients on different parameters of WAB-K:

The table 7 shows the literacy related differences in the performance of aphasic subjects on different parameters.

Table 7: Mean and S.D. of literacy related differences in WAB-K performance of aphasic clients for the different parameters:

Parameters	**Literacy**	N	**Mean**	S.D.
Information content	Literate	85	4.4824	3.9237
	Illiterate	63	1.9821	3.1443
Fluency	Literate	85	3.4941	3.4108
	Illiterate	63	2.0317	2.9236
Comprehension	Literate	85	7.0106	2.7293
	Illiterate	63	5.1558	3.0514
Repetition	Literate	85	3.3553	3.4879
	Illiterate	63	1.7286	3.0297
Naming	Literate	85	3.5353	3.4028
	Illiterate	63	1.5698	2.8074
A.Q.	Literate	85	43.4071	30.2612
	Illiterate	63	24.7116	25.6873

Independent t- test was administered to check the difference between literates and illiterates in aphasic groups for the different parameters.

Parameters	t	df	p
Information content	4.159	146	.000
Fluency	2.738	146	.007
Comprehension	3.887	146	.000
Repetition	2.964	146	.004
Naming	3.737	146	.000
A.Q.	3.958	146	.000

Results revealed that significant difference ($p<.005$) existed between literates and illiterates in different parameters which means literates performed better than illiterates for different tasks. Bhatnager et al. (2002) reported similar findings of the present study that literacy related differences were positively found.

Language contexts:

The table 8 shows the language contexts of normal and aphasics clients.

Table 8: Frequency of language contexts of normal subjects and aphasic groups:

Clients/Subject-groups	Language contexts			Total
	Monolingual	Bilingual	Multilingual	
Normal	13(43.3%)	11(36.7%)	6(20.0%)	30(100%)
Broca's	21(32.8%)	18(28.1%)	25(39.1%)	64(100%)
Anomic	6(21.4%)	7(25.0%)	15(53.6%)	28(100%)
Wernicke's	4(26.7%)	4(26.7%)	7(46.7%)	15(100%)
Conduction	3(33.3%)	1(11.1%)	5(55.6%)	9(100%)
Global	19(59.4%)	4(12.5%)	9(28.1%)	32(100%)
Total	66(37.1%)	45(25.3%)	67(37.6%)	178(100%)

Among 178 subjects/clients, 66(37.1%) were monolingual, 45(25.3%) were bilingual and 67(37.6%) were multilingual. Among normal subjects, 13 (43.3%) were monolingual, 11(36.7%) were bilingual and 6 (20.0%) were multilingual. Among aphasics, 53(35.8%) were monolingual, 34 (22.9%) were bilingual, and 61(41.2%) were multilingual while TMA client was multilingual and TSA was monolingual.

Effects of language contexts of Normal subjects on different parameters of WAB-K:

The table 9 shows the performance of language contexts of, normal subjects on different parameters.

Table 9: Mean and S.D. of language contexts in WAB-K performance of normal subjects for the different parameters:

Parameters	**Lang, contexts**	**N**	**Mean**	SD
Information content	Monolingual	**13**	10.000	.0000
	Bilingual	11	10.000	.0000
	Multilingual	**6**	10.000	.0000
	Total	30	10.000	.0000
Fluency	Monolingual	**13**	9.1538	1.5191
	Bilingual	11	9.2727	1.8488
	Multilingual	**6**	10.0000	.0000
	Total	30	9.3667	1.4967
Comprehension	Monolingual	**13**	9.6538	.4409
	Bilingual	**11**	9.7545	.4174
	Multilingual	**6**	9.9750	2.739
	Total	30	9.7550	.3940
Repetition	Monolingual	13	9.5077	.4499
	Bilingual	**11**	9.5273	.4839
	Multilingual	**6**	9.5000	.4858
	Total	30	9.5133	.4531
Naming	Monolingual	13	9.8538	.1761
	Bilingual	11	9.8364	.2203
	Multilingual	**6**	9.9667	8.165
	Total	30	9.8700	.1822
A.Q.	Monolingual	13	96.3385	3.2664
	Bilingual	11	96.7818	4.9640
	Multilingual	**6**	98.8833	1.1089
	Total	30	97.0100	3.7513

Parameters	F (2,27)	P
Information content	-	-
Fluency	.675	.518
Comprehension	1.402	.264
Repetition	.008	.992
Naming	1.089	.351
A.Q.	.975	.390

One-way ANOVA was carried out to compare the performance between monolingual, bilingual and multilingual normal for the different parameters. Results

revealed that there was no significant difference (p>.005) in any of the parameters which means that they perform similarly on all tasks.

The present finding is supported by the findings of Junque, Vendrell, and Vendrell (1995) who reported that in a study of linguistic tasks such as naming, pointing and translation, there was no difference in two languages in terms of naming and translation but differential impairment seen in pointing which may be due to different acquired pattern of cerebral organization.

Effects of language contexts on the aphasic performance of different parameters of WAB-K:

The table 10 shows the performance of language contexts of aphasic subjects on different parameters.

Table 10: Mean and S.D. of language contexts in WAB-K performance of aphasic clients for the different parameters:

Parameters	**Lang, contexts**	**N**	**Mean**	SD
Information content	Monolingual	53	2.2075	3.2896
	Bilingual	34	3.8824	4.0209
	Multilingual	61	4.2131	3.8992
	Total	148	3.4189	3.8084
Fluency	Monolingual	53	1.9623	3.0126
	Bilingual	34	3.2353	3.3760
	Multilingual	61	3.4590	3.3345
	Total	148	2.8716	3.2832
Comprehension	Monolingual	53	5.0819	2.9754
	Bilingual	34	7.0066	2.7823
	Multilingual	61	6.7730	2.8963
	Total	148	6.2210	3.0051
Repetition	Monolingual	53	1.7792	2.9958
	Bilingual	**34**	2.9265	3.4505
	Multilingual	**61**	3.2836	3.5588
	Total	148	2.6628	3.3874
Naming	Monolingual	53	1.6264	2.7760
	Bilingual	34	3.1265	3.4430
	Multilingual	**61**	3.3918	3.4464
	Total	148	2.6986	3.3002
A.Q.	Monolingual	53	25.0581	26.1370
	Bilingual	34	39.4603	30.0546
	Multilingual	**61**	42.2410	30.5678
	Total	148	35.4489	29.7928

Parameters	**F (2,145)**	p
Information content	4.460	.013
Fluency	3.319	.039
Comprehension	6.443	.002
Repetition	3.011	.052
Naming	4.648	.011
A.Q.	5.425	.005

One-way ANOVA was carried out to compare the performance between monolingual, bilingual and multilingual aphasics for the different parameters. Results revealed that there was significant difference ($p<.005$) for different parameters.

The present findings are supported by the findings of Franco Fabbro (2001) who reported greater impairment in L2 than LI. But, Junque, Vendrell, and Vendrell (1995) reported that in linguistic tasks such as naming, pointing and translation, no difference in two languages in terms of naming and translation but differential impairment is seen in pointing which may be due to different acquired pattern of cerebral organization. Findings contradict with the present findings.

Duncan's post hoc test was administered to check the pair wise difference across three language contexts.

Results revealed that in information content there was a significant difference between monolingual and multilingual, multi lingual subjects performed better (M = 4.21 than monolingual subjects (M = 2.20).

In fluency and repetition tasks, significant difference was found between monolingual and multilingual speakers. Mean of 3.45 for fluency and 3.28 for repetition was scored by multilingual subjects where as mean of 1.96 for fluency and mean of 1.77 for repetition was scored by monolingual subjects.

Comprehension, naming, and AQ showed similar results, wherein there was a significant difference between all three lingua groups. In comprehension, bilingual scored the mean of 7.00 followed by multilingual who had a mean score of 6.77 followed by monolingual (M = 5.08). In naming, multilingual had highest score (M= 3.39) followed by bilingual (M= 3.12.) and monolingual had lowest score (M= 1.62). In AQ, multi lingual scored higher (M= 42.24) followed by bilingual (M= 39.46), followed by monolingual (M 25.05).

Paraphasias:

The table 11 shows paraphasias in the aphasic groups.

Table 11: Frequency of paraphasias in aphasic groups:

Clients/Subject-groups	Paraphasia		Total
	Present	Absent	
Normal	~	30	30(100%)
Broca's	5(7.8%)	59(92.2%)	64(100%)
Anomic	8(28.6%)	20(71.4%)	28(100%)
Wernicke's	4(26.7%)	11(73.3%)	15(100%)
Conduction	2(22.2%)	7(77.8%)	9(100%)
Global	2(6.3%)	30(93.8%)	32(100%)
Total	21(11.8%)	157(88.2%)	178(100%)

Paraphasia is defined as an erroneous substitution of a target word by another word or nonword, elicited during spontaneous speech, naming and repetition. It is the product of a breakdown at a stage of word-retrieval process, and is a dominant symptom within the general category of anomia. It is produced unintentionally and is found primarily in fluent aphasics. Different types of paraphasia can be seen: (a) Phonemic paraphasia (e.g. - pike for pipe), (b) Semantic paraphasia (e.g. - chair for sofa, sister for wife). Pauranik (1998) reported that broca's aphasic had mostly phonemic paraphasia while fluent aphasic produced semantic paraphasia.

Among all the aphasics, 21(11.8%) subjects exhibited paraphasic errors and 127(85.8%) subjects exhibited no paraphasic errors. As seen in table 5, anomic aphasics exhibited more paraphasic errors compared to all other groups. Among the total 28 anomic aphasics, 8(28.6%) subjects exhibited paraphasic errors and 20(71.4%) subjects exhibited no paraphasic errors. In global aphasics, among 32 subjects, 2(6.3%) exhibited paraphasic errors and 30(93.8%) exhibited no paraphasic errors while TMA, paraphasic error was present in TSA, paraphasia was absent. The nature and types of paraphasias however were not found recorded in the case files.

Age-groups:

The table 12 shows age-wise distribution of subjects.

Table 12: Distribution of subjects/clients across age- groups:

Clients/Subject-groups	Age- groups (in years)						Total
	21-30	31-40	41-50	51-60	61-70	>70	
Normal	5(16.7%)	4(13.3%)	5(16.7%)	6(20.0%)	6(20.0%)	4(13.3%)	30(100%)
Broca's	8(12.5%)	7(10.9%)	19(29.7%)	11(17.2%)	11(17.2%)	4(6.3%)	64(100%)
Anomic	6(21.4%)	4(14.3%)	6(21.4%)	5(17.9%)	5(17.9%)	3(10.7%)	28(100%)
Wernicke's	-	-	8(53.3%)	2(13.3%)	2(13.3%)	2(13.3%)	15(100%)
Conduction	2(22.2%)	2(22.2%)	-	1(11.1%)	1(11.1%)	-	9(100%)
Global	-	9(28.1%)	12(37.5%)	5(15.6%)	5(15.6%)	1(3.1%)	32(100%)
Total	21(11.8%)	26(14.6%)	50(28.1%)	30(16.9%)	30(16.9%)	14(7.9%)	178(100%)

It is evident from table 12 that among aphasics, middle age-groups were more compared to younger (21-40 years), and older (41->70 years) age-groups which showed 38 and 34 clients respectively.

In the descending order, Broca's and Global aphasias were found more in middle age-groups (41-60years) while others were distributed across all age-groups.

Performance of aphasic subjects on different parameters across age-groups:

The table 13 shows the age-group differences in the performance of aphasic clients (young client Vs older clients) in different parameters.

Table 13: Mean and S.D. of WAB-K performance in aphasias across young clients (21-40 years) Vs older client (41->70 years) groups for the different parameters:

Parameters	**Client Age-groups**	N	Mean	S.D.
Information content	Younger	38	3.8158	4.2417
	Older	110	3.2818	3.6577
Fluency	Younger	38	2.9474	3.5637
	Older	110	2.84555	3.1974
Comprehension	Younger	38	6.4283	2.9218
	Older	110	6.1495	3.0431
Repetition	Younger	38	3.0368	3.6364
	Older	110	2.5336	3.3046
Naming	Younger	38	3.0605	3.4944
	Older	110	2.5736	3.2376
A.Q.	Younger	38	37.8013	33.0301
	Older	110	34.6362	28.7075

Independent t- test was administered to check the difference between young clients (21-40 years) Vs older clients (41->70 years) groups for the different parameters.

Parameters	**t**	df	p
Information content	.744	146	.458
Fluency	.164	146	.870
Comprehension	.492	146	.624
Repetition	.788	146	.432
Naming	.783	146	.435
A.Q.	.563	146	.574

Results revealed that there was no significant difference ($p>.005$) in any parameters between young and older aphasic groups. But in A.Q, though the differences were not statistically significant, younger aphasic clients showed a higher mean (M= 37.80) compared to older aphasic clients (M=34.63), which indicates better performance by the younger clients compared to older clients.

Mean **and S.D** of **different parameters** across **Subject/Client-groups, age and gender:**

(a) Information content:

The table 14 shows the mean and SD of information content with respect to client groups, age and gender.

Table 14: Mean and S.D. of information content with respect to Client-groups, Age and Gender:

Clients/Subject-groups	**Age-groups (in Years)**	**Gender**			
		FemaIes(F)		Males(M)	
		Mean	SD	Mean	SD
Normal	21-30	10.0000	.0000		-
	31-40	10.0000	.0000	10.0000	.0000
	41-50	10.0000	-	10.0000	.0000
	51-60	10.0000	.0000	10.0000	.0000
	61-70	10.0000	.0000	10.0000	.0000
	>70	10.0000	-	10.0000	.0000
Broca's	21-30	.0000	-	2.1429	3.0783
	31-40	.0000	-	.3333	.5164
	41-50	1.5000	.7071	1.2353	2.4117
	51-60	8.0000	-	4.0000	2.9352
	61-70	.0000	-	.4000	.9661
	>70	.0000	.0000	1.0000	. 1.4142
Anomic	21-30	10.0000	-	8.8000	1.6432
	31-40	-	-	9.0000	.8165
	41-50	9.0000	-	8.6000	1.1402
	51-60	10.0000		8.6667	.5774
	61-70	8.0000	-	8.5000	1.9149
	>70	9.0000	-	9.0000	1.4142
Wernicke's	41-50	3.0000	-	4.1429	3.4847
	51-60	3.0000	-	6.5000	2.1213
	61-70	-	-	3.0000	.0000
	>70	-	-	5.0000	7.0711
Conduction	21-30	9.0000	-	7.0000	-
	31-40	-	-	9.0000	1.4142
	51-60	9.0000	-	7.3333	1.1547
	61-70	-	-	5.0000	-
Global	31-40	.0000	-	.5000	1.0690
	41-50	.7500	.9574	.5000	1.4142
	51-60	-	-	.2000	.4472
	61-70	.0000	.0000	.6667	1.1547
	>70	-	-	.0000	-

Table 14 clearly shows that both normal males (M) and females (F) scored higher in all age-groups followed by anomic and conduction aphasics. In Global and Wernicke's

too, both males & females performed poorly in all age-groups. Thus, there is no gender difference seen in aphasics or normal groups with respect to information content of Western Aphasia Battery.

(b) **Fluency:**

The table 15 shows the mean and SD of fluency with respect to client groups, age and gender.

Table 15: Mean and S.D. of fluency with respect to Client-groups, Age-groups and Gender:

Clients/Subject-groups	**Age-groups (in Years)**	**Gender**			
		Females(F)		**Males(M)**	
		Mean	SD	**Mean**	SD
Normal	21-30	9.2000	1.0954	-	-
	31-40	10.0000	.0000	10.0000	.0000
	41-50	10.0000	-	9.5000	1.0000
	51-60	10.0000	-	10.0000	.0000
	61-70	7.0000	4.2426	9.5000	1.0000
	>70	10.0000	-	8.3333	2.8868
Broca's	21-30	.0000	-	1.1429	1.4639
	31-40	.0000	-	.3333	.5164
	41-50	.5000	.7071	.6471	1.3666
	51-60	4.0000	-	2.1429	1.2924
	61-70	.0000	-	.3000	.6749
	>70	.0000	.0000	1.0000	1.4142
Anomic	21-30	9.0000	-	6.6000	2.4083
	31-40	-	-	6.7500	2.0616
	41-50	9.0000	-	7.4000	1.9494
	51-60	6.0000	-	8.3333	1.1547
	61-70	9.0000	-	6.7500	2.2174
	>70	9.0000	-	6.5000	2.1213
Wernicke's	41-50	5.0000	-	5.2857	1.4960
	51-60	5.0000	-	7.5000	.7071
	61-70	-	-	5.5000	2.1213
	>70	-	-	6.5000	2.1213
Conduction	21-30	9.0000	-	7.0000	-
	31-40	-	-	7.5000	3.5355
	51-60	9.0000	-	7.0000	1.7321
	61-70	-	-	5.0000	-
Global	31-40	.0000	-	.2500	.7071
	41-50	.0000	.0000	.2500	.4629
	51-60	-	-	.4000	.5477
	61-70	.5000	.7071	.3333	.5774
	>70	-	-	.0000	-

Table 15 clearly shows that among normal subjects/clients, both males (M) & females (F) scored higher across all age-groups. Conduction and anomic aphasics follow the normal subjects. Thus, there is no gender difference in normal as*well as aphasic subjects. Wernicke's performed poorer compared to Conduction, anomic aphasics, and normals. Broca's and Global aphasics performed poorly when compared to all groups. This study supports the finding of Baldo et al. (2001), who reported that patients with left frontal lesion perform worse than patients with right frontal lesion on the verbal fluency tasks.

In the descending order of fluency, the clients/subject-groups can be placed as normal subjects, anomic, conduction, wernicke's, broca's and global aphasics.

(c) Comprehension:

The table 16 shows the mean and SD of comprehension with respect to client groups, age and gender.

Table 16: Mean and S.D. of Comprehension with respect to Client-groups, Age and Gender:

Clients/Subject-groups	**Age-groups (in Years)**	**Gender**			
		Females(F)		**Males(M)**	
		Mean	SD	**Mean**	SD
Normal	21-30	9.7700	.4324	-	-
	31-40	10.0000	.0000	9.6000	.5657
	41-50	9.9500	-	9.7125	.4171
	51-60	10.0000	-	9.8100	.3975
	61-70	9.1250	.2475	9.6875	.5588
	>70	10.0000	-	9.9167	.1443
Broca's	21-30	5.5000	-	6.2143	1.7660
	31-40	4.8000	-	6.9333	2.1281
	41-50	8.2500	2.4749	7.3853	1.6152
	51-6Q	5.7000	-	7.1964	1.7828
	61-70	6.6000	-	7.2950	1.8567
	>70	8.8250	.9546	6.7750	1.3789
Anomic	21-30	9.0000	-	9.5900	.4722
	31-40	-	-	9.2625	.9724
	41-50	9.6000	-	9.0300	.6496
	51-60	9.8000	-	8.8500	1.3257
	61-70	6.9500	-	9.9000	.2000
	>70	8.8000	-	9.7250	.3889
Wernicke's	41-50	6.7500	-	3.7343	2.9333
	51-60	1.8000	-	6.3250	.7425
	61-70	-	-	5.3500	2.1920
	>70	-	-	2.8000	3.9598
Conduction	21-30	9.0500		7.6500	-
	31-40	-	-	8.0000	.9899
	51-60	10.0000	-	7.7167	.7506
	61-70	-	-	8.2500	-
Global	31-40	3.0000	-	2.3969	1.7163
	41-50	.9500	.8021	2.9688	.9914
	51-60	-	-	2.0600	1.9037
	61-70	.8750	1.0253	2.1833	1.2829
	>70	-	-	.1000	-

Table 16 shows that in normal subjects, males & females scored higher in all age-groups followed by anomic aphasics. Conduction and Broca's scored poorer than normal and anomic groups. Wernicke's and Global performed poorly when compared to all groups.

In the descending order of comprehension, the clients /subject groups can be placed as Normal subjects, Anomic, Conduction, Broca's, Wernicke's and Global aphasics.

Similarly, Heilman & Scholes (1976) reported that Wernicke's aphasic made significantly more lexical errors in terms of comprehension compared to Broca's, Conduction and Normal groups.

(d) Repetition:

The table 17 shows the mean and SD of repetition with respect to client groups, age and gender.

Table 17: Mean and S.D. of Repetition with respect to Client-groups, Age and Gender:

Clients/Subject-groups	**Age-groups (in Years)**	**Gender**			
		Females(F)		**Males(M)**	
		Mean	SD	**Mean**	SD
Normal	21-30	9.8000	.2828	-	-
	31-40	9.9000	.1414	9.8000	.2828
	41-50	9.8000	-	9.5750	.4031
	51-60	10.0000	-	9.1200	.4147
	61-70	9.0000	.8485	9.4000	.5164
	>70	9.8000	-	9.3000	.1732
Broca's	21-30	.0000	-	1.5714	2.4143
	31-40	.0000	-	.5833	1.3805
	41-50	.2000	.2828	.5529	1.4366
	51-60	5.1000	-	2.6857	2.4573
	61-70	.0000	-	.1300	.2406
	>70	.5000	.1414	.1000	.1414
Anomic	21-30	7.6000	-	7.9000	.1414
	31-40	-	-	8.8750	1.0046
	41-50	10.0000	-	9.0600	.8050
	51-60	9.0000	-	7.7333	.2517
	61-70	7.7000	-	8.6750	.7890
	>70	8.5000	-	8.1500	1.2021
Wernicke's	41-50	3.2000	-	2.6571	2.5125
	51-60	3.5000	-	3.8500	1.3435
	61-70	-	-	3.6000	3.3941
	>70	-	-	1.5000	2.1213
Conduction	21-30	5.1000	-	6.1000	-
	31-40	-	-	3.4500	.9192
	51-60	4.8000	-	5.1000	1.3077
	61-70	-	-	4.0000	-
Global	31-40	.0000	-	2.5000	7.0710
	41-50	.0000	.0000	5.0000	.1414
	51-60	-	-	.1400	.3130
	61-70	.2000	.2828	6.667	.1155
	>70	-	-	.0000	-

Table 17 shows that in normals, males & females scored higher across all age-groups followed by anomic aphasics. Conduction and Wernicke's aphasics scored below anomic aphasics. Broca's and Global aphasics performed poorly when compared to all age-groups. In the descending order of repetition, the client/subject groups can be placed as Normal subjects, Anomic, Conduction, Wernicke's, Broca's and Global aphasics.

The present findings are supported by the findings of Edith & Sarah (1990) who reported that Conduction aphasics exhibited greater no. of phonemic attempt, word and phrase repetitions whereas Broca's aphasic exhibited more phonemic errors and Wernicke's aphasic repeated more unrelated words and jargons.

(e) Naming:

The table 18 shows the mean and SD of naming with respect to client groups, age and gender.

Table 18: Mean and S.D. of Naming with respect to Client-groups, Age and Gender:

Clients/Subject-groups	Age-groups (**in** Years)	**Gender**			
		Females(F)		**Males(M)**	
		Mean	SD	**Mean**	SD
Normal	21-30	9.8400	8.9440	-	-
	31-40	10.0000	.0000	9.9000	.1414
	41-50	10.0000	-	9.7500	.3317
	51-60	10.0000	-	9.9200	.1095
	61-70	9.7000	.1414	9.8500	.3000
	>70	9.9000	-	9.9333	.1155
Broca's	21-30	.0000	-	2.0429	3.1112
	31-40	.0000	-	.7333	1.7963
	41-50	3.0000	4.2426	1.1824	2.5316
	51-60	7.3000	-	3.2429	3.2093
	61-70	.0000	-	.2200	.6286
	>70	.0000	.0000	.5000	.7071
Anomic	21-30	7.3000	-	7.5000	.9083
	31-40	-	-	6.7500	3.1225
	41-50	6.3000	-	6.9000	1.9013
	51-60	8.9000	-	5.9333	2.8148
	61-70	7.6000	-	7.8500	1.0149
	>70	8.8000	-	6.4000	1.9799
Wernicke's	41-50	.2000	-	3.0143	2.6131
	51-60	.0000	-	4.4500	1.7678
	61-70	-	-	2.8500	.9192
	>70	-	-	.2000	.2828
Conduction	21-30	8.6000	-	5.6000	-
	31-40	-	-	4.7000	.4243
	51-60	8.1000	-	6.4000	1.3856
	61-70	-	-	6.6000	-
Global	31-40	.0000	-	.2750	.4559
	41-50	.0000	.0000	3.750	.1061
	51-60	-	-	4.000	8.944
	61-70	.0000	.0000	.7667	1.3279
	>70	-	-	.0000	-

Table 18 clearly shows that in normal subjects, males & females scored higher across all age-groups. Anomic aphasic performed below normal subjects. In Conduction aphasics females scored higher compared to males. Wernicke's, Broca's and Global performed poorly when compared to all groups.

In the descending order of repetition, the client subject groups can be placed as Normal subjects, Anomic, Conduction (F>M), Wernicke's, Broca's and Global aphasics.

The present study supports the findings of Susan & Harold (1985) who reported minimal word-production difficulty in anomic aphasia relative to other aphasia syndromes such as Wernicke's, Broca's, and Conduction aphasias.

(f) Aphasia quotient (A.Q.):

The table 19 shows the mean and SD of A.Q. with respect to Client groups, Age and Gender.

Table 19: Mean and S.D. of Aphasia Quotient (A.Q.) with respect to Client-groups, Age and Gender:

Clients/Subject-groups	Age-groups (in Years)	Gender			
		Females(F)		Males(M)	
		Mean	SD	Mean	SD
Normal	21-30	972200	31831	-	-
	31-40	99.8000	.2828	98.6000	1.9799
	41-50	99.5000	-	97.0750	21531
	51-60	100.0000	-	97.7000	1.5684
	61-70	89.6500	9.4045	96.8750	3.1117
	>70	99.4000	-	94.9667	5.3519
Broca's	21-30	11.0000	-	26.2143	22.2251
	31-40	9.6000	-	17.8333	6.0451
	41-50	26.9000	12.8693	22.0059	16.1722
	51-60	60.2000	-	38.5357	18.2677
	61-70	13.2000	-	16.6800	6.1932
	>70	18.6500	1,6263	18.7500	4.5962
Anomic	21-30	85.8000	-	80.7800	8.9701
	31-40	-	-	81.2750	8.2046
	41-50	87.8000	-	81.9800	7.5929
	51-60	87.4000	-	79.0333	11.8112
	61-70	78.5000	-	83.3500	6.5327
	>70	88.2000	-	79.5500	14.2128
Wemicke's	41-50	36.3000	-	37.6686	19.6114
	51-60	12.2000	-	57.2500	7.9903
	61-70	-	-	40.6000	8.7681
	>70	-	-	32.0000	31.1127
Conduction	21-30	81.5000	-	66.7000	-
	31-40	-	-	50.6000	28.8500
	51-60	81.8000	-	67.1000	3.7041
	61-70	-	-	57.7000	-
Global	31-40	6.0000	-	6.8938	5.2478
	41-50	3.4000	2.5245	7.6125	3.7757
	51-60	-	-	5.6800	4.4438
	61-70	3.1500	4.0305	8.0333	3786
	>70	-	-	.2000	-

Table 19 shows that normal subjects scored higher in all age-groups and no sex difference were found. In normal subjects, younger age-groups (21-60 years) scored higher than older age-groups.

Among anomic aphasics, both males and females scored higher across all age-groups. In Conduction aphasics, females scored higher than males. Wernicke's and Broca's aphasics scored below Conduction aphasics. Global aphasics performed poorly among all age-groups.

In the descending order of A.Q., the client groups can be placed as Anomic, Conduction (F>M), Wernicke's, Broca's and Global aphasics.

Mean age, Mean and Range of A.Q. in Normal and different aphasic clients:

The Table 19 (a) shows mean age, Mean and Range of A.Q. in normal subjects:

Client groups	Mean Age	A.Q.	
		Range	Mean
Normal Clients (N=30)	48 yrs	88.80-100.00	94.40

The Table 19 (b) shows mean age, Mean and Range of A.Q. in different aphasic subjects:

Aphasics (N=150)		Age	A.Q.	
SI No.	Types of Aphasia	Mean Age	Range	Mean
1.	Broca's	50.5 yrs	9.60-68.80	39.20
2.	Transcortical motor	25yrs	—	71.80
3.	Global	55 yrs	0.00-16.80	8.40
4.	Wemicke's	58.5 yrs	10.00-61.00	35.50
5.	Transcortical sensory	60 yrs	—	8180
6.	Anomic	50.5yrs	66.40-90.40	78.40
7.	Conduction	44 yrs	30.20-81.80	5600

As the tables 19 (a, & b) show, mean age and the A.Q. range are highly variable. The normal subjects had the highest A.Q. while Global aphasics had the lowest A.Q.

Performance of Client-groups, Age, Gender and their interaction:

The table 20 shows the effects of Client groups, Age and Gender and their interaction.

Table 20: Effect of Client- groups, Age, Gender and their interaction:

Factors & Degree of freedom(df)	**Parameters (D.V.)**	F	P
Clients/Subject-groups(5, 124)	Information content	75.287	.000
	Fluency	135.327	.000
	Comprehension	54.978	.000
	Repetition	153.719	.000
	Naming	71.845	.000
	A.Q.	153.274	.000
Age (5, 124)	Information content	1.700	.139
	Fluency	.986	.429
	Comprehension	.617	.687
	Repetition	1.401	.229
	Naming	1.206	.310
	A.Q.	1.505	.193
Gender (1, 124)	Information content	.065	.799
	Fluency	.789	.376
	Comprehension	.141	.708
	Repetition	.034	.855
	Naming	.032	.857
	A.Q.	.145	.704
Client groups * Age (20, 124)	Information content	1.169	.292
	Fluency	.916	.568
	Comprehension	.590	.914
	Repetition	1.204	.262
	Naming	.978	.493
	A.Q.	1.010	.456
Client groups * Gender (5, 124)	Information content	.852	.516
	Fluency	1.312	.263
	Comprehension	.844	.521
	Repetition	.126	.986
	Naming	1.900	.099
	A.Q.	1.895	.100
Age* Gender (5, 124)	Information content	.289	.918
	Fluency	.374	.866
	Comprehension	1.043	.395
	Repetition	.650	.662
	Naming	.440	.820
	A.Q.	.594	.704
Client groups * Age* Gender (12,124)	Information content	.409	.958
	Fluency	1.183	.302
	Comprehension	1.300	.227
	Repetition	.266	.993
	Naming	.524	.896
	A.Q.	.737	.713

MANOVA was carried out to check the effect of client-groups, age, gender and their interaction. Results of MANOVA revealed that there was significant difference between all client/subject groups (Normal, Broca's, Anomic, Wernicke's, Conduction,

and Global aphasics) ($p<.001$) for different parameters (information content, fluency, comprehension, repetition, naming and A.Q.) whereas no differences were found between age- groups and genders. Also, no significant interaction effect between client/subject groups, age and genders at 0.05 significant levels.

The present findings in terms of significant difference between client/subject groups ($p<. 001$) in all parameters (information content, fluency, comprehension, repetition, naming and A.Q.) supported by Obler et al. (1978) and Eslinger and Damasio (1981). They reported age related etiological changes in vascular distribution, which suggested that location of vascular accident gradually moves posteriorly with age producing a greater prevalence of posterior infarcts in the older subjects.

The results of the present study contradict the similar previous study in the Indian context. Bhatnager et al. (2002) found the mean age of Indian patients with aphasia was significantly lower and also reported that similar gender related differences found in aphasia (Broca's, Wernicke's, anomic, global, conduction and transcortical) types which were more in males than females.

Duncan's post-hoc test was administered to check the pair wise differences between client/subject groups. Results revealed that in information content, significant differences ($p<.005$) were found between global, broca's and wernicke's aphasic whereas no differences ($p>.005$) existed in all other client/subject groups. In fluency, significant differences existed between normal subjects and wernicke's aphasic and no pair wise differences were found in all other client/subject groups.. In comprehension, pair wise differences were found in all client-groups except in normals and anomic aphasic. In repetition, significant pair wise differences ($p<.005$) existed in all client - groups. In naming, no pair wise difference existed in all client-groups except normal subjects and global aphasics whereas in A.Q., pair wise differences ($p<.005$) existed between all client/subject groups.

Separate analysis was carried out for each client/subject-groups with respect to age.

Performance of normal subjects on WAB-K:

The table 21 shows mean and SD of normal subjects across age along WAB-K parameters.

Table 21: Mean and S.D. of WAB-K performance on Normal subjects for different parameters with respect to age:

Parameters	**Age-groups** (in **years)**	**Mean**	SD
Information content	21-30	10.0000	.0000
	31-40	10.0000	.0000
	41-50	10.0000	.0000
	51-60	10.0000	.0000
	61-70	10.0000	.0000
	>70	10.0000	.0000
	Total	10.0000	.0000
Fluency	21-30	9.2000	1.0954
	31-40	10.0000	.0000
	41-50	9.6000	.8944
	51-60	10.0000	.0000
	61-70	8.6667	2.4221
	>70	8.7500	2.5000
	Total	9.3667	1.4967
Comprehension	21-30	9.7700	.4324
	31-40	9.8000	.4000
	41-50	9.7600	.3765
	51-60	9.8417	.3639
	61-70	9.5000	.5329
	>70	9.9375	.1250
	Total	9.7550	.3940
Repetition	21-30	9.8000	.2828
	31-40	9.8500	.1915
	41-50	9.6200	.3633
	51-60	9.2667	.5164
	61-70	9.2667	.5888
	>70	9.4250	.2872
	Total	9.5133	.4531
Naming	21-30	9.8400	8.944
	31-40	9.9500	1.000
	41-50	9.8000	.3082
	51-60	9.9333	.1033
	61-70	9.8000	.2530
	>70	9.9250	9.574
	Total	9.8700	.1822
A.Q.	21-30	97.2200	3.1831
	31-40	99.2000	1.3466
	41-50	97.5600	2.1571
	51-60	98.0833	1.6881
	61-70	94.4667	6.1171
	>70	96.0750	4.8999
	Total	97.0100	3.7513

Parameters	F (5.24)	P
Information content	-	
Fluency	.760	.587
Comprehension	.707	.624
Repetition	1.890	.133
Naming	.684	.640
A.Q.	.996	.441

One-way ANOVA was carried out to compare among age-groups in normal subjects. Results revealed that there were no significant differences ($p>.005$) between age groups in any of the parameters. Normal subjects performed similarly in all tasks across all age-groups.

Performance of Broca's aphasics on WAB-K:

The table'22 shows mean and SD of Broca's aphasics across age along WAB-K parameters.

Table 22: Mean and S.D. of WAB-K performance in Broca's aphasics for different parameters with respect to age:

Parameters	**Age-groups (in years)**	Mean	SD
Information content	21-30	1.8750	2.9490
	31-40	.2857	.4880
	41-50	1.8750	2.2814
	51-60	4.2667	3.0111
	61-70	.3636	.9244
	>70	.5000	1.0000
	Total	1.7344	2.6322
Fluency	21-30	1.0000	1.4142
	31-40	.2857	.4880
	41-50	.6316	1.3000
	51-60	2.2667	1.3345
	61-70	.2727	.6467
	>70	.5000	1.0000
	Total	.9531	1.3502
Comprehension	21-30	6.1250	1.6544
	31-40	6.6286	2.1033
	41-50	7.4763	1.6534
	51-60	7.0967	1.7608
	61-70	7.2318	1.7739
	>70	7.8000	1.5292
	Total	7.1039	1.7403
Repetition	21-30	1.3750	2.3033
	31-40	.5000	1.2793
	41-50	.5158	1.3607
	51-60	2.8467	2.4486
	61-70	.1182	.2316
	>70	.3000	.2582
	Total	1.0859	1.9251
Naming	21-30	1.7875	2.9696
	31-40	.6286	1.6630
	41-50	1.3737	2.6505
	51-60	3.5133	3.2652
	61-70	.2000	.6000
	>70	.2500	.5000
	Total	1.5734	2.6725
A.Q.	21-30	24.3125	21.2679
	31-40	16.6571	6.3353
	41-50	22.5211	15.6225
	51-60	39.9800	18.4706
	61-70	16.3636	5.9683
	>70	18.7000	2.8154
	Total	24.8984	16.8602

Parameters	F (5, 58)	p
Information content	5.595	.000
Fluency	5.489	.000
Comprehension	.919	.475
Repetition	4.819	.001
Naming	2.964	.019
A.Q.	4.434	.002

One-way ANOVA was carried out to compare the performance in Broca's aphasic across all age groups. Results revealed that significant difference ($p<.005$) existed between age-groups for different parameters except in comprehension tasks.

Duncan's post-hoc test was administered to check the pair wise differences between age-groups. Results revealed that in information content and fluency, there was significant difference existed only in 51-60 years and no significant difference existed within other age-groups. Repetition, naming and A.Q. exhibited no pair wise differences across different age-groups except in comprehension.

The results of the present study supports the finding of Trudeau, Goulet, Joanetta (1993) who reported that Broca's group was significantly different with respect to distribution of age. Caramazza and Zurif (1976) also reported that Broca's aphasics had difficulty comprehending sentences when the crucial cues for comprehension were purely syntactic in terms of grammatical markers and word order.

Crary & Kertesz's (1988) results contradict the present study with the finding that some patients such as severe Broca's aphasia changes in the type of expressive error on naming and repetition tasks without any change of A.Q. which suggests that patient's communication ability or language errors changes over time without change in overall severity of aphasia (A.Q.).

Performance of Anomic aphasics on WAB-K:

The table 23 shows mean and SD of Anomic aphasics across age along WAB-K parameters

Table 23: Mean and S.D. of WAB-K performance in Anomic aphasics for the different parameters with respect to age:

Parameters	**Age-groups (in years)**	**Mean**	SD
Information content	21-30	9.0000	1.5492
	31-40	9.0000	.8165
	41-50	8.6667	1.0328
	51-60	9.0000	.8165
	61-70	8.4000	1.6733
	>70	9.0000	1.0000
	Total	8.8214	1.1564
Fluency	21-30	7.0000	2.3664
	31-40	6.7500	2.0616
	41-50	7.6667	1.8619
	51-60	7.7500	1.5000
	61-70	7.2000	2.1679
	>70	7.3333	2.0817
	Total	7.2857	1.8828
Comprehension	21-30	9.4917	.4862
	31-40	9.2625	.9724
	41-50	9.1250	.6259
	51-60	9.0875	1.1821
	61-70	9.3100	1.3306
	>70	9.4167	.6007
	Total	9.2821	.8299
Repetition	21-30	7.8500	.1761
	31-40	8.8750	1.0046
	41-50	9.2167	.8159
	51-60	8.0500	.6658
	61-70	8.4800	.8106
	>70	8.2667	.8737
	Total	8.4750	.8418
Naming	21-30	7.4667	.8165
	31-40	6.7500	3.1225
	41-50	6.8000	1.7181
	51-60	6.6750	2.7354
	61-70	7.8000	.8860
	>70	7.2000	1.9698
	Total	7.1393	1.7815
A.Q.	21-30	81.6167	8.2807
	31-40	81.2750	8.2046
	41-50	82.9500	7.1949
	51-60	81.1250	10.5120
	61-70	82.3800	6.0590
	>70	82.4333	11.2224

Parameters	F(5,22)	P
Information content	.201	.959
Fluency	.163	.974
Comprehension	.152	.977
Repetition	2.618	.053
Naming	.272	.923
A.Q.	.037	.999

One-way ANOVA was carried out to compare the performance among anomic aphasics across different age-groups. Results revealed that there was no significant difference ($p>.005$) between the age groups in any parameter. Anomic aphasics performed similar tasks in all age groups.

Kim & Duk (2004) in their Korean version of WAB found that age to be one of the influential variables in WAB performance but the current study did not find the same. One possible reason could be that present study was a cross sectional study. AQ also didn't alter with respect to age.

Performance of Wernicke's aphasics on K-WAB:

The table 24 shows mean and SD of Wemicke's aphasias across age along WAB-K parameters.

Table 24: Mean and S.D. of WAB-K performance in Wernicke's aphasias for the different parameters with respect to age:

Parameters	**Age-groups (in years)**	**Mean**	SD
Infohnation content	41-50	4.0000	3.2514
	51-60	5.3333	2.5166
	61-70	3.0000	.0000
	>70	5.0000	7.0711
	Total	4.2667	3.2175
Fluency	41-50	5.2500	1.3887
	51-60	6.6667	1.5275
	61-70	5.5000	2.1213
	>70	6.5000	2.1213
	Total	5.7333	1.5337
Comprehension	41-50	4.1113	2.9175
	51-60	4.8167	2.6647
	61-70	5.3500	2.1920
	>70	2.8000	3.9598
	Total	4.2427	2.6993
Repetition	41-50	2.7250	2.3341
	51-60	3.7333	.9713
	61-70	2.7250	3.3941
	>70	1.5000	2.1213
	Total	2.8800	2.1258
Naming	41-50	2.6625	2.6159
	51-60	2.9667	2.8572
	61-70	2.8500	.9192
	>70	.2000	.2828
	Total	2.4200	2.3413
A.Q.	41-50	37.4975	18.1631
	51-60	42.2333	26.6162
	61-70	40.6000	8.7681
	>70	32.0000	31.1127
	Total	38.1253	18.7313

Parameters	**F(3.11)**	**P**
Information content	.222	**.879**
Fluency	**.778**	.530
Comprehension	**.301**	**.824**
Repetition	.473	**.708**
Naming	**.652**	**.598**
A.Q.	**.108**	.953

One-way ANOVA was carried out to compare the performance in wernicke's aphasia across different age groups. Results showed that there was no significant difference (p>.005) between age groups in different parameters.

Trudeau, Goulet, Joanetta (1993) contradict the present study and they reported that Wernicke's aphasia was significantly different with respect to distributions of age. Brown & Jaffe (1975) also contradict the present study who reported that language areas go through the functional revolution with age.

Performance of Conduction aphasics on WAB-K:

The table 25 shows mean and SD of Conduction aphasics across age along WAB-K parameters.

Table 25: Mean and S.D. of WAB-K performance in conduction aphasia for the different parameters with respect to age:

Parameters	**Age-groups (in years)**	**Mean**	SD
Information content	21-30	8.0000	1.4142
	31-40	9.0000	1.4142
	51-60	7.7500	1.2583
	61-70	5.0000	-
	Total	7.7778	1.5635
Fluency	21-30	8.0000	1.4142
	31-40	7.5000	3.5355
	51-60	7.5000	1.7321
	61-70	5.0000	-
	Total	7.3333	1.9365
Comprehension	21-30	8.3500	.9899
	31-40	8.0000	.9899
	51-60	8.2875	1.2957
	61-70	8.2500	-
	Total	8.2333	.9451
Repetition	21-30	5.6000	.7071
	31-40	3.4500	.9192
	51-60	5.0250	1.0782
	61-70	4.0000	-
	Total	4.6889	1.1450
Naming	21-30	7.1000	2.1213
	31-40	4.7000	.4243
	51-60	6.8250	1.4151
	61-70	6.6000	-
	Total	6.3889	1.5087
A.Q.	21-30	74.1000	10.4652
	31-40	50.6000	28.8500
	51-60	70.7750	7.9479
	61-70	57.7000	-
	Total	65.5778	15.3923

Parameters	**F(3,5)**	p
Information content	2.058	.225
Fluency	.461	.722
Comprehension	.035	.990
Repetition	1.951	.240
Naming	1.173	.407
A.Q.	1.126	.422

Conduction aphasia is distinguished by very poor repetition with relatively fluent but paraphasic speech and good comprehension. This group has been inconsistently reported in literature due to its resemblance to other aphasics and repetition has to be tested specifically to identify them.

One-way ANOVA was carried out to compare the performance in conduction aphasia across all age groups. Results reveal that there was no significant difference ($p>.005$) between the different age groups in any of the parameters. But, Bhatnager et al. (2002) contradict the present study and they found that the mean age of Indian patients with aphasia was significantly lower. Meceli et al. (1981) also contradict the present study who reported that greater frequency of fluent (conduction) aphasia in elderly subjects due to results from integration of brain pathology with normal aging-induced cognitive changes.

Performance of Global aphasics on WAB-K:
The table 26 shows mean and SD of Global aphasics across age along WAB-K parameters.

Table 26: Mean and S.D. of WAB-K performance in Global aphasia for the different parameters with respect to age:

Parameters	Age-groups (in years)	Mean	SD
Information content	31-40	.4444	1.0138
	41-50	.5833	1.2401
	51-60	.2000	.4472
	61-70	.4000	.8944
	>70	.0000	-
	Total	.4375	.9817
Fluency	31-40	.2222	.6667
	41-50	.1667	.3892
	51-60	.4000	.5477
	61-70	.4000	.5477
	>70	.0000	-
	Total	.2500	.5080
Comprehension	31-40	2.4639	1.6180
	41-50	2.2958	1.3375
	51-60	2.0600	1.9037
	61-70	1.6600	1.2646
	>70	.1000	-
	Total	2.1383	1.4821
Repetition	31-40	2.222	6.667
	41-50	3.333	.1155
	51-60	.1400	.3130
	61-70	.1200	.1789
	>70	.0000	-
	Total	5.938	.1583
Naming	31-40	.2444	.4362
	41-50	2.500	8.660
	51-60	4.000	8.944
	61-70	.4600	1.0286
	>70	.0000	-
	Total	.1563	.4649
A.Q.	31-40	6.7944	4.9179
	41-50	6.2083	3.8874
	51-60	5.6800	4.4438
	61-70	6.0800	3.3596
	>70	.2000	-
	Total	6.0828	4.1114

Parameters	F(4,27)	P
Information content	**.171**	.952
Fluency	,.335	.852
Comprehension	.722	.584
Repetition	.721	.585
Naming	.955	**.448**
A.Q.	.560	.693

Global aphasia is the most severe form of aphasia. These patients are severely affected in all language functions. Their spontaneous speech is nonfluent, lack information content, poor comprehension, repetition and naming.

One-way ANOVA was carried out to compare the performance in Global aphasics across all age groups. Results reveal that there was no significant difference ($p>.005$) between the different age groups in any of the parameters. The findings of Basso et al. (1980) contradict the present study that larger extension of lesion associated with global aphasia may be incompatible with survival with old patients, thus causing a prevalence of Global aphasias in younger age itself.

CHAPTER V

SUMMARY ANDCONCLUSION

In the present investigation, an attempt was made to standardize a test in Kannada based on the principles of Western Aphasia Battery (Kertesz, 1979)and to assess the language ability in terms of Aphasia Quotient (A.Q.) in adults with and without language pathology.

The study consisted of two stages:

(1) Test description
(2) Administration of the test

(1) Test Description:

The following language parameters identified as being important for an aphasia test, are described:

1. Description of Spontaneous or Conversational speech
2. A measure of information value.
3. A measure of fluency
4. Auditory comprehension
5. Repetition
6. Naming

The present test had subtests which are based on similar lines as that of WAB (Kertesz, 1979). Under each subtest, materials were mainly translation of WAB - English (Kertesz, 1979) but some materials were modified to suit the linguistic principles of Kannada and the Indian cultural context (Appendix-1).

(2) Administration of the Test:

Subjects

The present study was a retrospective study which aimed to establish the clinical data on the Kannada Version of Western Aphasia Battery (WAB). One hundred and fifty clients with Kannada as mother tongue (monolingual/bilingual/multilingual) with different types of aphasia participated in the study. In order to review the available records, the following procedures were used. The available clinical data was classified into 7 categories of aphasia: (1) Global aphasia (2) Broca's aphasia (3) Transcortical

Motor aphasia (4) Wernicke's aphasia (5) Transcortical Sensory aphasia (6) Conduction aphasia and (7) Anomic aphasia. The present study also aimed to establish normative data on a sample for Kannada adaptation of WAB. Kannada version of WAB was administered to 30 normal subjects who were native speakers of Kannada with or without the knowledge of English, Hindi or any other language and were able to read and write Kannada. All these subjects also had formal education in English. The scores (AQ) obtained by the subjects on K-WAB and from aphasic case files (administered previously by SLP) were considered for interpretation (see Appendix 2). Since, there were only one participant each in TMA (Transcortical motor aphasia) & TSA (Transcortical sensory aphasia) categories, these two categories were not included for statistical analysis.

Results indicated the following:

> Normal and aphasic clients showed no gender differences on different parameters of Western Aphasia Battery-Kannada.

> Among normal clients, literates performed better in comprehension and naming tasks than illiterates. Also results showed similar performance for literates and illiterates in other parameters. Among aphasics, literates performed better on all parameters compared to illiterates.

> Normal clients showed similar performance across language contexts (mono/bi/multilingualism) for all parameters. Aphasics showed significant variation in their performance across language context for different parameters. Results revealed that in information content, fluency and repetition tasks, multi lingual subjects performed better than monolingual subjects whereas in comprehension, bilingual performed better than multilingual and followed by monolingual. In naming and A.Q., multilingual performed better than bilinguals and monolinguals.

> Aphasics as a group did show a significant variation of paraphasic errors for different parameters.

> Normal clients showed no age-differences on different parameters.

> Younger aphasic clients (21-40 years) performed better compared to older aphasic clients (41->70 years) on different parameters.

> In Broca's aphasia, there was a significant variation on different parameters except comprehension task across age-groups.

> Anomic, Wernicke's, conduction and global aphasics performed similar on different parameters across age-groups.

> High variability was seen on all different parameters. The performance was best in Normal clients, followed by Anomic, Conduction, Wernickes, Brocas, and Global aphasics, in that order of A.Q. on WAB-K.

Implications of the results of the study:

• It would provide an objective assessment "tool for aphasics in Kannada context.

• The WAB (Kannada Version) would yield culture specific norms pertaining to the Indian monolinguals and bi/multilinguals, theses norms can be used for comparative purposes with western norms.

••• It would add to the clinical utility of the standardized tests providing for norms.

••• It will have ubiquitous parity in research and rehabilitative efforts.

Limitations of the study:

S The present study considered only the Kannada Version of WAB and did not consider other languages such as Hindi and English Version of WAB.

S There were unequal numbers of aphasic clients in different aphasic groups.

Suggestions for Further Research:

• A comparison could be made between the present/similar sample of monolingual and bilingual (Kannada-English) aphasics, to look at their performance on English WAB in addition to same in Kannada.

• Further studies should consider equal no. of age- and gender-matched clients in different aphasic groups which would give comprehensive and more details in different languages.

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APPENDIX I

WESTERN APHASIA BATTERY

TEST BOOKLET

(KANNADA VERSION)

DEPARTMENT OF SPEECH-LANGUAGE PATHOLOGY

ALL INDIA INSTITUTE OF SPEECH & HEARING

Manasagangothri, Mysore- 570006

PATIENT DATA

Name Age Birthdate

Address

Languages

Handedness Writing Throwing **Gutting** **Drawing** **Spoon** **Brush**

Education (Number of Standards)

Occupation

I'rcscnl Illness

Signs Severe Hemiplegia Moderate , Mild Side Recovered Hemianopia Sensory Loss

Investigations: Date Size *Lesion* Side Location

FE.G.

Isotope Sean

C. T. Scan

Arteriograns

Operative Date

Autopsy Data

Date File Number

Institution

Examiner

Referred By

l. 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 pnge 3.

1. ನೀವು ಇವತ್ತು ಹೇಗಿದ್ದೀರಿ ?

2. ನೀವು ಇಲ್ಲಿಗೆ ಮೊದಲು ಬಂದಿದ್ದೀರಾ ? ಅಥವಾ ನಾನು ನಿಮ್ಮನ್ನು ಹಿಂದೆ ಪರೀಕ್ಷಿಸಿದೆನಾ ?

3. ನಿಮ್ಮ ಹೆಸರೇನು ?

4. ನಿಮ್ಮ ವಿಳಾಸವೇನು ?

5. ನೀವು ಏನು ಕೆಲಸ ಮಾಡುತ್ತಿದ್ದಿರಿ ?

6. ನೀವು ಇಲ್ಲಿಗೆ ಏಕೆ ಬಂದಿರುವಿರಿ ? ಅಥವಾ ನಿಮಗೆ ಏನು ತೊಂದರೆ ಹೇಳಿ ?

7. ಈ ಚಿತ್ರದಲ್ಲಿ ಏನು ನಡೆಯುತ್ತಿದೆ ಎಂಬುದನ್ನು ಹೇಳಿ.

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 Held. 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, c.p., first name or last, name only.

(2) Correct response to any-I 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 he 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 Piraohasias

(0) No words or short, meaningless utterances.

O Recurrent stcreotypic 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 1 don't know".

(5) Often telegraphic but more fluent speech with some grammatical organization. Paraphasis 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. . jj

(R) Circumlocutory, fluent speech. Marked word finding difficulty. Verbal puraphasias. 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 articulalory errors.

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

-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, I hen eye closure for "yes" should be established. The instructions should be repented, if necessary, during (he lest. Reinforce the patient when •lie or she gels inlo the .set of answering as requested, but avoid nodding or commenting on specific items! If the patient self-corrects, the hist answer is scored. If a patient gives an ambiguous or coufabulatory response, repeat the instructions and the question and score accordingly. If (he response is still ambiguous, score 0. Score 3 points for each correct answer. Record response in the appropriate column : veibal, gestural, or eye blink.

	Verbal	Gestural	Eye Blink
1. ನಿಮ್ಮ ಹೆಸರು ಕುಪ್ಪಸ್ವಾಮಿ ಎಂದೇ ? ("no" should be correct)			
2. ನಿಮ್ಮ ಹೆಸರು ರಾಮಕೃಷ್ಣ ಎಂದೇ ? ("no" should be correct)			
3. ನಿಮ್ಮ ಹೆಸರು (ನಿಜವಾದ ಹೆಸರು) ಎಂದೇ ? (real name)			
4. ನೀವು ಬೆಂಗಳೂರಿನಲ್ಲಿ ವಾಸಿಸುತ್ತೀರಾ ? ("no" should be correct)			
5. ನೀವು (ನಿಜವಾದ ಊರು) ವಾಸಿಸುತ್ತೀರಾ ? (real residence)			
6. ನೀವು ಕಲಕತ್ತೆಯಲ್ಲಿ ವಾಸಿಸುತ್ತೀರಾ ? ("no" should be correct)			
7. ನೀವು ಗಂಡಸರೇ/ಹೆಂಗಸರೇ ? ("yes" should be correct)			
8. ನೀವು ವೈದ್ಯರೇ ? ("no" should be correct)			
9. ನಾನು ಗಂಡಸೇ/ಹೆಂಗಸೇ ? ("yes" should be correct)			
10. ಈ ಕೋಣೆಯಲ್ಲಿ ದೀಪ ಹತ್ತಿದೆಯೇ ? ("yes" should be correct)			
11. ಬಾಗಿಲು ಮುಚ್ಚಿದೆಯೇ ? ("yes" should be correct)			
12. ಇದು ಫಲಹಾರ ಮಂದಿರವೇ ?			
13. ಇದು ಆಸ್ಪತ್ರೆಯೇ ?			
14. ನೀವು ತೊಟ್ಟಿರುವ ಬಟ್ಟೆ ಕೆಂಪು ಬಣ್ಣದ್ದೇ ? ("no" should be correct)			
15. ಕಾಗದಕ್ಕೆ ಬೆಂಕಿ ಹತ್ತಿಕೊಳ್ಳುತ್ತದೆಯೇ ?			
16. ಮಾರ್ಚ್ ತಿಂಗಳು ಜೂನ್ ತಿಂಗಳಿಗಿಂತ ಮೊದಲು ಬರುತ್ತದೆಯೇ ?			
17. ನೀವು ಬಾಳೇಹಣ್ಣನ್ನು ಸಿಪ್ಪೆ ಸುಲಿಯುವ ಮೊದಲೇ ತಿನ್ನುತ್ತೀರಾ ?			
18. ಜುಲೈ ತಿಂಗಳಲ್ಲಿ ಮಳೆ ಬರುತ್ತದೆಯೇ ?			
19. ಕುದುರೆ ನಾಯಿಗಿಂತ ದೊಡ್ಡದೇ ?			
20. ಕೊಡಲಿಯಿಂದ ಮಲ್ಲನ್ನು ಕತ್ತರಿಸುತ್ತಾರೆಯೇ ?			

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, nml colors. Ask the patient to point to the furniture, his or her body parts, nod lingers, in the.order listed. Ask the patient to point to each item, by say ing, "Point to the———-—, or, "Show me the———•———." One repetition of each command is allowed. ^ H I lie 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
ಕಪ್	ಬೆಂಕಿಕಡ್ಡಿ	ಚೌಕ	ಜ	5
ಬೆಂಕಿಕಡ್ಡಿ	ಕಪ್	ತ್ರಿಕೋಣ	ಪ	61
ಪೆನ್ಸಿಲ್	ಬಾಚಣಿಗೆ	ಗುಂಡು	ಬ	500
ಹೂವು	ಚಾಕು	ಬಾಣ	ಕ	1867
ಬಾಚಣಿಗೆ	ಪೆನ್ಸಿಲ್	ಕ್ರಾಸ್ (ಗಂಟು)	ಮ	32
ಚಾಕು	ಹೂವು	ಅರ್ಧಚಂದ್ರ	ದ	5000

Colors	Furniture	Body Parts	Fingers	Right–Left
ನೀಲಿ	ಕಿಟಕಿ	ಕಿವಿ	ಹೆಬ್ಬೆರಳು	ಬಲಬಾಜು
ಕಂದು	ಕುರ್ಚಿ	ಮೂಗು	ಉಂಗುರದ ಬೆರಳು	ಎಡ ಮೊಣಕಾಲು
ಕೆಂಪು	ಮೇಜು	ಕಣ್ಣು	ತೋರುಬೆರಳು	ಎಡ ಹಿಮ್ಮಡಿ
ಹಸಿರು	ದೀಪ	ಎದೆ	ಕಿರು ಬೆರಳು	ಬಲ ತೊಡೆ
ಹಳದಿ	ಬಾಗಿಲು	ಕತ್ತು	ಮಧ್ಯ ಬೆರಳು	ಎಡ ಪೊಣಕೈ
ಕಪ್ಪು	ಪಾರಸಿ	ಹಣೆ	ಬಲ ಕಿವಿ	ಬಲ ಕೈ

Maximum Score 60
Patient's Score———

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 science. On (he table before the patient line up ihe pen, comb, and book in this respective order and label each, verbally : "See the pen, the comb, and the book V I will ask you to point to them and do things with them, just as I say. Are you ready?" If the patient docs not seem to understand the task, point with the comb to the pen to demonstrate, and start again.

	Scores
ಕೈಯೆತ್ತಿ	2
ಕಣ್ಣು ಮುಚ್ಚಿ	2
ಕುರ್ಚಿ ತೋರಿಸಿ	2
ಕಿಟಕಿ[2] ತೋರಿಸಿ ಆಮೇಲೆ ಬಾಗಿಲು[2] ತೋರಿಸಿ	4
ಪೆನ್ನು[2] ಮತ್ತು ಪುಸ್ತಕ[2] ತೋರಿಸಿ	4
ಮೂರನೆಂದ[4] ಪುಸ್ತಕವನ್ನು[4] ತೋರಿಸಿ	8
೪ ಪೆನ್ನನ್ನು[4] ಪುಸ್ತಕದಿಂದ[4] ತೋರಿಸಿ	8
ಬಾಚಣಿಗೆಯನ್ನು[4] ಪೆನ್ನಿಂದ[4] ತೋರಿಸಿ	8
೪ ಪುಸ್ತಕದಿಂದ[4] ಬಾಚಣಿಗೆಯನ್ನು[4] ತೋರಿಸಿ	8
೧೪ ಪೆನ್ನನ್ನು[4] ಪುಸ್ತಕದ[6] ಮೇಲಿಟ್ಟು ನಂತರ ಅದನ್ನು[4] ನನಗೆ ಕೊಡಿ	14
೧೫ ಬಾಚಣಿಗೆಯನ್ನು[5] ಪೆನ್ನಿನ[5] ಪಕ್ಕ ಇಟ್ಟು ಪುಸ್ತಕವನ್ನು[5] ತಿರುಗಿಸಿ[5]	20

Maximum Score 80
Patient's Score———

111. 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, lake I point off for errors in order of word sequence or for each literal paraphasia (phonemic errors).

		Maximum Score
1.	ಕೈ	2
2	ಮೂಗು	2
3.	ಹಾಸಿಗೆ	2
4.	ಕಿಟಕಿ	2
5.	ಕತ್ತಲೆ	2
6.	ಕಾಮನ ಬಿಲ್ಲು	4
7.	ನೀಲಮತ್ತೈದು	4
8.	ತೀಕಡ ತೊಂಬತ್ತೈದು	6
9.	ಐವತ್ತೈದುವರೆ ಕಿಲೋಮೀಟರ್	10
10.	ರೈತನು ಹೊಲ ಉಳುತ್ತಿದ್ದಾನೆ	8
11	ಅವನು ಒಂತಿರುಗಿ ಬರುವುದಿಲ್ಲ	10
12.	ಹೂಳೆಯುವುದೆಲ್ಲಾ ಬಂಗಾರವಲ್ಲ	10
13.	ಮೊದಲನೆಯ ಭಾರತೀಯ ನೌಕಾ ಪಡೆ	8
14.	ಆದರೆ ಬುದರ ಆಥವಾ ಮತ್ತು ಇಲ್ಲ	10
15.	ನಸ್ಸ ಗಾಡಿಯನ್ನು ಐದು ಡಜನ್ ಬಿಳಿ ಗೋದಿಯ ಮೂಟೆಗಳಿಂದ ತುಂಬಿ	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 artieulutory error, 2 points for a recognizable phonemic paniphnsia, and t point if a phonemic or tactile cue is required.

Stimulus	Response	Taclilc Cue	Phonemic Cue	Score
ದುಡ್ಡು : ಪೈಸೆ				
ಬಾಲ್ (ಚೆಂಡು)				
ಬಾಕು				
ಕಪ್				
ಪಿನ್				
ಕನ್ನಡಿ				
ಟೂತ್‌ಬ್ರುಷ್				
ನಳ್ಳಿಕ				
ಬೀಗ				
ಪೆನ್ಸಿಲ್				
ಕತ್ತರಿ				
ಬೀಗದಕ್ಕಿ				
ಸೂಜಿ				
ಬಳೆ				
ಬಾಚಣಿಗೆ				
ಕೈಗಡಿಯಾರ				
ಚಮಚ				
ಹೂವು				
ತಟ್ಟೆ				
ಬೆಂಕಡ್ಡಿ				

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 lit,era| 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 I point for phonemic paraphasius. Accept reasonable alternatives, e.g., sugar is....(fattening) but not grass is,., (brown).

1. ಹುಲ್ಲಿನ ಬಣ್ಣ ———— (ಹಸಿರು)
2. ಸಕ್ಕರೆಯು ———— ಇದೆ (ಸಿಹಿ ಅಥವಾ ಬಿಳಿ)
3. ಗುಲಾಬಿ ಕೆಂಪು, ಮಲ್ಲಿಗೆ ———— (ಬಿಳಿ)
4. ಅವರು ನಾಯಿ ———— ಗಳ ತರಹ ಕಚ್ಚಾಡಿದರು (ಬೆಕ್ಕು)
5. ಭಾರತದ ಸ್ವಾತಂತ್ರ್ಯ ದಿನವನ್ನು ———— ತಿಂಗಳಿನಲ್ಲಿ ಆಚರಿಸುತ್ತಾರೆ (ಆಗಸ್ಟ್)

Maximum Score 10
Patient's Score———

D. Responsive Speech

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

1. ನೀವು ಯಾವುದರಿಂದ ಬರೆಯುತ್ತೀರಾ ? (ಪೆನ್ : ಪೆನ್ಸಿಲ್)
2. ಹಾಲು ಯಾವ ಬಣ್ಣ ? (ಬಿಳಿ)
3. ಒಂದು ವಾರದಲ್ಲಿ ಎಷ್ಟು ದಿನಗಳಿವೆ ? (ಏಳು)
4. ವೈದ್ಯರು ಎಲ್ಲಿ ಕೆಲಸ ಮಾಡುತ್ತಾರೆ ? (ಆಸ್ಪತ್ರೆ)
5. ಆಯಿ : ಸ್ಟಾಂಪ್ ಎಲ್ಲಿ ದೊರೆಯುತ್ತದೆ ? (ಆಯಿ ಕಛೇರಿ : ಪೋಸ್ಟ್ ಆಫೀಸ್)

Maximum Score 10
Patient's Score———

APPENDIX II

WAB - KANNADA : MASTER DATA SHEET

	groups	actualag	age	gender	educatio	languag	paraphas	infocont	fluency	compre	repetiti	namin	aq
1	1	22.00	1	2	1	1	2	10.00	8.00	9.95	10.00	9.80	95.50
2	1	23.00	1	2	1	1	2	10.00	10.00	10.00	9.60	10.00	99.20
3	1	24.00	1	2	1	1	2	10.00	10.00	9.90	10.00	9.80	99.40
4	1	27.00	1	2	1	2	2	10.00	10.00	10.00	10.00	9.80	99.60
5	1	28.00	1	2	2	1	2	10.00	8.00	9.00	9.40	9.80	92.40
6	1	32.00	2	2	1	1	2	10.00	10.00	10.00	9.80	10.00	99.60
7	1	32.00	2	2	1	3	2	10.00	10.00	10.00	10.00	10.00	100.00
8	1	33.00	2	1	1	2	2	10.00	10.00	10.00	10.00	10.00	100.00
9	1	35.00	2	1	1	1	2	10.00	10.00	9.20	9.60	9.80	97.20
10	1	41.00	3	1	1	2	2	10.00	10.00	10.00	9.80	10.00	99.60
11	1	41.00	3	1	2	1	2	10.00	8.00	9.80	10.00	9.70	95.00
12	1	48.00	3	1	2	2	2	10.00	10.00	9.10	9.40	9.30	95.60
13	1	48.00	3	1	2	1	2	10.00	10.00	9.95	9.10	10.00	98.10
14	1	50.00	3	2	1	3	2	10.00	10.00	9.95	9.80	10.00	99.50
15	1	53.00	4	2	1	2	2	10.00	10.00	10.00	10.00	10.00	100.00
16	1	54.00	4	1	1	3	2	10.00	10.00	9.95	9.40	10.00	98.70
17	1	56.00	4	1	1	3	2	10.00	10.00	10.00	8.60	9.80	96.80
18	1	57.00	4	1	2	1	2	10.00	10.00	9.10	8.80	9.80	95.40
19	1	57.00	4	1	1	2	2	10.00	10.00	10.00	9.20	10.00	98.40
20	1	58.00	4	1	1	3	2	10.00	10.00	10.00	9.60	10.00	99.20
21	1	62.00	5	2	2	2	2	10.00	10.00	8.95	9.60	9.60	96.30
22	1	65.00	5	1	1	2	2	10.00	8.00	9.95	9.20	10.00	94.30
23	1	67.00	5	1	1	3	2	10.00	10.00	9.95	9.60	10.00	99.10
24	1	68.00	5	1	2	1	2	10.00	10.00	8.85	8.80	9.40	94.10
25	1	68.00	5	1	1	1	2	10.00	10.00	10.00	10.00	10.00	100.00
26	1	69.00	5	2	1	2	2	10.00	4.00	9.30	8.40	9.80	83.00
27	1	72.00	6	2	2	2	2	10.00	10.00	10.00	9.80	9.90	99.40
28	1	72.00	6	1	1	2	2	10.00	10.00	10.00	9.40	9.80	98.40
29	1	73.00	6	1	1	1	2	10.00	10.00	9.75	9.10	10.00	97.70
30	1	74.00	6	1	1	1	2	10.00	5.00	10.00	9.40	10.00	88.80
31	2	21.00	1	2	2	1	2	.00	.00	5.50	.00	.00	11.00
32	2	22.00	1	1	2	1	2	2.00	1.00	5.00	.50	2.20	21.40
33	2	23.00	1	1	2	3	2	.00	1.00	6.00	.00	.00	14.00
34	2	26.00	1	1	2	2	2	.00	.00	5.00	.00	.00	10.00
35	2	26.00	1	1	1	3	1	6.00	2.00	6.55	2.60	3.90	42.10
36	2	27.00	1	1	1	3	2	.00	.00	4.10	1.30	.00	10.80
37	2	27.00	1	1	1	2	2	7.00	4.00	9.25	6.60	8.20	70.00
38	2	28.00	1	1	2	1	2	.00	.00	7.60	.00	.00	15.20
39	2	35.00	2	1	1	1	2	1.00	.00	7.35	.00	.00	16.70
40	2	35.00	2	1	2	3	2	.00	.00	4.50	.10	.00	9.20
41	2	36.00	2	1	2	1	2	.00	.00	9.10	.00	.00	18.20
42	2	36.00	2	1	1	3	2	.00	.00	9.05	.00	.00	18.10
43	2	37.00	2	1	1	3	2	1.00	1.00	4.25	3.40	4.40	28.10

	groups	actualag	age	gender	educatio	languag	paraphas	infocont	fluency	compre	repetiti	namin	aq
44	2	38.00	2	1	1	2	2	.00	1.00	7.35	.00	.00	16.70
45	2	41.00	3	1	1	1	2	.00	.00	7.20	.00	.50	15.40
46	2	41.00	3	1	1	3	2	.00	.00	9.10	.00	.00	18.20
47	2	41.00	3	1	1	2	2	.00	.00	6.30	.00	.00	12.60
48	2	41.00	3	1	2	1	2	.00	.00	5.35	.00	.00	10.70
49	2	42.00	3	1	1	1	2	7.00	2.00	10.00	4.10	7.30	60.80
50	2	42.00	3	1	2	1	2	.00	.00	7.90	.00	.00	15.80
51	2	42.00	3	1	2	1	2	.00	.00	7.90	.00	.00	15.80
52	2	42.00	3	1	2	1	2	.00	.00	8.80	.00	.00	17.60
53	2	44.00	3	1	1	2	2	.00	.00	8.60	.00	.00	17.20
54	2	44.00	3	1	1	3	2	7.00	4.00	7.70	4.60	6.90	60.40
55	2	45.00	3	1	2	2	1	4.00	4.00	9.50	.30	.40	36.40
56	2	45.00	3	1	2	2	2	2.00	.00	8.60	.40	5.00	32.00
57	2	45.00	3	1	2	1	2	.00	1.00	6.05	.00	.00	14.10
58	2	48.00	3	2	1	3	2	1.00	1.00	6.50	.40	.00	17.80
59	2	50.00	3	1	2	1	2	.00	.00	5.60	.00	.00	11.20
60	2	50.00	3	2	1	3	2	2.00	.00	10.00	.00	6.00	36.00
61	2	50.00	3	1	1	3	2	.00	.00	5.35	.00	.00	10.70
62	2	50.00	3	1	2	1	2	.00	.00	4.70	.00	.00	9.40
63	2	50.00	3	1	2	1	2	1.00	.00	6.90	.00	.00	15.80
64	2	51.00	4	1	1	3	2	4.00	1.00	4.70	.20	.50	20.80
65	2	52.00	4	1	2	3	1	2.00	1.00	8.85	.00	.00	23.70
66	2	52.00	4	1	2	1	2	4.00	2.00	7.35	6.30	1.80	42.90
67	2	52.00	4	1	1	2	2	6.00	3.00	7.40	3.00	3.20	45.20
68	2	54.00	4	1	1	3	2	8.00	4.00	7.30	5.20	8.30	65.60
69	2	54.00	4	1	2	2	2	.00	4.00	8.45	4.70	3.50	41.30
70	2	57.00	4	1	1	3	2	5.00	2.00	8.75	1.20	1.00	35.90
71	2	57.00	4	1	1	2	2	7.00	2.00	4.85	1.20	6.80	43.70
72	2	58.00	4	1	1	3	1	2.00	1.00	4.90	3.90	1.30	26.20
73	2	58.00	4	1	2	3	2	7.00	4.00	7.75	5.20	7.60	63.10
74	2	58.00	4	1	2	3	2	.00	1.00	8.30	.00	.00	18.60
75	2	58.00	4	1	1	2	2	8.00	2.00	10.00	6.00	8.40	68.80
76	2	60.00	4	2	2	1	2	8.00	4.00	5.70	5.10	7.30	60.20
77	2	60.00	4	1	1	2	2	3.00	3.00	7.75	.70	3.00	34.90
78	2	60.00	4	1	1	1	2	.00	.00	4.40	.00	.00	8.80
79	2	62.00	5	1	1	3	2	.00	.00	6.25	.40	.00	13.30
80	2	64.00	5	2	2	2	2	.00	.00	6.60	.00	.00	13.20
81	2	64.00	5	1	1	3	2	.00	.00	8.60	.00	.00	17.20
82	2	65.00	5	1	1	1	2	.00	.00	6.40	.00	.00	12.80
83	2	65.00	5	1	1	3	2	1.00	.00	9.80	.00	.00	21.60
84	2	65.00	5	1	1	2	2	.00	1.00	7.95	.00	.00	17.80
85	2	65.00	5	1	1	2	2	.00	.00	9.20	.20	2.00	22.80
86	2	66.00	5	1	1	2	1	.00	.00	7.60	.00	.00	15.20

	groups	actualag	age	gender	educatio	languag	paraphas	infocont	fluency	compre	repetiti	namin	aq
87	2	66.00	5	1	1	3	2	3.00	2.00	8.20	.70	.20	28.20
88	2	69.00	5	1	1	2	2	.00	.00	4.85	.00	.00	9.70
89	2	70.00	5	1	2	2	2	.00	.00	4.10	.00	.00	8.20
90	2	71.00	6	1	2	1	2	.00	.00	7.75	.00	.00	15.50
91	2	72.00	6	2	1	3	2	.00	.00	9.50	.40	.00	19.80
92	2	72.00	6	1	2	3	2	2.00	2.00	5.80	.20	1.00	22.00
93	2	80.00	6	2	2	1	2	.00	.00	8.15	.60	.00	17.50
94	2	37.00	2	2	2	3	2	.00	.00	4.80	.00	.00	9.60
95	3	21.00	1	1	1	3	2	10.00	10.00	9.10	8.00	8.10	90.40
96	3	24.00	1	1	1	3	2	6.00	4.00	10.00	8.00	6.00	68.00
97	3	28.00	1	1	1	3	2	9.00	5.00	9.05	8.00	7.30	76.70
98	3	29.00	1	1	1	3	2	9.00	6.00	9.90	7.70	7.90	81.00
99	3	29.00	1	2	1	3	2	10.00	9.00	9.00	7.60	7.30	85.80
100	3	30.00	1	1	1	2	2	10.00	8.00	9.90	7.80	8.20	87.80
101	3	35.00	2	1	1	2	1	9.00	5.00	10.00	8.70	8.70	82.80
102	3	36.00	2	1	1	3	1	9.00	8.00	7.95	7.60	2.10	69.30
103	3	40.00	2	1	1	3	2	10.00	5.00	10.00	10.00	7.80	85.60
104	3	40.00	2	1	2	1	2	8.00	9.00	9.10	9.20	8.40	87.40
105	3	43.00	3	2	1	3	2	9.00	9.00	9.60	10.00	6.30	87.80
106	3	45.00	3	1	2	1	2	8.00	6.00	9.80	10.00	8.10	83.80
107	3	48.00	3	1	1	3	1	10.00	10.00	8.20	9.00	7.50	89.40
108	3	49.00	3	1	1	3	1	9.00	6.00	8.60	7.90	8.80	80.60
109	3	49.00	3	1	1	3	1	9.00	9.00	9.50	9.60	6.10	86.40
110	3	50.00	3	1	2	1	1	7.00	6.00	9.05	8.80	4.00	69.70
111	3	55.00	4	1	1	2	2	9.00	9.00	10.00	8.00	8.90	89.80
112	3	55.00	4	2	1	3	2	10.00	6.00	9.80	9.00	8.90	87.40
113	3	55.00	4	1	1	2	2	9.00	9.00	9.15	7.70	5.60	80.90
114	3	60.00	4	1	1	1	1	8.00	7.00	7.40	7.50	3.30	66.40
115	3	62.00	5	1	1	3	2	10.00	8.00	10.00	9.00	6.90	87.80
116	3	63.00	5	1	1	3	2	6.00	4.00	10.00	9.00	9.00	76.00
117	3	67.00	5	1	2	2	2	10.00	9.00	9.60	9.20	7.10	89.80
118	3	67.00	5	2	2	1	2	8.00	9.00	6.95	7.70	7.60	78.50
119	3	78.00	6	1	1	3	2	8.00	5.00	9.45	7.30	5.00	69.50
120	3	80.00	6	2	2	2	2	9.00	9.00	8.80	8.50	8.80	88.20
121	3	80.00	6	1	1	2	2	10.00	8.00	10.00	9.00	7.80	89.60
122	3	62.00	5	1	2	1	1	8.00	6.00	10.00	7.50	8.40	79.80
123	4	42.00	3	1	1	1	2	7.00	6.00	5.30	6.00	5.00	58.60
124	4	44.00	3	2	1	2	1	3.00	5.00	6.75	3.20	.20	36.30
125	4	46.00	3	1	1	3	2	3.00	3.00	5.70	5.50	2.50	39.40
126	4	46.00	3	1	2	1	2	1.00	5.00	2.19	3.90	1.90	27.98
127	4	47.00	3	1	1	3	1	10.00	5.00	6.40	2.20	6.90	61.00
128	4	48.00	3	1	1	3	2	3.00	4.00	.00	.00	.10	14.20
129	4	50.00	3	1	1	3	1	5.00	7.00	6.55	1.00	4.70	48.50

	groups	actualag	age	gender	educatio	languag	paraphas	infocont	fluency	compre	repetiti	namin	aq
130	4	50.00	3	1	2	1	2	.00	7.00	.00	.00	.00	14.00
131	4	56.00	4	1	1	3	1	8.00	8.00	6.85	2.90	5.70	62.90
132	4	58.00	4	1	1	3	2	5.00	7.00	5.80	4.80	3.20	51.60
133	4	60.00	4	2	2	1	2	3.00	5.00	1.80	3.50	.00	12.20
134	4	66.00	5	1	2	2	2	3.00	4.00	6.90	6.00	3.50	46.80
135	4	68.00	5	1	2	2	2	3.00	7.00	3.80	1.20	2.20	34.40
136	4	72.00	6	1	2	3	2	.00	5.00	.00	.00	.00	10.00
137	4	75.00	6	1	2	2	2	10.00	8.00	5.60	3.00	.40	54.00
138	5	27.00	1	1	1	3	2	7.00	7.00	7.65	6.10	5.60	66.70
139	5	29.00	1	2	1	3	2	9.00	9.00	9.05	5.10	8.60	81.50
140	5	32.00	2	1	1	1	2	10.00	10.00	7.30	2.80	5.00	71.00
141	5	34.00	2	1	1	2	2	8.00	5.00	8.70	4.10	4.40	30.20
142	5	55.00	4	2	1	3	2	9.00	9.00	10.00	4.80	8.10	81.80
143	5	56.00	4	1	1	3	2	6.00	8.00	8.45	6.00	7.20	71.30
144	5	60.00	4	1	2	1	2	8.00	5.00	6.95	5.70	7.20	65.70
145	5	60.00	4	1	1	1	1	8.00	8.00	7.75	3.60	4.80	64.30
146	5	61.00	5	1	1	3	1	5.00	5.00	8.25	4.00	6.60	57.70
147	6	31.00	2	1	1	1	2	.00	.00	3.80	.00	.00	7.60
148	6	31.00	2	2	2	1	2	.00	.00	3.00	.00	.00	6.00
149	6	31.00	2	1	2	1	2	.00	.00	.00	.00	.00	.00
150	6	31.00	2	1	2	2	2	.00	.00	3.98	.00	.00	7.95
151	6	32.00	2	1	1	1	1	1.00	.00	.90	.20	.90	6.00
152	6	35.00	2	1	2	1	2	.00	.00	3.20	.00	.00	6.40
153	6	35.00	2	1	1	1	2	3.00	2.00	3.40	.00	.00	16.80
154	6	38.00	2	1	1	3	1	.00	.00	.20	.00	.20	.80
155	6	44.00	3	1	1	3	2	.00	.00	.90	.00	.00	1.80
156	6	45.00	3	2	2	2	2	.00	.00	.40	.00	.00	.80
157	6	45.00	3	2	2	3	2	1.00	.00	2.10	.00	.00	6.20
158	6	47.00	3	1	1	1	2	.00	.00	3.65	.00	.00	7.30
159	6	50.00	3	1	2	1	2	.00	.00	2.25	.00	.00	4.50
160	6	42.00	3	2	1	2	2	2.00	.00	.40	.00	.00	4.80
161	6	42.00	3	1	2	1	2	.00	.00	3.00	.00	.00	6.00
162	6	43.00	3	1	1	3	2	.00	1.00	3.80	.00	.00	9.60
163	6	44.00	3	1	1	3	2	.00	.00	3.90	.00	.00	7.80
164	6	45.00	3	1	2	1	2	4.00	.00	3.20	.00	.00	14.40
165	6	48.00	3	2	2	2	2	.00	.00	.90	.00	.00	1.80
166	6	50.00	3	1	1	3	2	.00	1.00	3.05	.40	.30	9.50
167	6	52.00	4	1	2	1	2	.00	.00	.00	.00	.00	.00
168	6	54.00	4	1	1	3	2	1.00	1.00	3.95	.00	.00	11.90
169	6	55.00	4	1	2	1	2	.00	.00	3.90	.00	.00	7.80
170	6	56.00	4	1	2	1	2	.00	.00	2.20	.00	.00	4.40
171	6	60.00	4	1	2	1	2	.00	1.00	.25	.70	.20	4.30
172	6	63.00	5	1	2	1	2	2.00	1.00	1.10	.00	.00	8.20

	groups	actualag	age	gender	educatio	languag	paraphas	infocont	fluency	compre	repetiti	namin	aq
173	6	65.00	5	1	2	1	2	.00	.00	3.60	.20	.00	7.60
174	6	65.00	5	2	2	1	2	.00	1.00	1.60	.40	.00	6.00
175	6	65.00	5	2	2	1	2	.00	.00	.15	.00	.00	.30
176	6	67.00	5	1	2	1	2	.00	.00	1.85	.00	2.30	8.30
177	6	79.00	6	1	1	3	2	.00	.00	.10	.00	.00	.20
178	6	38.00	2	1	1	3	2	.00	.00	3.70	.00	1.10	9.60
179	7	25.00	1	1	1	3	1	3.00	1.00	8.50	10.00	8.40	71.80
180	8	60.00	4	2	2	1	2	10.00	9.00	6.25	7.00	8.30	81.10

Note:

Variables	Categories	Codes
Client/ Subject groups	Normal	1
	Broca's	2
	Anomic	3
	Wernicke's	4
	Conduction	5
	Global	6
	Transcortical Motor	7
	Trascortical Sensory	8
Age groups (in yrs)	21 – 30	1
	31 – 40	2
	41 – 50	3
	51 – 60	4
	61 – 70	5
	>70	6
Gender	Male	1
	Female	2
Literacy / Education	Literate	1
	Illiterate	2
Language Contexts	Monolingual	1
	Bilingual	2
	Multilingual	3
Paraphasia	Present	1
	Absent	2