A *TEST* OF APHASIA IN MALAYALAM

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1992

With Love

To my dearest

Daddy and Mummy

who are PROUD even of my SMALL achievements.

J.

CERTIFICATE

This is to certify that the Disseertation entitled "A TEST OF APHASIA IN MALAYALAM" is a bonafide work in part fulfilment for the degree of Master of Science (Speech & Hearing), of the student with the Rcgister Number M.9005

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CERTIFICATE

This is to certify that this Dissertation entitled " A *TEST OF* APHASIA IN MALAYALAM *" has been prepared under my supervision and guidance.*

MYSORE
1992

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DECLARATION

This dissertation entitled "A TEST Of APHASIA IN MALAYALAM" is the result of my own study under the guidance of Dr. Prathibha Karanth, Head of the department of Speech Pathology, All India Institute of Speech and Hearing, Mysore and has not been submitted earlier at any University for any other diploma or Degree.

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INTRODUCTION

Aphasia is one, said Marie.
But others contend that can't be
They claim three forms, or four,
Sometimes five, even more.
There's no number on which all agree.[B.B.]

Aphasia is a many faceted problem. This has been studied using different frameworks. The complexity of the problem accounts for the great diversity of opinion and approaches found among the investigators. The realization that the problem is complex has persuaded investigators, of the need for communication across disciplines. This field has remained as a challenging field of enquiry. This complex problem has attracted not only neurologists, but also Psychologists, Speech Pathologists and Linguists.

The diversity of opinion among the people concerned with this problem can be seen even at the level of definition. However, the common element of all the definition is that Aphasia is a language disorder which is due to brain damage.

Similarly aphasics have been classified differently by different people. Thus there are many classifications, but none of them can be considered as satisfactory either in terms of describing the condition of the case nor in diagnosis nor in therapy. However, it is necessary to have classifications to help the clinician in treating aphasics. Regarding classification, Kertesz(1979) says that "many of the classifiers describe the same phenomena from a different angle and infact, complement rather than contradict each other".

Objections have always been made to systematic testing of aphasic patients. A common argument is that aphasic responses are incosistent and consequently test results are unreliable. Criticisms have been directed at plus-minus scoring and at quantification of data. Some clinician consider that test procedures are traumatic to patients (Schuell,1965). Aphasia testing has proven to be complex and difficult to standardize. Kertesz(1979) has given a list of criteria to be considered in an ideal test. The criteria are:

A test should

1> explore all potentially disturbed modalities

2> employ subtests that discriminate among various clinically meaningful types of aphasia

3> included graded test items so that a representative range of severity can be examined

4> contain enough items to eliminate variability in subtests performance

5> be practical enough in terms of duration required to administer the full test

6> minimise the effects of intelligence and education and permit to measure language performance as purely as possible

7> be standardized as to scoring and administration, so that, the test is reliable

8> discriminate between aphasics from normal, brain damaged non-aphasics and other problems

9> have internal consistency and comparability of scores

10> have face and content validity

Further Kertesz(1979) states that a test for aphasics should measure the following parameters of language, to be considered as useful.

1) Description of spontaneous or conversational speech.
2) A measure of informational value converyed by such speech.
3) A measure of fluency.
4) Auditory comprehension.
5) Naming
6) Repetition
7) Reading comprehension
8) Writing
9) Airthmetic
10) Gestural expression (Praxis)

Several tests for assessing aphasic problems have been described since 1926 [Head's Serial Test(1926), Weisenburg & McBrides Battery 1935, The Goldstein-Scheered Tests of Abstract and Concrete Thinking 1941, Halstead-Wepman Screening Test for Aphasia 1949, Eisensons Inventory 1954, LMTA-Wepman & Jones 1961, Token Test -DeRenzi & Vignolo 1962, MTDDA-Schuell 1965, NCCEA-Spreen & Benton 1968, FCP, Sarno M.T.1967, PICA-Porch 1967, ACD-Emerick,L,1971, ACTS-Schewan & Canter 1971, The Sklar..Aphasic Scale-Sklar 1973, Queensland University Aphasia and Language Test - Tyres et al 1973, WAB-Kertesz 1979, BDAE-Goodglass & Kaplan 1982, LPT-Karanth,P.,1980].

All these tests have their own merits and demerits. Many tests show some relationship to previous tests either in terms of the similarity of the items or the m odalities explored. The early aphasia tests have borrowed few concepts from intelligence tests. Most of these tests are considered to be long and fatiguing to the patient and the examiner. So, often, only selected items are used for testing. Some tests like PICA specify that the examiner should undergo training in administering the test. So the results of the tests are also influenced by amount and kind of training the examiner has received.

Common problems in these tests, in assessing aphasia as cited by Benton(1967) are (1) lack of explicit instructions for administration and criteria for scoring (2) poor scaling of items with respect to level of difficulty (3) inadequate normative information and (4) excessive length. Unusual selection of tests based upon various idiosyneratic concepts of aphasia leads to artifactual diagnostic categories not shared by other clinicians. On the other hand a mechanical exploration of the endless combinations of input and output modalities, regardless of clinical emphasis, results in meaningless categories an impractically long test batteries. Obviously, there is no test that satisfies every one, but the balance between selectivity and comprehensiveness is probably the key to the value of each test, provided other criteria concerning standardization, grading and

validity are satisfied. The case of administration and scoring will contribute to the popularity of a test, but too short an examination may not fulfill some requirements of research or even clinical diagnosis.

Need for the study

Although there are a considerable number of tests for aphasia available in both English and Indian languages, there are no aphasia tests in Malayalam, the language spoken in Kerala, India. Therefore the present study attempts to design an aphasia test in Malayalam based on WAB (Kertesz,1979).

Such a test would help in identifying the aphasic, describing the aphasia and classifying it into various sub groups for the purpose of diagnosis, therapy and prognosis. Such a test would be very useful in speech and language clinics in Kerala since one of the primary concern of speech and language pathologist is to assess and improve the communication skills in aphasics.

The Western Aphasia Battery (WAB) [Kertesz 1979, 1980, Kertesz & Poole 1974) is a recent comprehensive assessment instruments for language functioning in aphasic. The primary goals of the WAB are to classify various aphasic syndrome (Eg. Brocas, Wernickes, anomic, conduction) and to evaluate the severity of the aphasic impairment. The examination designed for both clinical and research use is composed of four language

subtests and three performance tests. Syndrome classification is determined by the pattern of performance on the four language subtests; the summed overall performance on these subtests yields a rating of performance severity [i.e. the Aphasia Quotient]. The four language subtests assess spontaneous speech, comprehension, repetition and naming. The three performance subtests encompasses reading & writing, praxis & constructions. Test items were selected to provide a wide enough range of difficulty for all grades of severity to be assessed.

Standardization information is provided by Kertesz & Poole(1974) and updated by Kertesz(1979). These references include criteria for classification of aphasic syndromes based on the language subtest performance of a sample of 150 aphasic patients with various etiologies. Reliability and validity data are also provided. The WAB manifests high inter rate reliablity, good internal consistency and high test-retest-reliability. Successful criterionvalidity has also been described. Aphasics were differentiated from non-brain damaged adults on the WAB performance. The use of Aphasia Quotient distinguish aphasics from non-aphasic brain damaged controls. Kertesz states that language subtests can be administered in approximate one hour but that the full WAB would require atleast two test sessions to complete.

Even though BDAE is one of the most extensive aphasia examination in popular use today, for the present study the

principles of WAB (Kertesz 1979) were used because the composition of WAB subtests resembles that of the BDAE and WAB has its own advantages. Like BDAE, the WAB also seeks to assign patients to classical aphasic syndromes such as Broca's aphasia, Wernickes aphasia, Anomic aphasia, Conduction aphasia, Global aphasia, Transcortical Motor, Transcortical sensory & Isolation syndrome. The basis for the decision about syndrome type is the summed score from each of the four language subtests i.e. the Aphasia Quotient. WAB goes further than the BDAE in that it provides explicit decision criteria for assigning a particular classification. Moreover it claims that individual patients can be placed into one of 8 basic types according to summed score obtained on the diagnostic subtests. The WAB assessment can be completed in shorter time than the BDAE.

Thus a test for aphasics in Malayalam composed of four language subtests and three performance tests was proposed to be developed based on WAB (Kertesz 1979).

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REVIEW

"Round and round like a stage army moves
the procession; the clinical appearances
are identical, but each fresh group of
observers view them with new eyes
and with different preconceptions".

- Henry Head, 1926.

As Henry Head has stated, each group of observers have been viewing 'Aphasia' from their point of view and giving their own explanation of the problem. Still aphasia has remained as a challenging field of inquiry.

Several definition of aphasia have been proposed and have been used (Broca 1861; Jackson 1879; ;Marie,P 1906; Osgood & Miron 1963; Bay,E 1967; Eisenson,J 1973; Benson 1976; Schuell 1975).

According to Eisenson,J (1973) Aphasia is an impairment of language functioning of persons who have incurred localized cerebral damage that results in a reduced likelyhood that an individual involved in a communicative situation will understand or produce appropriate verbal formulations'. This includes the concept of Henry Head(1926) and Jackson,H (1879). Most of the authors agree upon two important points. First, that aphasia is not a speech disorder. Second, aphasic symptoms are caused by brain damage or damage to the central nervous system.

Various workers in the field of aphasiology have proposed and used many classification systems based on their own

philosophy. The most widely used is the expressive - receptive division stressed by Weisenburg & McBride(1935). Almost every patient with aphasia has some degree of expressive abnormality and similarly, a pure receptive aphasia, one without any hint of expressive problem is extremely rare.

Assessment:

It is necessary to have a test to identify the problem, to describe the problem and to classify the problem into various groups for the purpose of diagnosis, therapy and prognosis. Thus several tests have been proposed and used in various clinics to assess the aphasics. Some of the classifications are also based on the tests. For Eg. Schuell(1975) and Eisenson(1973) have used their own tests and classified the aphasic cases.

The tests attempt to make the assessment of aphasia in a systematic manner. It has been frequently reported that aphasic responses are inconsistent and consequently test results are unreliable. Criticisms have been directed at plus and minus scoring and quantification of data. Some clinicians consider that test procedures are traumatic to patients. The most frequent complaint is that comprehensive testing is economically unfeasible because it requires too much time.

Inspite of these drawbacks, the clinicians have been using various tests that have been constructed to assess the abilities and disabilities of different aspects of language in aphasics, as

they still help the clinicians in describing their cases, formulating therapy procedures and predicting possible improvement.

The testing involves asking questions and making observations. When testing is done under controlled conditions, observations can be repeated and help in comparing patient from time to time.

Briefly the examiner tries to find out the abilities and disabilities of the patient by determining the level of performance on a given test and tries to find the reason for the breakdown in the performance and tries to account for them.

Several workers have constructed tests to assess the aphasic patients and still attempts are going on to construct tests with cautions to overcome drawbacks of previous tests , still constructing a test is considered to be not an easy task. It has been reported that one would face several problems while constructing a test for aphasics.

Benton,L.A.(1967) states that "If we look to the problem of test construction and application in the field of aphasia we can say that we are in 1900, (i.e.) in the pre Binet state". Several tests for aphasics have been developed and are in use in various clinics. However, only few of these tests can be found in use, either in their original form or in their modification, in some clinics. This may be because (as attributed by Benton 1967).

-> They have not been published in usable form

-> No standardization information has been given with any of these tests.

-> Exact scoring methods have not been prescribed.

-> No guidelines have been provided for the interpretation of performance correctly.

-> Moreoever none of them present convincing evidence that the utility is significantly greater than any other services of aphasia test which might be assembled.

The concept of language is basic for the development of a language test. Review of concepts of language indicates that there are variations in the concepts being used by the various workers in the field. This variation poses the basic problem in the construction of a test for aphasia. Benton(1967) very aptly put this problem by stating that "our fundamental preconception of language will determine the nature of an examination and of specific tasks included in it. Now we must face the difficult problem of whether it is possible to go beyond the pragmatic level in constructing a standard test battery for aphasia". Given the diversity of conceptual approaches to the problem of aphasics if we do not see the possibility of achieving a single conceptual framework which is satisfactorily to all school of thoughts, then a standardized basic examination can be assembled on pragmatic grounds. Some kind of solution or at least,

understanding of the question must be achieved before a broadly acceptable standard examination for aphasia can be constructed.

Apart from the basic problems of selection of the conceptual framework one would face other problems also, which can be considered as "technical" problems, in an attempt to construct a test fo aphasics. Most frequently faced technical problems are (1) selection of items for the test battery (2) finding out the reliability and validity of the test (3) developing norms for various test items for various groups. Further it can be stated that these factors are further influenced by (a) age (b) sex (c) culture and (d) previous practice or exposure to the test or similar test conditions. (4) developing standard procedures for interpretations of responses (5) to give proper weightage to the educational, cultural, age and other factors which may affect the scores in various cases of aphasia (6) converting the raw scores into standard scores or to rank various cases based on their language abilities, to understand the actual condition of the patient, variations in the abilities of languages with time and/or therapy. and also to compare various groups of aphasia with each other.

It has been reported that it is very difficult to overcome above mentioned problems and it is also considered that the task of overcoming these problems are tedious and time consuming. Apart from these problems, variations in dialect of a language may also act as a variable i.e. the test has to be standardized

for each dialect as for eg. the same test item may not necessarily have the same meaning or same difficulty level in every community. Thus one has to develop suitable norms with reference to each language community in which the test has to be used.

One should also take into account (1) the frequency of occurrence of words (2) the relative ease or difficulty of pronouncing the words , and (3) grammatical form in which the preposition is stated in that particular language.

While constructing a test one should give attention to homogenity of stimuli and homogenous test items. There should be a range of difficulty in the test items.

Thus the review of literature on problems in construction of tests indicates that apart from inherent problems which are technical in nature, one would also encounter problems of choosing appropriate conceptual frame work.

Several tests of Aphasia have been developed. An attempt has been made to review some of them here.

The clinician examining a dysphasic patient has several specific goals in mind, including answers to the following questions:

-> Which parts of the brain are damaged?

-> What is the nature of the lesion? (Eg. vascular, infections, etc)

-> Which kind of dysphasia is present and what is its pathophysiologic basis?

-> Which parts of the brain are spared and can these healthy regions of the brain be utilized to compensate for lost verbal abilities?

The basic clinical aim, then, is a search for some neuro behavioural mechanism by which the dysphasic patient can communicate.

Although a formal language evaluation can provide detailed answers to these questions, such an examination may take from two to twelve hours, depending on the nature of the dysphasic defecit and does not provide the busy clinician with a quick guide to the diagnosis from which an initial series of management steps may be undertaken. For this purpose, a brief examination for dysphasia can be used. This brief examination can be completed in fifteen minutes, can be carried out at the bedside with no need for special testing equipment beyond a pencil and paper and can provide a general guide to initial diagnosis and treatment. The same examination, if followed systematically, can also be used on a daily basis to monitor the course and progression of the dysphasic syndrome.

Some basic items of medical history are necessary in the investigation of language disorders.

-> Handedness of the patient should always be assertained over 95% of right handers and about 60% of left handers have language organized in the left hemisphere. For the remainder, either the right hemisphere is dominant or language is organized bilaterally.

-> Native language of the dysphasic patient should be determined. There is suggestive evidence that language may not be organized in the brain of a bilingual in the same manner as in that of a monolingual.

-> Level of education of the patient is important, since linguistic performance depends on level of academic attainment.

In the clinical approach to the dysphasic patient, the examiner should use all available clues to diagnosis, whether they are linguistic or not. Evidence of neurological disease other than the language disorder can be helpful in determining the nature of the dysphasia. Presence of a significant hemiplegia places the lesion in motor pathways and suggests that serious impairment in spontaneous speech production will be present; and that the dysphasic syndrome will be of a non-fluent type. Presence of a significant hemisensory defect or hoaconymous hemianopia, in the absence of hemiplegia, suggests that the dysphasic syndrome will have been caused by a more posteriorly located lesions and that the language disorder is likely to be of

a fluent type. Presence of all three - hemiplegia, hemisensory deficit, hemianopia - is more likely to be associated with a mixed or global dysphasia.

In evaluating the language disorder itself, the examiner should consider oral and written language separately useful Bedside test of oral language should include a sampling of spontaneous speech, repetition, naming and comprehension. Tests of written language should sample reading and writing. The following examination can be completed in 10-15 minutes at the bedside.

1. Spontaneous speech:- can be elicited by conversation with the patient. The clinician tries to see the form (refers to features of fluency or non-fluency Eg. rate of speaking, melody, phrase length, etc) and content (refers to features of word choice, syntax and presence or absence of paraphasias) of his speech.

A patient with an anterior aphasia is likely to use few highly meaningful, substantive words. A patient with a posterior dysphasia is more likely to be circumlocutory, using many words to talk around a subject without precision. In such patients there may be an excessive drive to continuous speaking.

2. Repetition:- The examiner utters the words to be repeated and asks the patient to "say what I say" or "repeat after me" Items to be tested include single words and sentences of increasing length and syntactic complexity.

Repetition may be defective, normal or hypernormal(echolalia).

3. Naming or word finding:- Impaired ability to name an object o to find the desired word for production in spontaneous speech is present in every type of dysphasia word finding defecit may be detected in the examination of spontaneous speech.

Confrontation naming is testing by presenting a test stimulus with the request to "tell me what this is".

4. Comprehension of spoken language:- Two approaches are generally successful: ask the patient to point to objects in the room, ask the patient questions which can be answered "yes" or "no" . A series of questions of graded difficulty can then be presented.

5. Reading: Reading aloud and reading comprehension should be tested separately, since these two language skills can be impaired independently in dysphasia.

Reading aloud can be tested by presenting written material in script or block letter form.

Reading comprehension can be tested by presenting written names of common objects to the patient who may demonstrate comprehension by pointing to the object and also a series of questions of graded difficulty can be presented in written form to the patient, the examiner requesting a "yes" or "no" reply.

6. Writing:- Writing disorders of a linguistic nature are commo in dysphasic syndromes and may be tested by asking the subjects to write single letters and digits, words and multidigit numbers, and sentences of increasing length and complexity. Writing to dictation may be tested independently of writing to command.

Thus before this brief, clinical bedside examination or test, certain other factors also should be checked i.e. if the patient has got any movement problems-dyspraxia and if he has got motor disturbances like hemiplegia or hemiparesis. Associated disorders like visual functions, hearing etc. should also be checked because they might interfere with the testing if they are involved.

Thus aphasia testing at the stages of descriptive aphasiology often consisted of asking the patient questions. From time to time, other terms were added to this. Broca, for instance, besides asking his second patient, conversational question also described his gestures and tested his tongue movement, writing and airthmetic. Hughlings Jackson tested sign making, writing, comprehension, repetition, reading, and tongue movements, regularly in addition to spontaneous speech. Pierre Marie felt that comprehension deficit underlies all aphasia and it is only a matter of using difficult enough tests to detect it. He also emphasized that nonverbal intellectual functions were also disturbed. He described the now famous three paper test of

comprehension in which the patient is asked to do various things with three pieces of paper, in sequence.

Tests developed by Head,H(1926) & Weisenburg & McBride(1935) are considered to be two important landmarks in examination for aphasia. The test developed by EHead,H(1926) is called the EAD' SERIAL TEST.

The underlying philosophic principal of Head's Serial Test is revealed in his statement that "an inconsistent response is one of the most striking results produced by a lesion of cerebral cortex". Accordingly, Head(1926) decided that adequate assessment must include testing and retesting of a function in graduated sequence, and in several different ways (through different modalities). Head's serial test consists of the following:

1] Naming and recognition of common objects:

Head chose 6 objects - a pencil, a key, a penny, a match box, scissors, and a knife.

2] Naming and Recognition of colors

3] The man, cat and dog tests.

These tests investigated mainly reading and writing in their most elementary form. The patient was asked to read three word sentences and then form these sentences from pictures only. He was then asked to write them down, and finally, to copy them from print into cursive handwriting.

4] The clock tests.

The tests calls for direct imitation - telling the time, setting the hands of the clock to oral commands and to printed commands.

5] The coin - Bowl test.

The patient is required to place a coin into one of 4 bowls, according to a series of numerical commands (both printed and oral commands).

6] The hand, eye and ear tests.

The patient should imitate a series of movements which consists of touching an eye or an ear with one or the other hand, first on the same side, then crossing the body. Then the patient was placed in front of a large mirror and was asked to imitate the reflected movement of the observer. The patient was then given cards, each of which represented a human figure carrying out one of the target movements. This was the most difficult of all the serial tests. It was also a test of Right & Left orientation and to some extent, praxis.

Other tests included by Head,H(1926) were:

- Writing down the
  - alphabet
  - the days of the week
  - the months of the year
- Understanding a paragraph from the newspaper.
- Describing a picture.
- Counting, taking airthmetic tests of various complexity.
- Naming coins.

- Drawing objects from a model and from a memory.
- Sketching a ground plan of a familiar room.
- Visual imagery.
- Spatial orientation.
- Finding the way along some familiar route.
- Playing games such as dominoes, chess, cards or billiards.
- Completing Jigzaw puzzle.

Henry Head(1926) considered his testing incomplete and capable of improvement. He thought that testing should be adapted to the capacity of the patient and that it should not be applied in a routine manner, even though he described in some detail the way the tests should be applied (Kertesz,A. 1979). Head's test are time consuming and boring (Eisenson,J.1973). Weisenburg & McBride (1935) in commenting on Head's tests say "as their value in differentiating the aphasic from the normal, the simpler tests are satisfactory while the more difficult tests are not, for the latter require complex performances in which many normal persons are not altogether successful. These more difficult tests cannot be used satisfactorily with aphasic patients without knowledge of normal performances, both qualitative and quantitative, which Henry Head did not obtain".

Several brief examinations employing Head's procedure relative to type of task have been published and have attained fairly wide use in U.S.A. These include:

-> Chesher's Test for Clinical Examination in Aphasia (1937)

-> The Well-Ruesh Examination (1945)

-> Halstead Wepman Screening Test for Aphasia (1949).

These examinations are screening instruments intended for determining obvious areas of impairment or of relative abilities in brain damaged persons.

Weisenburg and McBride's Battery:

The assessment procedures presented by Weisenburg and McBride(1935) come considerably closer to a standardized examination than did those of Henry Head, Weisenburg & McBride(1935) did not produce a new list or inventory for assessing aphasic patients. Instead, they constructed a test battery chosen from published and standardized psychological and educational tests.

The principal test used by Weisenburg and McBride consists of:

1) Speaking: (a) Recording the patients spontaneous speech or reactive speech.

(b) Automatic word series of counting and days of the week, months of the year, and the alphabet, reciting a prayer or nursery rhyme.

2) Naming - objects and colors as by Henry Head.

3) Repeating - single words containing all English sounds and a series of short, familiar phrases and easy sentences.

4) Testing comprehension - i.e. a test for understanding spoken language.

5) Reading - Testing reading by the 'Gates graded word pronounciation test' and the 'Gray oral reading paragraph'.

6) Writing - Testing writing by using samples of spontaneous writing of the patients name and by having the patient compose letters and reports. They also had the patient write to dictation and also copying.

7) Airthmetic - They testes airthmetical ability with airthmetic tests from the "Standard Achievement Airthmetic Examination" including computation and reasoning.

8) Language Intelligence Tests - such as oral opposites, part-whole tests, oral analogies [horn is to blow as bell is to ring], the printed analogies test, sentence completion test and oral absurdities test.

9) Reproduction of verbal material i.e. Immediate memory for digits, letters and disconnected words and reproduction of a short story of the "Auditory Verbal Memory Test" were also tested.

10)Non language tests :

They constructed shorter batteries =, one for use in "severe" disorders, with a probable time of 2-3 hours and one for "slighter" disorders, for the same duration.

The Goldstein - Scheerer Tests of Abstract and concrete thinking: of Goldstein - Scheerer(1941)

This constitute an inventory of psychological procedures intended to assess quantitative and qualitative changes in intellectual functioning in brain damaged persons with specific reference to abstract and concrete reasoning.

The battery of tests in Goldstein-Scheerer inventory includes block designs, color form sorting, a stick test, and one for object sorting.

Halstead - Wepman Screening Test for Aphasia (1949):

A simple screening test was developed by Halstead during the World War I & II.

The test consisted of a test board containing a dial or wheel on which the stimulus figures were printed. And the necessary accessories are provided. Two viewing apparaturs are affixed on the front side of the test board, each for the patient and examiner. The instructions were given orally and factually, in addition to the one appeared on the backside of the board.

Eisenson's Inventory (1954) - Examining for Aphasia:

Designed to provide the examiner with a guided judgement for assessing the variety of disturbances in languages and other disturbances closely related to language functions, which may be useful for rehabilitation.

The immediate purpose of this examination is to determine the areas of difficulty and level of speech and language of patient. The test has two main parts geared towards eliciting information on receptive and expressive lines within which items range from those intended to test subsymbolic and low symbolic levels to levels of higher symbolic content.

(1) Receptive disturbances are examined in the first part. Recognition of common objects is tested by either naming, pointing, or selecting choices given by the examiner. Similarly, colors, forms, reduced size pictures, numbers, letters printed words and printed sentences are examined for recognition. Auditory verbal comprehension of sentences followed by a series of questions, allows the patient the choice of four in the response. Reading comprehension is composed of paragraphs adopted from other reading lists.

(2) Expressive disturbances are also examined including apraxia, by carrying out actions with the body, with objects and also, to pretend actions. On the verbal apraxia test, the patient is asked to repeat numbers, words and sentences. Automatic speech, writing, spelling, naming, word finding, calculation, clock setting and oral reading are all tested and impairment on each subtest is summarized on a five point scale, as complete, severe, moderate, little or none.

The test is to be administered by a clinician. Testing time

can vary from 30 minutes to 90 minutes depending on the severity of the impairment. Testing can be done in one or more sittings. For screening purpose only the first item of each subtest needs to be administered. Not standardized in the usual sense of the term, but it was widely used by clinicians as a guide for treatment (Kertesz 1979).

The Language Modalities Test for Aphasia)LMTA) - Wepman & J (1961).

Wepman & Jones (1961) view this test as an instrument to provide a psycholinguistic analysis by a standardized procedure. There is a four-way organization of the presentation of stimuli and responses. The visual stimuli are presented on film strips and the auditory stimuli by the examiner. Oral and graphic responses are scored for both kinds of stimuli. The stimulus material includes pictures of common objects, such as a tree or dog, simple words, numbers, and sentences of three, four or five words. Responses are speaking, writing or matching. The LMTA tests the comprehension of language symbols, as well as the ability to imitate them when presented both visually and auditorily. Form recognition, airthmetic, spelling and articulation are scored as well. It also includes four pictures about which the subject is asked to tell a story. The standardized samples of spontaneous speech thus obtained allow examination of the use of syntax and vocabulary. The scoring scale for all oral and graphic responses consists of:

1> the correct response

2> the phonemic or graphic errors

3> syntactic errors

4> semantic errors

5> jargon or illegible response

6> no responses

The procedure takes about an hour. The scoring system is to differentiate between defective symbol processing and input or output problems and to indicate the therapy needs of the patient.

On the basis of oral responses to the LMTA, five classes of aphasic patients can be identified.

(1) Syntactic patients whose difficulties are largely with syntactic words such as "of", "with", "in", "singulars", "plurals" and verb endings.

(2) Semantic patients who have semantic or word finding problem.

(3) Pragmatic patients whose comprehension is usually poor and whose speech converys little meaning. They often use neologisms and inappropriate substantive words.

(4) Jargon patients who, unlike pragmatic patients, use few, if any, meaningful words but unintelligible jargon words instead.

(5) Global patients who often have no speech at al except for a few automatic phrases, such as "I dont know" or meaningless combination of sound.

Main advantage is that it consists of two parallel forms for re-test purposes. This checks the practice effect. But (1) it does not cover a wide range of linguistic abilities, (2) the range of difficulty is insufficient to detect minimal language defects, (3) scoring is based on particular aphasic types syntactic, semantic, pragmatic, jargon & Global (Tyres et al 1971).

The Token Test - De Renzi and Vignolo(1962)

This is a special test of comprehension, for mild sensory disturbances or to detect such as in expressive syndromes. It consists of 61 commands of graded length and complexity. The patient has to point, touch, or pick up tokens of five different colors, two shapes and two sizes. The fifth part of the test uses prepositions, conjunctions, or adverbs to vary the linguistic complexity of the commands. Redundancy and clues given by the nature of the objects are eliminated. It is generally considered too difficult for many aphasics but a sensitive test for mild or latent comprehension disturbance. Nonaphasic left and right hemisphere lesioned patients had a relatively high "false positive" rate. Quite different types of aphasics obtain similar score. Although it is an excellent

research tool, clinicians find it's applicability to the assessment of aphasia limited. A shortened version has been incorporated in the N.C.C.E.A. (16 items). A 36 item short version has been recently recommended by De Renzi(1978).

Revised Token Test (RTT) - McNeil,M.R. and Prescott,T.E.(1978)

Designed as a sensitive and quantifiable test battery for the assessment of auditory processing inefficiencies associated with brain damage, aphasia and language and learning disabilities. It is a reconstruction of the original token test (De Renzi & Vignolo 1962) in accordance with accepted standards of test construction and standardization. The RTT includes multidimensional evaluative systems for describing the nature and quantifying the degree of auditory defecits.

A Kannada adaptation of the RTT incorporating principles of the RTT (McNeil & Prescott 1978) and "concrete object form to token test" (Martino et al,1976) was designed to assess the comprehension ability in normal and disordered adults and children (Veena,N.R. 1982).

Normative data on 52 children (5-9 years), adults (20-60 years) and 11 brain damaged subjects, has been compiled.

The Minnesota Test for Differential Diagnosis of Aphasia (MTDDA) - Schuell (1965)

It is one of the most popular tests which is in use. The test has been named after the U.N. Hospital of Minnesota where it

was constructed. The MTDDA is a long inventory that in depth and scope enables the examiner to assess the parameters of language and related sensory and motor involvement of aphasic person.

This test consists of 69 items, with more than 595 test items. The main 6 sections are:

[1] Test for auditory disturbances - items ranging from word recognition, discrimination to sentence and paragraph comprehension.

[2] Tests for visual and reading disturbances - items include matching of forms to reading comprehension of paragraphs as well as oral reading of sentences.

[3] Tests for speech and language disturbances - items include testing for articulatory movement to naming word defining, picture discription and paragraph reading.

[4] Tests for visuomotor and writing disturbances - items include copying of forms and letters, to writing to dictation and written sentence formulation.

[5] Tests for numerical relations and airthmetic processes items include making change, clock setting, simple numerical combinations and written problems.

[6] Tests for body image.

This test requires considerably more time to administer. A short version of the test intended primarily as a screening device has been developed. It is a comprehensive list.

Schuell's short examination for Aphasia - Schuell (1957).

This test is based on tests selected from the research edition of the MTDDA. Only tests considered to have high diagnostic and prognostic values are included.

The test has 4 parts:

SECTION-A: Auditory disturbances includes -

-> Auditory recognition - tested by the subject pointing to objects and pictures of objects, after the examiner speaks only the single word and after a pause, repeats it.

-> Auditory retention span - consists of pointing to objects called out serially by the examiner.

-> Repetition task - where the patient repeats increasingly complex words and sentences.

-> Auditory comprehension - is also tested by following directions, again with increasing complexity including several sequences of relational words between stimuli. Finally, comprehension of a paragraph is tested by the examiner reading a story and asking "yes" and "no" questions about it.

SECTION-B : Reading disturbances are tested at the word level, where the stimulus is a printed word and the patient has to select a picture from an array.

-> Auditory recognition of words - consists of an auditory stimulus with a pointing response to a choice of printed words.

-> Reading comprehension is tested by reading sentences and a paragraph and asking "yes" and "no" questions.

SECTION-C: includes

-> Examination of cranial nerve involvement: Initiating and sustaining phonation, deviation of the tongue, inequality of the lateral movements and deviation of the uvula and movements of the soft palate or difficulty in swallowing are included.

-> Sensori motor involvement is tested by repetition tasks and mispronounciations are scored as errors. A naming task is also included here, utilizing line drawings of simple items.

-> Functional speech consists of a vocabulary test, in which the patient has to explain the meaning of words and proverbs.

SECTION-D: includes test of visual and writing disturbances, such as drawing a man, reproducing letters, spelling, writing words and sentences on dictation, and spontaneous writing, tested by writing a paragraph about a picture.

No section has more than 4 items and in many cases all these need not be given. The examination takes 30 or 35 minutes.

The Neurosensory Center Comprehensive Examination for Aphasia (NCCEA) - Spreen and Benton,1968.

Purpose: The implicit purpose of NCCEA is the comprehensive examination of the language skills of patients suspected of being dysphasia. This examination helps to assess understanding and production of language, retention of verbal material, reading and writing.

This test consists of 20 language tests and 4 control tests of visual and tactile functions. The subtests of the NCCEA include:

[1] Visual naming of common objects.
[2] Description of use of the same objects.
[3] & [4] Tactile naming with right and left hand.
[5] Sentence repetition of tape recorded sentences.
[6] Digit repetition.
[7] Digit reversal.
[8] Word fluency, using three one-minute trials for all the words recalled, beginning with a specific letter.
[9] Sentence construction from five sets of upto three words.
[10] Object identification by name (auditory recognition task), where the patient points to objects named by the examiner.

[11] Identification by sentence, using a shortened version (36 items only) of the Token Test (Spreen & Spellacy,1969).

[12] Oral reading of names of objects presented before.

[13] Oral reading of the 12 command sentences in test 11.

[14] Silent reading of names, which involves matching the written name of an object to a display of objects.

[15] Reading sentences for meaning. The patient is instructed to executel2 of the written commands used in test 11.

[16] Visuographic naming requests the patients to write the names of 10 objects presented visually.

[17] Writing names, which scores test 16 for correctness of spelling. If the naming portion is not performed, then the patient is dictated a name and asked to write it.

[18] Writing on dictation of two sentences.

[19] Copying sentences.

[20] Articulation (which is also a list of repetition) of 30 meaningful and 8 nonsense words, presented from a tape recording.

Scores are entered on profile sheets and can be compared with norms for normal adults and for an aphasic population as percentiles. Corrections for age and educational level are applied for some tests. It has been standardized for 81 patients.

Functional Communication Profile - Sarno,M.T. 1969.

Designed to measure "Functional performance reflective of natural language use in contrast to the clinical performance" elicited in formal language tests which often sample artificial behaviour.

The FCP consists of a list of 45 communication behaviours considered communication functions of everyday life, subgrouped as movement, speaking, understanding reading and other behaviours. The subject is rated on actual use for each behaviour, on the basis of a non-structured interaction in a conversational situation, with reference to his premorbid skills. The ratings of each behaviour are made on a continuam along a 9 point scale. Ratings take into account, speed, accuracy, consistancy, voluntary control without external cues and compensatory functions. EAch rating is converted into percentages in each of the 5 modalities - movement, speaking, understanding, reading and miscellaneous category which includes writing and calculation. An overall score is a single measure of an individual's communication effectiveness in every day life. A conversion chart is provided. The profile makes no reference to symptamatology or diagnostic categories. It does not suggest a rationale or directions for treatment. It has a descriptive value. That is the ratings suggest patterns of verbal behaviour for the individual patient. Information on normative data, reliability and validity is provided.

The Porch Index of Communicative Abilities - PICA (Porch,B.E.197

This test of aphasia was first proposed by Porch,B.E.(1967) revised in 1971 & 1981.

This clinical tool is designed to assess and quanlify certain verbal, gestural and graphic abilities.

Through it's use the clinician may obtain general and specific levels of output ability and make inferences about input and integrative ability. The index is made up of 18 subtests, four in verbal, eight in gestural and six in graphic response modalities using 10 common object as stimuli. In the recent edition, Porch adjusted subtests categories according to functions - 4 verbal, 2 pantomime, 2 auditory, 2 reading, 2 visual and 6 writing.

Porch (1971) suggested that the two major requirements of an aphasia test are high reliability and a scoring system which specifies the nature of the patients response in terms of multiple dimensions. So the patients responses are scored through the use of a multidimensional scoring system, the scores being recorded on the index score sheet. This multidimensional scoring system describes a response in terms of several dimensions rather than limiting the description to the plus-minus dichotomy which may be ignoring important information. This system includes the following dimensions:

Accuracy -> the degree of correctness or rightness of a response. Responsiveness -> the ease with which the response is elicited, especially in terms of how much information the patient requires in order to complete the task.

Completeness -> is the degree to which the patient carries out the task in it's entirety.

Efficiency -> is the degree of facility the patient demonstrates in performing the motoric aspects of the response.

At the completion of testing, the subtest scores are compiled and the computation of gestural, verbal and graphic levels and of the overall communication level is carried out. This information is then recorded and graphed on the index response summary for later interpretation.

The test has been standardized, great emphasis is laid on tester training. Time of administration can range from 22 to 143 minutes.

Analysis of test results proceeds from general to specific consideration, first referring to the overall and modality levels, then to the subtest means and finally to the item scores. Additional test interpretation is provided by the use of profiles of subtest means plotted on graphs. These profiles when compared with norms are useful in planning treatment, selection of modalities and measures of progress.

Appraisal of Language Disturbances - ALD (Emerick,L.1971)

The ALD is a clinical tool designed to permit the clinician to make a systematic inventory of patients communicative abilities both in the modalities of input and output and the central integration processes. The clinician receives a description of the patients capacity with respect to the various pathways for stimulation and response. Tasks are arranged in an ascending order of linguistic complexity within each subtest assessing input and output factors, allowing evaluation of nature and extent of the problem. Additional flexibility is provided by several open ended items. The ALD also includes a unit designed to assess central language processes and a final segment for evaluating areas of functioning peripheral to symbolic language such as tactile recognition, airthmetic abilities and the oral area.

The 10 subtests include:

-> The oral to oral subtests include automatic speech, repetition, supplying opposites to words, sentence completion, definition and disparities (word finding)

-> The oral to visual - include pointing to objects, pictures and words, comprehension and reading.

-> The oral to gesture subtests are partly tests of praxis, such as shaking the head, coughing, whistling, humming, pointing to body parts and demonstrating actions.

-> The oral to graphic subtest is writing on auditory stimuli, the subtests are similar to the oral to oral tests, except the patient responds in writing.

-> The gestural to visual subtest assesses comprehension of gestures, with multiple choice objects, pictures and words.

-> The visual to gesture subtest examines praxis, with actual objects.

-> The visual to oral subtest contains reading and naming tasks.

-> The visual to graphic subtest includes copying, writing the names of objects and writing about a picture.

-> Central language is said to be examined by matching of silhouttes to line drawings, pictures to each other and pictures to written words.and

-> Related functions: A special test of demanding or asking, airthmetics and examination of tongue, lip and jaw movement and phonation.

The subjects performance is rated on a 5 point rating scale and a summary profile given. Reporting is descriptive.

The ALD protocol outlines the severity of a patients language disturbances and the areas of impairment. It does not yield a classification system nor does it attempt to place aphasics into various categories.

A Gujarathi version of the ALD has been developed at the B.M. Institute, Ahmedabad, where it is currently in use.

The Auditory Comprehension Test for Sentences (ACTS) - Shewan & Canter, 1971.

This is another test which basically tries to assess language ability based on auditory compatibility of the individual. This test contains 42 sentences, which vary systematically in the parameters of length, vocabulary difficulty and syntactic complexity. The patient responds by pointing to the correct picture from an array of four corresponding to the sentence presented orally by the examiner. There are 7 types of sentences with six examples of each type, created by increasing the difficulty of the three parameters independently, to a moderate and high degree. Scoring uses a weighted system with prompt (0-3 sec), correct (4-10 sees), and delayed (11-30 sec) responses. Incorrect, perseverative categories are scored as zero. The time estimated to administer the test is 20-30 minutes.

The Sklar Aphasic Scale (SA) - Sklar, 1973.

Sklar(1973) has attempted to give a scale to test the abilities of aphasics which he has named after himself bycalling it as "Sklar Aphasia Scale".

In this test there are 4 subtests representing the four language areas. Each subtest contains 25 items.

1. Auditory Decoding: uses identifying body parts, understandin simple questions, identifying words and objects in the environment, identifying useful objects and recalling the object's name (memory span).

2. Visual decoding is tested by matching printed words, matching words with pictures, sentence completion, airthmetic and silent reading with pointing to correct answers.

3. Oral encoding scores functional speech, repeating spoken words, naming objects, reading an article aloud and telling about five items remembered, and describing actions of people in a picture incident.

4. Graphic encoding requires the patient to write his name and address, copy words from a model, write names of pictured objects, sentences from dictation and describe a picture.

Each item is scored correct (0), retarded(1), assisted (2), distorted (3) erased or no response (4). A total impairment score is determined by adding the four subtest scores and dividing the sum by four. The patients are classified into categories of:

-> minimal impairment 0-10

-> mild impairment 11-20

-> moderate impairment 21-60

-> severe impairment 61-90

-> total or global impairment 91-100

and those categories are also described in terms of functional communication. The author claims that on the basis of the total impairment score a prognosis for recovery can be made. The lower the total impairment score the better is the prognosis.

Queensland University Aphasia and Language Test (QUALT)
- Tyres et al (1973)

The QUACT consists of a battery of language tests comprising of 4 groups corresponding to 4 primary region channels of verbal communication.

1. Auditory comprehension (AC)
2. Oral Expression (OE)
3. Reading (R) and
4. Writing (W)

Each channel is represented by several subtests of language function.

- 4 subtests for AC
- 11 subtests for OE
- 8 subtests for R and
- 7 subtests for W

making 30 subtest altogether. Each subtest is dividied into a number of items. It was attempted to construct items of progressively increasing difficulty, item 2 being more difficult than item 1 and so on. Tests for AC are administered first, in order to assess and take into account any loss on this channel of communication when testing OE. Similar consideration lead to the assessment of reading comprehension before writing.

Authors claim it is a comprehensive and detailed battery 3-4 parallel forms are available. It takes 1 - 1 1/2 hours to administer this test.

Western Aphasia Battery (WAB)
-Kertesz & Poole (1974), Kertesz.A (1982)

Kertesz and Poole(1974) developed another test battery called "Western Aphasia Battery" incorporating some of the material from the Boston Diagnostic Test for Aphasic of Goodglass & Kaplan (1972).

The Western Aphasia Battery is designed for research and clinical use. The language subtest can be administered in an hour to most patients, although two such sessions re often required for the full battery.

The oral language subtests - (a) spontaneous speech (b) comprehension, (c) repetition and (d) naming - are used to assess the severity and type of phasia. The summary of their scales scores provide the Aphasia Quotient (AQ). When reading,

writing praxis, drawing, block design, calculation and Raven's Progressive Matrices Scores are added, the Performance Quotient (PQ) is obtained, and AQ and PQ combined provided the Cortical Quotient (CQ), a summary of the cognitive function.

The first language parameter assessed is spontaneous speech, measured in terms of fluency and information content. This is tested by conversational questions and presentations of a simple picture which the patient is asked to describe. Carefully graded criteria are used to judge fluency of speech in 1 to 10 scale. The same spontaneous speech is scored for information content depending on the number of items answered correctly.

Comprehension is measured in three ways. First, thePatient 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, colors, letters, numbers and shapes. Finally, the patient is asked to perform sequentially ordered auditory commands with 3 single objects to each other, or placing them in relation to each other.

Repetition is tested with words and increasingly complex sentences of low and high probability. Naming is scored by:

(a) requiring the patient to identify 20 objects.

(b) Finding names for an object category.

(c) Sentence completion and

(d) Questions requiring single word responses.

The subscores of 4 items of the test - they are (1) spontaneous speech, (2) comprehension, (3) Repetition, and (4) Naming allow a classification of the patient according to the taxonomic principle into one of 8 subtypes of aphasia.

Classification:

	Fluency	Comprehension	Repetition	Naming
	Expressive			
1. Global	0-4	0 -3.9	0-4.9	0-6
2. Brocal	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 a clinically valid baseline for research, diagnosis and prognosis.

Apart from the English version, Indian adaptation in Kannada, Hindi, Gujarathi, Marathi & Tamil are being used extensively for clinical purpose in India.

Benton, Spreen, De Renzi and Vingrow, a team of psychologists and neurologists, are engaged in the construction of a test battery for Aphasia and they hope that it will be possible to use this test in all languages through out the world and they have named the test as " International Test for Aphasia" Benton and his collaborators do not consider that this test battery will provide in depth protocols of aphasic patients. They view their inventory as an instrument to provide useful clinical information and which will serve as a valid research technique. They consider that it will be possible to present the final form of the test only in 10 subtests and not requiring more than 50 minutes to administer.

The Boston Diagnostic Aphasic Examination - BDAE
- Goodglass & Kaplan(1982)

This test is like PICA, one of the widely used tests. This test was developed in the tradition of approaching the aphasia on the one hand as a psychological analysis and measurement of language related skills and on the other hand as a problem in relating particulr configuration of symptoms with their neuropathological correlates.

Purpose: BDAE was designed to meet 3 general aims:

1. Diagnosis of presence and type of aphasic syndrome, leading to inferences concerning cerebral localization.
2. Measurement of the level of performances over a wide range, forboth initial determination and detection of change over time.

3. Comprehensive assessment of the assets & liabilities of the patient as a guide to therapy.

The subtests included in the tests are:

1] Examination of conversational or expository speech (9 items).

6 features of speech production, melodic line, phrase length, articulatory ability, grammatical form or variety of grmmatical construction, praphasias in running speech and word finding are rated subjectively, by the examiner on a l-7scale.

2] Auditory comprehension - is measured by:

(a) Word discrimination which is a multiple choice auditory word recognition test, sampling 6 semantic categories, such as objects, geometric forms, letters, actions, numbers and colors.

(b) Body parts and finger identification.

(c) Commands of increasing complexity.

(d) Complex ideational material, requiring only "yes" and "no" responses to matched questions'.

3] Oral expression comprises of:

(a) Oral agility - which is divided into

-> Nonverbal agility - alternating movement of the tongue and lips.

-> Verbal agility - rapid repetition of words.

(b) Automatized sequences of days, months, numbers and the alphabet.

(c) Recitation of nursery rhymes, singing and tapping rhythms.

(d) Repetition of words, including letters numbers and a tongue twister.

(e) Repetition of phrases and sentences.

(f) Word reading.

(g) Responsive naming.

(h) Visual confrontation naming.

(i) Body part naming.

(j) Animal naming, measuring fluency in controlled association.

(k) Oral sentence reading.

4] Understanding written language is measured by pointing to multiple choice item. Word recognition involves the selection from a multiple choice of five written words, phonetic association, comprehension of oral spelling, symbol and word discrimination. The comprehension of written words is tested with word-picture matching, as well as reading sentences and paragraphs. The test of reading comprehension is accompanied by pointing to a multiple choice of words, completing the test sentence or paragraph.

5] Writing is tested by instructing the patient to write his name and address and then copy a printed sentence The mechanics of

writing is scored on a 0-3 scale. The recall of written symbols is accompanied by serial writing of the alphabet and numbers and dictation of individual numbers, letters and words, at a primary level. Spelling to dictation and written confrontation naming with a range of words of average difficulty is also used. Finally, written formulation is tested by getting the patient to write connected sentences about a picture with the patient being scored on a five point scale, from 0-4.

Thus the subtest of the battery have been chosen so as to elicit quantitative evidence of the many possible areas of defect and represent alternative "windows" that enable one to infer the status of an underlying capacity.

Fluency is judged from speech production during extended conversation and free narration. The BDAE prescribes an interview followed by presentation of a complex picture situation as a stimuli for a short narrative description. A rating scale for fluency is included in a set of 6 rating scales for those speech characteristics that are difficult to quantify objectively.

In addition there are supplementary language tests which cover an exploration of psycholinguistics factors in auditory comprehension and in expression, exploration of disorders of repetition, study of the sparing of comprehension of whole body involvement commands and screening for hemispheric disconnection

symptoms. The subtests are based on experimental and clinical experience but have not been incorporated into the aphasia battery. They are meant for the use of the examiner who is interested in a more complete understanding of the patients language functioning because of it's value in diagnosis ,therapy or both.

There is a final section on supplementary non-language tests which include drawing on command and copying reproduction of stick figures and three dimensional block designs, finger comprehension, finger naming, visual finger matching, right-left test, airthmetic test, clock setting, finger identification and matching two-finger position.

Profiles of each individual aphasic is drawn on all of the above subtests and rating scales.

The BDAE has been adapted or is being adapted and translated into Indian languages like Hindi, Tamil, and Telugu, some amount of clinical data has been compiled in these - Indian versions. (Puranik,A,1985; Kacker and Pandit, 1988).

Linguistic Profile Test (LPT) - Karanth,P (1980)

Originally designed in 1980, in Kannada, in order to obtain a language sample large enough and varied enough to permit a comprehensive linguistic analysis of aphasic language. It was designed within the systems approach, covers most of the major

linguistic features of the language and explores alternate modalities of reception and expression. It is more a descriptive tool than a diagnostic one.

The LPT was originally called the Test of Psycholinguistic abilities in Kannada (Karanth,P 1980, 1981). A parallel version in Hindi was developed in 1988, at which time the name of the test was changed to LPT in order to make it language free.

The LPT has been used extensively with clinical population both adults and children has been found clinically useful both for evaluation and as a basis for rehabilitation and linguistic retraining of the communicatively disabled (Karanth,P. 1988). It provides a useful means to tap the impaired and spared linguistic skills and structures at different linguistic levels which can serve as a baseline and guide for therapeutic programming and monitoring.

Dysphasia diagnosis and analysis coding card system Charey,P.(1980)

For her doctoral thesis, the author designed a test battery suitable for regular bedside use incorporating a diagnosis or analysis coding card system including extended test procedure to cover literates and polygots. The testing procedures covers a wide range of language abilities including cerebral dominance, lobar localization, nonverbal disorders and sequential and spatial integrative abilities. Test items include free

conversation, contextual conversation, auditory perception, repetition, speech formulation, complex ideational material, visual comprehension and perception, serial and sequential integration, somatic orientation, spatial integration, numerical relationships and drawing and copying. Additional subtests are provided for assessment of reading.

The severity scoring is based on Schuell's criteria in the MTDDA. A master dysphasia card is provided for localization and counter checking of linguistic features. The extended form takes approximately 2 hours for administration while the short form can be given inhalf an hour.

Normative data on 88 dysphasies above the age of 7 years and 40 controls matched on age, sex and literacy has been collected.

Bilingual Aphasia Test (BAT) - Paradis, M (1987, 1990)

This is a multilingual battery for testing language skills in bilingual and polygol aphasic patients.

The protocol consists of 3 parts:

(1) A detailed questionnaire to reconstruct the patients bilingual history (contexts of acquisition and use)

(2) A test of each language, comprising spontaneous speech, comprehension exercises, repetition, naming series, recitation, sentence construction, test of verbal fluency, semantic and grammatical exercises, a verbal auditory discrimination test, reading writing and mental airthmetic.

(3) A test for each given pair of languages, comprising translation and acceptability judgements for sentence incorporating syntactic surface structures of the other language. Equivalent versions have been produced in about 30 languages.

In each language, speech is analyzed at various levels of spontaneity and formality, spontaneous conversation, description of a connected series of pictures, sentence construction and production of grammatical transformation in accordance with instructions followed by examples.

So that norms may be established for each component of the protocol, the tests are given to population of hospitalized neurologically non-impaired unilingual and bilingual patients.

The purpose of these test is not to diagnose aphasia, but to compare linguistic performance in each of the patients language along as many parameters as possible. However, since the battery comprises tests usually considered reliable indicators of deficits characteristics of specific types of aphasia; a differential aphasia would become apparent, given the pattern of discrepancy between deficits in the two languages.

The bilingual aphasia test has been/is being developed in the following Indian languages - Hindi, Urdu, Kannada, Tamil, Gujarathi and Oriya.

Psycholinguistic Language Test for Aphasia (PLTA) - Mayadevi Ghante

The test design was taken up by the author for her doctoral work and is based on the frame work of a linguistic model which concerns itself with language as a psychological process.

The test based on the information structure model consists of tasks eliciting performance on the expression and comprehension of language forms associated with the formation levels.

The subject population on which it was initially tried out consisted of 30 normals above the age of 15, 30 brain-damaged non-aphasic subjects and 30 brain damaged aphasic patients.

The PLTA tests results are of help to the clinician from 2 points of view:

(1) What it tells the clinician about the aphasic deficits, and
(2) What it suggests for therapy.

These in brief, are the formal language tests for aphasia.

Thus the review of the tests reveals an interesting paradox. The end product of the administration of any one of the tests is a "diagnostic statement", which may take one of several forms. It might be categorizing the patient as showing a particular type of aphasia. For Eg-> Expressive or Receptive using.

Eisenson's Examining for Aphasia

-> Type [1] in MTDDA

-> Syntactic - if LMTA

-> Broca's if BDAE or WAB

The FCP & CADL on the other hand yield statements of "Functional Level". Given this array of possible classification schemes, one would expect that the instruments would reveal basic design differences. Close examination of the ways in which the tests are constructed in terms of the types of the items and performance requirements, however, shows that there is a remarkable similarity between the tests. The difference lie primarily not in the choice of items and their performance requirements, but rather in the manner in which they are administered (even here the differences are often minimal), scored and grouped for interpretation. There are, of course, differences between tests in terms of the numbers of items in an area such as naming to which the patient is asked to respond. Type of stimulus and manner of response also vary from test to test. However, inspite of these differences, the overall content of the test does not vary greatly. Thus it shows that no matter what the theoretical bias of the authors of the tests, the phenomenon of language disturbance falling under the rubric of aphasia requires that these areas of linguistic function be examined.

Th e present study attempts to design an aphasia test in Malayalam based on WAB (Kertesz,1979) because, although there are a considerable numbers of tests for aphasia available in both English and other Indian languages, there are no aphasia tests in Malayalam. Such a test would help in identifying the aphasic, describing the aphasia and classifying it into various subgroups. For the purpose of diagnosis, prognosis and therapy such a test would be very useful in speech and language clinics in Kerala since one of the primary concern of speech and language pathologist is to assess and improve the communication skills in aphasia.

METHODOLOGY

In the present investigation, an attempt has been made to develop a test in Malayalam based on the principles of Western Aphasia Battery (Kertesz 1979) to assess the language ability in adults with and without language pathology.

The study consists of two stages:

(1) Development of the test.

(2) Administration of the test.

DEVELOPMENT OF THE TEST:

The following language parameters were identified as being important for an aphasia test.

1. Description of spontaneous or conversational speech.
2. A measure of information value.
3. A measure of fluency.
4. Auditory comprehension.
5. Naming.
6. Repetition.
7. Reading comprehension.
8. Writing.
9. Airthmetic.
10. Gestural expression (Praxis)

Most clinically useful aphasia tests like BDAE, WAB, etc will explore these language parameters.

The present test has subtests which are based on similar lines as that of WAB (Kertesz 1979). Under each subtests materials were developed. These materials are mainly the translation of WAB-English (Kertesz 1979) but some are modified to suit the linguistic principles of Malayalam and the Indian cultural context. (See Appendix-I)

Thus the subtest of this study are as follows:

Oral Language Subtests (AQ)

>I> Spontaneous Speech

a) Description of test and materials.

This item is 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 a few encouraging comments are permitted. The two important aspects of spontaneous speech to be examined are the information content and fluency.

Consist of six questions which are mainly the translation of original WAB and a picture card. This picture card has been modified to the Indian culture.

Scoring:

Information content and fluency are scored according to the set criteria for spontaneous speech (See Appendix-1)

II> Auditory Verbal Comprehension:

Since patient performance is 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" Questions.

Description of materials:

The patient is asked to reply or nod "Yes" or "No" to 20 questions. The first nine questions are the most relevant to the patients own person. The next five questions are related to the environment and the last six are more general in their context, yet remain semantically simple and short, although there is an increase in linguistic complexity requiring more comprehension of syntax, such as relational words. The use of Yes/No responses avoids to some extent the pointing difficulty or apraxia that may interfere with the other tasks 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. Record responses in the appropriate column:- verbal, gestural or eyeblink. If the patient self corrects, the last answer is scored. If the response is ambiguous, score 0.

(b) Auditory Word Recognition:

Description of the Test and Materials:

The patient is asked to point to an item, spoken by the examiner, from an array in the same category. Materials of this task are six objects, six line drawings 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 item of finger recognition and seven of right and left orientation.

Instruction:

Ask 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 is allowed.

Scoring:

Score 1 point for each correct responses. If the patient points to more than one item, score 0, unless it is 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 subtest is also used to examine the comprehension of syntax consist of 11 commands. The initial commands and sequences are 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 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 sentences and the number of clauses is also increased.

Instruction:

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

Scoring:

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

III> Repetition:

Description of the Test.

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

Instructions:

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 pronounciations are 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 include

(a) Object Naming:

Naming of objects on visual confrontation constitutes 60% of the naming score. Twenty common prototypical objects that are easily available are shown individually. The sample contains various categories, shapes and sizes. The patient first is asked to name

the object on visual presentation. In the case of no response or incorrect response, the patient is allowed to palpitate it and if necessary, the first phonemic of the word is given as a cue. If it is a composite word, the first half is given as a semantic prompt. A total of 20 sec is allowed for all of these steps for each object.

Scoring:

Score 3 points if named correctly or with minor articulatory error, 2 points for a recognizable phonemic paraphasia and 1 point if an phonemic or tactile cue is required.

(b) Word Fluency - is 20% of the naming score. It is measure 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 sec. if no responses are forthcoming.

Scoring:

Score 1 point for each animal named, even if distorted by literal paraphasias.

(c) Sentence completion - is 10% of the naming score. Here the patient is asked to complete what the examiner say. There are 5 items here.

Scoring:

Score 2 points for correct response and 1 point for phonemic paraphasias.

(d) Reponsive speech - is 10% of the naming score. Here the wor finding is facilitated by the context of the preceding sentence. There are 5 items here.

Scoring:

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

V> Reading - This task include

(a) Reading comprehension of sentences:

This test utilizes the technique of sentence completion with a four-way multiple choice. There are 8 sentences. These sentences range in complexity from 3 words to a small paragraph of two sentences.

Here the patient is instructed to read these sentences and point to the missing word. Ask him to choose the best from those. Instructions may be repeated if the patient does not seem to understand.

(b) Reading commands - is scored for reading aloud and for doing what the card requests, separately. If consists of 6 commands which are increasing in length and complexity.

If the combined score of A and B is 50 or more, discontinue reading tests and give full credit of 100 minus twice the difference from 60.

(c) Written word stimulus - Object choice matching

Here the objects are placed in a random order before the patient, and the patient is asked to point to the object that corresponds to the word presented on cards. Score 1 point for each correct response.

(d) Written word stimulus - Picture choice matching

The card with pictures on it is placed before the patient and the patient instructed to point to the picture that matches the word that is presented individually on cards. Score 1 point for each correct response.

(e) Picture stimulus - Written word choice matching

The card which has the words listed on it is placed before the patient. The patient is then requested to point to the word that is same as the picture. The pictures are presented individually on cards. Score 1 point for each correct response.

(f) Spoken words - Written word choice matching

The patient is presented with cards and asked to select the orally presented target word from a choice of 5. Score 1 point for each correct response.

(g) Letter Discriminaion:

Six individual letters are spoken by the examiner and the patient chooses from the printed choice of six.

(h) Spelled word Recognition:

Here the patient is asked to name the word that is spelled orally by the examiner. Score 1 point for each correct answer.

(i) Spelling:

Six common stimulus words are spoken. 2-7 letters in length. The patient is asked to spell each of them.

VI> Writing

Writing tasks are divided into the standard subtess such as writing on request, dictation and copying.

(a) Writing on request - The patient is asked to write his name and address. Score 1 point for each recognizable word or number. Deduct 1/2 point for each spelling mistake or paraphasic error.

(b) Written output - The patient is asked to write as much as he can in sentences about the same picture that was shown for the spontaneous speech subtest. Score 34 points for a full description, 8 points for each complete sentences with 6 words or more, 1 point for each correct word in incomplete or short sentences. Deduct 1/2 point for each spelling or

paraphasic error score isolated words 1 point, to a maximum of 10 points.

(c) Writing to dictation - The patient is asked to write the sentence that the examiner dictates to him. The sentence may be broken up if the patient cannot remember it and parts repeated once. Score 10 points for the complete sentence or 1 point for each correct word. Deduct 1/2 point for each spelling or paraphasic error.

(d) Writing of dictated or visually presented words: The patient is asked to write the words dictated to him. If the patient fails to write the name of one of the objects dictated, the actual object is shown and the patient is encouraged to write the name. If he still fails, the word is spelled by the examiner and the patient is asked to write it. The last alternative is to have the patient spell the word using cut-out letters.

(e) Alphabets and Numbers:

The alphabets and serial number upto 20 are requested. Score 1/2 point for each letter or number even if it is out of order.

(f) Writing of dictated letters and numbers:

Six letters and six numbers are dictated.

Score 1/2 point each for correctly written letter and one for each complete number.

(g) Copying of words of a sentence:

Score 1 point for each correct word, 10 points for the complete sentence. Subtract 1/2 point for each incorrect letter.

VII> Apraxia

Twenty commands are given for upperlimb, buccofacial, instrumental (transitive) and complex performances.

Instruction: Tell the patient "I am going to ask you to do some things, try and do them as well as you can". If the patient fails to perform the command well, imitate the action. If this fails, then give the patient the real object.

Scoring: The patient is scored 3 for acceptable, 2 for approximate performance, 2 for imitation only and 1 for approximate performance on imitation or if performed with actual object.

VIII> Constructional, Visuospatial and Calculation Tasks:

(a) Drawing:

The patient is asked to draw a circle, square, Christmas tree, cube, clock, house and person and also, to bisect a line (to quantitative visuospatial neglect).

Scoring considers completeness, perspective and quality and penalizes perseveration, disconnected lines, inappropriate angles and neglect.

(b) Block Design:

The first 3 items and a demonstration item from the Wechsles Intelligence Scale Block Design Test (Koh's Blocks) are used, with a modified scoring system (See APPENDIX)

(c) Calculation:

The calculation task utilizes one or two digit numbers, 3 items for each of addition, subtraction, multiplication and division. These tasks are presented visually on cards as well as the examiner speaking the nubers and the requested airthmetical operations.

(d) Raven's Colored Progressive Matrices:

Sets A, AB, and B are used to assess visuospatial perceptual function and nonverbal intelligence. The Malayalam aphasia test thus developed is given in the appendix.

ADMINISTRATION OF THE TEST

Subjects:

In order to find the validity of this test, the test was administered on a group of normal adults.

GROUP-I:

Five normal adults of age range 21-30 years. They were bilinguals whose mother tongue was Malayalam. Although they were equally proficient in both languages, they used English more frequently as their functional language. Number of years during which they were exposed to these languages are given in the Table-1. All of them were right handers.

Subject No.	Age years	Sex	Education (Years)	Language exposure in years Malayalam	English
1.	22	F	17	22	17
2.	21	M	15	21	15
3.	25	F	17	25	20
4.	22	M	17	22	17
5.	23	F	17	23	14

TABLE-1: Showing the age,sex, education and language exposure of Group-I (Normal bilingual adults).

After the validification of this test, it was administered on two groups of subjects, to obtain clinical norms on this test.

GROUP-II - Adults with normal speech and language.

GROUP-III - Aphasics with defenite brain lesion and language disorders.

Handedness was determined by questioning the subject or reletives about hand preference for (1) writing (2) throwing (3) cutting (4) drawing (5) brushing and (6) using a spoon, with four out of six items deciding handedness.

GROUP-II : Consisted of 100 normal adult subjects who did not report any history of brain damage or neurological disease. These subjects were considered as normals in their society and by the investigator. All of them were right handers. Language most frequently used by this group was Malayalam (both at home and

outside)[see Table-2]. However, some of them were exposed to English as a medium of instruction, and as a single subject during their schooling.

Subjects	No	Age		Sex distribution		Educa
		Range	Mean	Male	Female	Range
GROUP-I	20	21-30	23.1	10	10	15-17
	20	31-40	33.6	10	10	8-18
	20	41-50	44.4	10	10	5-19
	20	51-60	55.65	10	10	5-16
	20	61-70	65.45	10	10	5-16

TABLE-2: Showing age, sex distribution, educational level and exposure to Malayalam Language of controls (100 normal adults).

GROUP-III:

Consists of 8 aphasic subjects. Criteria for admission to this study were that the patient was clinically considered aphasic by a Physician or Speech Pathologist and well enough to be tested. The majority of the patient had cerebral infarction and were neurologically and pathologically stable. All of these subjects were monolignuals, whose mother tongue was Malayalam. However, few of them were exposed to English as a single subject during their schooling for a duration of 3-4 years. All of them were right handers.

Subjects	Age yrs	Sex	Post onset Time of Test	Education (Years)	Exposure to Malayalam language	Complaint or physical sign	Physicians diagnosis Clinical impression	CT Scan data
A	65	M	60 days	8	65 years	- Right side - Visual problem - Loss of speech hypertension	Total Aphasia	Large left sided sided hypertension haemorrhages involving the basal ganglia
B	48	M	34 days	9	48 years	- Weakness of right hand and face	- Paresis of the right side of the face and of the right upper extremity. - Repetition disorder	Vascular lesion of the posterior end of the sylvian fissure
C	69	F	60 days	5	69 years	- Visual problem - Speech problem	- Homonymous hemianopia - Wernicke's syndrome	Lesions in ttie left posterio superior temporal labs - Embolic Store
D	42	M	48 days	10	42 years	- Cannot remember names	- Anomic Aphasia	- Vascular lesion in left temporo parietal region
E	52	F	58 days	10	52 years	— Right side paralysis - Loss of speech	- Right hemiplegia - Brocas Aphasia	— Infarcts in the left cerebellar hemisphere and right parietal lobe adjacent to the body orf the left venticle waterhsed area of the left MCA &, PCA
F	70	M	62 days	5	70 years	- Paralysis of whole body - Loss of speech	- Global Aphasia	Large left temporal lobe haemorrhage haemorrhage and multifocal lesion in the posterior frontal opercular
G	65	M	55 days	8	65 years	- Paralysis and loss of speech	- Total aphasia	Lesion in the left fronto-tempero parietal language language zone-suspect MCA failure
H	45	F	60 days	3	45 years	- Right side hemiplegia - Loss of speech	- CVA with hypertension - Brocas Aphasic	Infarcts in 3rd frontal convolution

TABLE-3: Showing the age, sex, post onset time of testing, educational background, language background complaint or physical signs, physicians diagnosis or clinical impression and CT Scan data of 8 aphasic subjects.

In order to compare the performance of aphasics on this test with English WAB (Kertesz,1979) performance which has been previously standardized, both these tests were administered on a group of aphasics.

GROUP-IV:

Three bilingual aphasics whose mother tongue was Malayalam. Although they were equally proficient in both English and Malayalam, their functional use of English was limited to the professional circle. They were all right handers.

Subjects	Age years	Sex	Past onset time of	Education (in years)	Exposure to Language(in years) Malayalam	English	CT Scan data
I	52	M	65 days	19	52	47	Infarction in the left fronto-parieta region – left MCA territory.
J	34	F	57 days	17	34	29	Cerebral thrombosis Lesion in the front lobe involving areas 45 & 44
K	48	M	39 days	20	48	38	Fronto-parietal non–haemorrhagic enhancing infarcti in the left MCA territoy

TABLE-4: Showing the age, sex, post onset time of testing, Educational background, language background and CT Scan data of 3 bilingual aphasics.

The results of this test on these 3 bilingual aphasics were compared with the results obtained by the same subjects on English WAB Kertesz(1979).

The test procedures, instructions, scoring, and other formalities were same as mentioned earlier.

RESULTS AND DISCUSSION

The test for aphasics in Malayalam composed of 4 language subtests and 3 performance tests has been described in the previous chapter.

Validity of the test:

Any sophisticated instrument needs to ensure that it's claims are true. The order to ensure that this test's claims are true, the results of this test on 5 bilingual normal adult subjects were compared with the results obtained by the same subjects on English WAB(Kertesz, 1979).

In order to validate this test, bilingual normal adults were used as subjects, because qualitatively different patterns of dysphasia have been observed in individual polyglots and bilinguals at the same time. (Bychowski 1919; Albert and Obler 1975; Silverberg and Gordon 1978).

A detailed statistical analysis of comparison of performance of bilingual normal adults on Malayalam WAB and English WAB (Kertesz 1979) are shown on Table 5 & 6.

Subtests	Z	P
Content	0	1
Fluency	0	1
Comprehension	1.527	0.126
Repetition	0.436	0.662
Naming	0.872	0.382
AQ	0.872	0.382
Reading	1.309	0.19
Writing	0.436	0.662
Constructional visuospatial calculation. Raven's Score	0	1

TABLE-5: showing the performance of bilingual normal adults (Group-I) on both Malayalam WAB and English WAB. Test used: Mann Whitney Test.

From Table-5 it has been found that since the P values are greater than 0.01 & 0.05, there is no significant difference between the performance of bilingual normal adults on these two tests.

Subtests	Pearson's correlation (r)	Spearman's correlation (rho)
Content	1	1
Fluency	1	1
Comprehension	]	1
Repetition	1	1
Naming	0.7579	0.7607
AQ	0.7057	0.7607
Reading	0.7057	0.7607
Writing	1	1
Praxis	1	1
Constructional visuospatial calculation. Raven's Score.	1	1

TABLE-6: Malayalam WAB - English WAB correspondence correlatio of bilingual normal adults (GROUP-I).

Table-6 indicates a high degree of positive correlation between the subtests of Malayalam WAB and English WAB on bilingual normal adults.

Thus the results indicate that this test is valid.

After validating this test, the test was administered on two groups of subjects.

GROUP-II : 100 normal adults age ranging from 20-70 years.

GROUP-III : 8 aphasics with definite brain lesion and language disorder.

The time taken to complete the test was approximately 20-30 minutes for normal adults. The aphasics took more than one hour, it varied from 90 minutes to 2 1/2 hours.

The number of subjects, their mean age, mean scores on subtests with standard deviation and AQ are summarized in Table-7

Number	Subjects	Age	Content		Fluency		Comprehension		Repetition		Naming		Aphasia Quotient		Reading		Writing		Praxis		Constructional Visuospatial calculation Ravens Score	
		X	X	S.D	X	S.D	X	S.D	X	S.D	X	S.D	X	S.D	X	S.D	X	S.D	X	S.D	X	' S.D
20	Group-I (21-30	23.1	10	0	10	0	10	0	10	0	9.74	.123	99.48	.246	10	0	9.7	1.56	10	0	9.8	1.56
20	Group-II (31-40 yrs)	33.6	10	0	10	0	10	0	10	C	9.68	.133	99.35	.267	10	0	9.7	1.56	10	0	9.8	1.56
20	Group-Ill (41-50 yrs)	44.4	10	0	10	0	10	0	10	0	9.41	7.181	98.79	.165	10	0	9.55	.02	10	0	9.65	1.17
20	Group-IV (51-60 yrs)	55.65	10	0	10	0	10	0	10	0	9.25	5.13	98.5	.103	10	0	9.31	5.35	10	0	9,43	4.44
20	Group-v (61-70 yrs)	65.45	10	0	9.64	.199	10	0	10	0	9.12	.100	98.24	.201	10	0	9.2	.102	10	0	9.31	4.47
8	Aphasics	57.5	3.31	2.45	3.5	3.3	4.29	3.04	3.09	2.63	2.39	1.84	32.98	24.95	3.13	2.94	1.82	2.46	3.77	2.94	2.94	3.04

TABLE-7: Showing the number of subjects, their mean age, mean scores by subtests and their S.D. and AQ.

As Table-7 depicts, performance of clinical population on all the subtests is very low compared to the performance of normal adults. For Eg. Mean AQ score of 32.98 for aphasics and mean AQ score of 99.48, 99.35, 98.79,98.24 for group I, II, III IV & V respectively and it can be observed that variability in performance is very high in aphasics when compared to all other groups.

Since the T-Test (which was administered on normal adult scores) showed that there was no significant difference in the performance between males and females at 0.05 level in each age group and also there was no significant difference in the performance between normal adults in various age groups at 0.05 level, the data was consdered as a whole.

A more detailed statistical analysis of comparison of performance of aphasics and normal adults are given in the following table.

Subtests	Z	P
Content	4.568	0.0
Fluency	4.568	0.0
Auditory Comprehension	4.568	0.0
Repetition	4.568	0.0
Naming	4.568	0.0
AQ	4.568	0.0
Reading	4.568	0.0

Writing	4.568	0.0
Praxis	4.568	0.0
Constructional Visuospatial calculation. Raven's Score	4.568	0.0

Test used: Mann - Whitney U-Test.

TABLE-8: Showing comparison of performances of aphasics an normal adults.

Since all the P-values are less than 0.01, it indicates that there is a significant difference in the performance between aphasics and normals as a group on each subtest at both 0.05 and 0.01 level.

The result of this statistical analysis indicates that the performance of aphasics in each subtest is significantly different from the normal adults as a group. Thus this test is capable of identifying the aphasics i.e. subjects having language disorder due to brain damage from the normal adult population.

For purposes of gross clinical diagnosis and clinico-anatomic correlation, a major distinction may be made i.e. between fluent and non-fluent aphasics, based upon their speech output, neurological disease (physical signs) and CT scan data.

Non-fluent aphasics have slow laboriously produced speech with abnormal speech rhythm and melody, poor articulation,

shortened phrase length and preferential use of substantive words (such as nouns and main verbs) rather than grammatical words (such as conjunction and auxilliary verbs). Their speech is often called telegraphic or agrammatic and is frequently associated with anteriorly located lesions. Presence of a significant hemiplegia places the lesion in motor pathways and suggests that the syndrome will be of a non-fluent type.

Fluent aphasics produce speech at a normal or hypernormal rate, with normal speech rhythm and melody, good articulation and normal or hypernormal phrase length. In fluent aphasics the lesion is usually located posteriorly in the cerebral hemisphere. Presence of a significant hemisensory defect or homonymous hemi-anopia, in the absence of hemiplegia, suggests that the dysphasic syndrome will have been caused by a more posteriorly located lesion and that the language disorder is likely to be a fluent type.

Thus the aphasics included in the present study were classified as having non-fluent aphasia and fluent aphasia based on their speech output, physical signs and CT scan data as given in the Table -9.

Nonfluent aphasics -> A,E,F,G & H

Fluent aphasics -> B,C & D

The performance of each subject belonging to nonfluent type and fluent type of aphasia on each subtest of this test are as follows.

Subjects	Content	Fluency	Auditory Comprehension	Repetition	Naming	A Q	Reading	Writing	Praxis	Construction Visuo spatial calculation-Raven
Non Fluent Aphasics										
A	1	1	2.05	1	0.4	9.5	0.9	0	0	0
E	3	2	4.75	3	3.35	32.2	3.1	0.85	4	2.35
F	1	0	0.75	0.4	.25	4.8	0	0	0	0
G	1	1	1.25	0.6	0.5	8.7	0	0	0	0
H	2.5	2	5.1	3.8	3.7	34.2	4.6	1.2	6.09	3.9
Fluent Aphasics										
B	5.5	6	7.95	3.6	3.8	53.7	6.8	4.65	8.3	6.35
C	5	8	3.4	3.8	2.1	44.6	2.1	1.25	4.1	0
D	7.5	8	9.05	8.5	5.0	76.1	7.5	6.6	5.6	7.3
Mean	6	7.33	6.8	5.3	3.63	58.13	5.46	4.16	6.0	4.55

TABLE-9: Showing the mean scores of nonfluent and fluent aphasics on each subtest.

Details regarding these aphasics, in terms of their age, sex, post onset time of testing, literacy and language background are given in Table-3, page...

The comparison of mean scores of 2 groups show that there is significant difference in the performance between 2 groups. For Eg. The mean AQ of non-fluent aphasics is 17.88 whereas the fluent aphasics mean AQ is 58.13.

A more detailed statistical analysis of comparison of performance of non-fluent and fluent aphasics are shown in Table-10.

Subtests	Z	P
Content	-2.236	0.025
Fluency	-2.236	0.025
Comprehension	-1.639	0.100
Repetition	-1.786	0.073
Naming	-1.639	0.101
A.Q	-2.236	0.025
Reading	-1.639	0.101
Writing	-2.236	0.025
Praxis	-1.639	0.101
Constructional visuospatial calculation. Raven's Score	-1.192	0.233

TABLE-10: Showing comparison of performance of nonfluent and fluent aphasics on Mann-Whitney V test.

Since the P-values of content, fluency, writing and AQ are less than 0.05, it indicates that there is a significant difference in the performance between nonfluent and fluent aphasics on these subtests at 0.05 level.

Thus it can be considered that this test is capable o differentiating nonfluent aphasics from fluent aphasics using AQ and the subtests like content, fluency and writing.

In order to identify the clinical subtypes of aphasics, the performance of each individual (aphasic subtests) on the language subtest of this test (Table-12) was compared with the classification criteria given by Kertesz(1979) (Table-11).

	Fluency	Comprehension	Repetition	Naming
Global	0-4	0-3.9	0-4.9	0-6
Brocas	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
Wernickes	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-11: Criteria for classification given by Kertesz (1979).

Subjects	Fluency	Comprehension	Repetition	Naming
A	1	2.05	1	0.4
B	6	7.95	3.6	3.8
C	8	3.40	3.8	2.10
D	8	9.05	8.5	5.00
E	2	4.75	3.0	3.35
F	0	0.75	0.4	0.25
G	1	1.25	0.6	0.50
H	2	5.10	3.8	3.70

TABLE-12 : Showing the scores of each aphasic subjects o language subtests of this test.

From this comparison it is evident that:

-> the scores of aphasic subjects A,F & G (Table-12) are falling under the category of Global aphasic.

-> The scores of aphasic subjects E & H (Table-12) are falling under the category of Brocas aphasia.

-> The scores of aphasic subject C (Table-12) is falling under the category of Wernicke's aphasia.

-> The scores of aphasic subject B (Table-12) is falling under the category of conduction aphasia, and

-> The scores of aphasic subject D (Table-12) is falling under the category of Anomic aphasia.

Thus the aphasics included in this study were typed a Global, Brocas, Wernicke's, Conduction and Anomic aphasia based on their language test scores.

The number of aphasic subjects, their age, mean scores of language subtest and AQ are summarized in Table-13.

Number	Type of Aphasia	Mean Age	Content	Fluency	Comprehension	Repetition	Naming	AQ
3	Global	67.66	1.00	0.6	1.35	0.60	0.38	7.67
2	Brocas	48.50	2.75	2.0	4.93	3.19	3.53	33.2
1	Wernicke's	69.00	5.00	8.00	3.40	3.80	2.10	44.6
1	Conduction	48.00	5.50	6.00	7.95	3.60	3.80	53.7
1	Anomic	42.00	7.50	8.00	9.05	8.50	5.00	76.1
8	TOTAL	57.50	3.313	3.50	4.29	3.09	2.39	32.98

TABLE-13: Showing the number, mean ages, mean scores of language subtest and AQ's of subgroups and the total 8 aphasics.

These results are in agreement with those reported in Kertesz(1979) in a large population of 150 aphasics on the original WAB (See Table-14).

His aphasic patients mean age, mean scores of language, subtest and AQ are given in Table-14.

Number	Type of Aphasia	Mean Age	Content	F1uency	Compreh
26	Global	65	0.6	1	2.2
24	Broca's	57.3	1.8	2.5	5.9
28	Wernicke's	60.3	3.3	6.9	3.5
15	Conduction	62.2	5.7	6.1	8.3
40	Anomic	60.3	7.7	8.0	9.0
150	TOTAL	61.1	4.0	5.2	5.7

TABLE-14: Showing the number, mean ages, mean scores of subtests and AQs of the language subgroups and total 150 aphasics of Kertesz(1979).

CT Scan Correlation:

In order to find the clinical validity, CT Scan correlation with the type of aphasia has been done. Figure-1

Global Aphasia:

This group (N=3) have large scan uptakes involving most of the left hemispheres. They are:

-> large left sided hypertensive haemorrhages involving the basal ganalia (aphasic subject A)

-> Large left temporal lobe haemorrhage and multifocal lesion in the posterior frontal operculam (aphasic subject F).

-> Lesion in the left fronto-tempero parietal language zone (aphasic subject G)/ See Fig 1

This is supported by various other authors. Albert et al(1981) reported that Global aphasia is most commonly associated with lesion that destroy large portions of the left fronto-temporo-parietal language zone extending from it's anterior-most to it's posterior-most poles.

Brocas Aphasia:

These aphasic subjects (No.2) have a smaller and more anteriorly located lesion when compared with Global aphasics. They are:

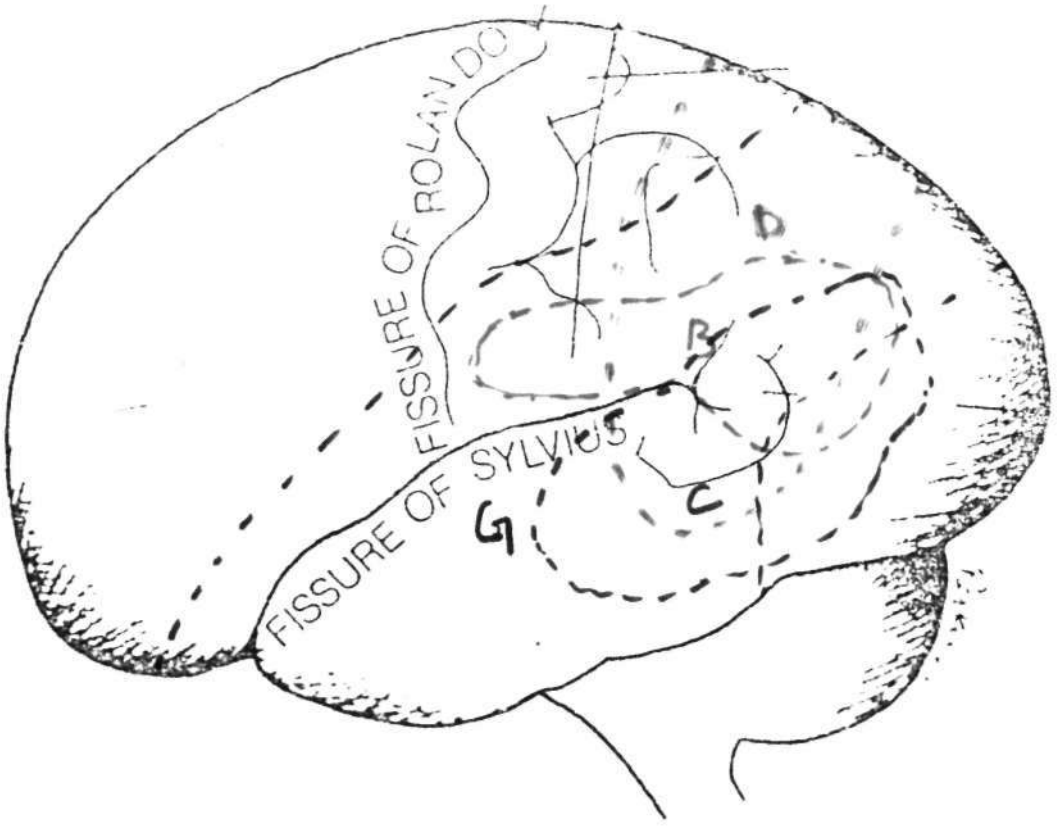

Fig. 1 CT Scan Correlation with type of Aphasia.

-> Infarcts in the left cerebellar hemisphere and left parietal lobe adjacent to the body of the left ventricles. Water shed-area of the left MCA & PCA. (aphasic subject E).

-> Infarcts in the 3rd frontal convolution (aphasic subject H)

This is supported by various authors like Mohr et al(1978), Naeser, Hayward(1978). They reported that Brocas dysphasia is produced by extensive lesions of the left fronto-parietal regions.

Wernicke's Aphasia:

This patient has lesion in the post rolandic area i.e. lesion in the left posterio superior temporal lobe (aphasic subject C). See Fig.1

Sarno M.T.(1981) support this by reporting that Wernicke's aphasia is generally associated with lesions of the posterior region of the left superior temporal gyrus. According to Naeser, Hayward(1978) and Kertesz(1978), Wernicke's dysphasia reveal a large area of injury in the posterior temporal-inferior parietal regions.

Conduction Aphasia:

Usually this group appeared to have lesions primarily between Broca's and Wernicke's area, although some appear right over these areas as well. Here the patient has vascular lesion of the posterior end of the sylvanian fissure (Aphasic subject B

B) See Fig 1

According to Albert et al (1981) lesion of arcuate fasciculus or its connection in the inferior parietal lobule (supra marginal gyrus) may result in conduction aphasia. According to Benson et al(1973) and Green & Howes (1977) conduction dysphasia is routinely associated with lesions that cap the posterior end of the sylvanian fissure.

Anomic Aphasia:

Anomic patients are less disabled than others. Here the patient has a vascular lesion in the left temporo parietal region (Aphasic subject D). See Fig. 1

This is supported by several authors like Pitres(1898), Nielson(1947), Brain(1961), Alajouanine et al(1957), Newcombe et al (1971). According to them the most commonly reported focal site of damage in anomic dysphasia is the left temporal or temporo-parietal region. Whereas according to Benson)1979), Smaller lesions, limited to the inferior temporo-occipital junction may result in a pure anomic dysphasia.

In order to see the type of aphasia on individual bilinguals, the Malayalam aphasia test and English WAB (Kertesz,1979) were administered on 3 bilingual aphasics (Group-IV).

The performance of each bilingual aphasic subject on each subtest of both the tests are as follows.

Subject	Age	Sex		Content	Fluency	Comprehension	Repetition	Naming	A Q	Reading	Writing	Prexis	Construction
I	52	M	(a)	7	4	7.65	2.5	4	50.3	5.2	2.75	9.8	6.4
			(b)	6	4	7.35	2.45	3.8	47.2	5.2	2.75	9.8	6.4
J	34	F	(a)	6	4	9.25	6.2	6.1	62.7	6.6	2.35	9.5	6.2
			(b)	6	4	4.8	4.2	3.8	43.9	1.6	1.93	9.3	6.8
K	48	M	(a)	1	1	8.1	0	0	20.2	4.5	1.95	7.5	5.3
			(b)	1	1	7.85	0	0	17.7	4.3	1.95	7.5	5.3

TABLE-1.5: Showing the age, sex, and performance of each bilingualaphasic on each subject of both MALAYALAMWAB(a)andEnglishWAB.(b).

Details regarding these aphasics in terms of their post onset time of testing, literacy and language background are given in TABLE-4 , Page, 73

Comparing the performance of each bilingual aphasic on each subtest of both these tests with the classification cirteria given by Kertesz(1979) (Table-11) and the CT scan data of these subjects (Table-4) it has been found that all these subjects fall into the category of Broca's aphasia.

Thus, eventhough qualitatively different patterns of dysphasia have been observed in individual polygots & bilinguals, at the same time (Bychowski 1919, Albert & Obler 1975, Silverberg & Gordon 1978), the results of this data in this study indicated a same pattern of dysphasia in all the 3 individual bilinguals, in both the languages.

These data is then subjected to Mann-Whitney U test to find the significant difference between performance of bilingual aphasics on Malayalam WAB and English WAB.

Malayalam WAB Vs English WAB	Z	P
Content	0	1
Fluency	0	1
Comprehension	1.527	0.126
Repetition	0.436	0.662
Naming	0.872	0.382
AQ	0.872	0.382
Reading	1.309	0.190

Writing	0.436	0.662
Praxis	0.218	0.820
Construction visuospatial calculation. Raven's Score	0	1

TABLE-16: Showing the significant difference betv/een performance of bilingual aphasics on Malayalam WAB and English WAB.

From this table, it has been found that since the P values of all the subtests are greater than 0.01 & 0.05, there is no significant difference between the performance of bilingual aphasics on Malayalam WAB and English WAB.

Thus the performance of bilingual aphasics on Malayalam WAB and English WAB are the same.

Correlation of Malayalam WAB subtests:

The correlation matrix for the Malayalam WAB subtest is shown in Table-17.

Information content correlates highly with all language subtests and it has the highest correlation with the AQ also. Fluency correlates well with information content. Auditory comprehension correlates best with reading, writing, praxis and naming. Naming correlates best with information content, both are a general measure of the severity of aphasia. Information content is dependent, to some extent, on the ability to find names for the information requested. Reading and writing

correlate highly in the aphasic population. Construction which includes calculation, drawing, block design and Raven's matrices correlates well with reading, probably reflecting the role of the dominant parietal lobe plays in these function.

Subtest scores		Content	Fluency	Comprehension	Repetition	Naming	A Q	Reading	Writing	Praxis	Construction Visuospatial calculation. Ravens Score
Content	(a)	1.100									
	(b)	1.000									
Fluency	(a)	0.942	1.00								
	(b)	0.787	1.00								
Comprehension	(a)	0.88	0.72	1.00							
	(b)	0.729	0.506	1.00							
Repetition	(a)	0.92	0.8	0.88	1.00						
(b)		0.774	0.703	0.676	1.00						
Naming	(a)	0.83	0.65	0.95	0.89	1.00					
	(b)	0.875	0.70	0.783	0.88	1.00					
A Q	(a)	0.98	0.90	0.94	0.95	0.91	1.00				
Reading	(a)	0.92	0.69	0.99	0.86	0.95	0.92	1.00			
	(b)	0.769	O.584	0.835	0.687	0.882		1.00			
Writing	(a)	0.92	0.77	0.93	0.89	0.82	0.92	0.92	1.00		
	(b)	0.648	0.530	0.659	0.593	0.706		0.753	1.00		
Praxis	(a)	0.74	0.65	0.89	0.69	0.87	0.81	0.91	0.72	1.00	
	(b)	0.69	0.563	0.815	0.679	0.707		0.739	0.607	1.00	
Construction visuospatial calculation Ravens Score	(a)	0.78	0.56	0.96	0.81	0.90	0.85	0.97	0.92	0.82	1.00
	(b)	0.64	0.62	0.791	0.549	0.697		0.79	0.770	0.771	1.00

TABLE-17: Correlation matrix for the subtotal scores on the Malayalam WAB (a)and English WAS (b)(Kertesz 1979)

This is in support of Kertesz(1979) who reported the same information from the correlation of English WAB subtests. The correlation matrix for the English WAB subtests is shown in Table-17.

In this correlation matrix of English WAB subtests, few of the correlation are below 0.6 and these appear on the fluency subtests and repetition. The lower correlation with comprehension is probably explained by the non-fluent aphasics who comprehend well (Broca's, transcortical motor). Such a finding is not seen in the correlation matrix of Malayalam WAB subtests. This may be because of the limited subjects in each aphasia type. On the other hand correlation matrix of both the WAB subtests revealed that fluency correlates well with information content, naming and repetition parameters of language output.

>

SUMMARY AND CONCLUSION

As there is no aphasia test in Malayalam to test the communication skills in aphasics, an attempt was made to construct a test based on WAB (Kertesz,1979).

The new test thus developed for aphasics in Malayalam consists of 4 language subtests.

(1) Spontaneous speech : Information content, Fluency.

(2) Auditory comprehension

(3) Repetition

(4) Naming and
3 performance tests

(5) Reading

(6) Writing

(7) Praxis, and a subtest to measure intelligence and visuospatial performance.

(8) Construction : Drawing
Block design
Calculation
Raven's matrices

In order to cross validate this aphasia test with English WAB Kertesz(1979), it was given to:

- Group-I : 5 bilingual normal adults and compare this performance with the performance ofthe same subjects on English WAB.

After validating this test, inorder to obtain clinical norms on this test, the test was given to:

- Group-II : 100 normal adults, age ranging from 20-70 years, and

- Group-III : 8 aphasics with definite brain lesion and language disorders.

In order to see the type of dysphasia on individual bilinguals, the Malayalam aphasia test was administered along with the English WAB on:

- Group-IV : 3 bilingual aphasics and compare their performance with the performance of same aphasics on English WAB.

The following results are obtained.

(1) There is a high correlation between the Malayalam aphasia test and English WAB Kertesz(1979) as administered on 5 bilingual normal adults.

(2) The aphasia test in Malayalam could distinguish aphasics from normal population.

(3) The test has proved itself to be capable of differentiating non-fluent aphasics from fluent aphasics.

(4) This test also enables one to assign patients to classic aphasic syndromes such as Global, Brocas, Wenickes,

conduction, transcortical motor, transcortical sensory, isolation, conduction and anomic based upon their scores on each language subtest.

(5) There is no significant difference between the performance of bilingual aphasics on Malayalam WAB and English WAB.

Thus this test can be used in clinics and for research purposes to assess the communication skills of aphasics in Malayalam.

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APPENDIX-I

PATIENT DATA

Name: Age: Date of birth:

Address:

Languages:

Handedness Writing Throwing Cutting Drawing Spoon Brush

Education:

Occupation:

Present Illness:

Signs	Hemiplegia Severe	Moderate	Mild	Side Recovered	Hemianopia	Sensory loss

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

Date File Number

Institution

Examiner

Referred By

I. Spontaneous Speech

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

1. നിങ്ങൾക്ക് ഉണ്ടെങ്കിലെന്തെങ്കിലുണ്ട് ?

2. നിങ്ങൾ ഇതിനു മുൻപ് ഇവിടെ വന്നിട്ടുണ്ടോ?

3. നിങ്ങളുടെ പേര് എന്താണ്?

4. നിങ്ങളുടെ മേൽവിലാസം എന്താണ്?

5. നിങ്ങളുടെ ജോലി എന്താണ്?

6. നിങ്ങൾ എന്തിനാണ് ഇവിടെ വന്നിരിക്കുന്നത്? നിങ്ങളുടെ കുഴപ്പമെന്താണ്?

7. ഈ ചിത്രത്തിൽ കുറച്ചു കാര്യങ്ങൾ ഉണ്ട്. അവയെപ്പറ്റി സംപൂർണ്ണമായ വാക്യങ്ങളിൽ കുറച്ചു പറയാമോ?

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 patients in fact visual field. Ask for more complete response if only a few words are produced.

Maximum	score	20
patients	score	_____

SCORING OF SPONTANEOUS SPEECH

A. Information Content:

(0) No information

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

(2) Correct response to any 1 item.

(3) Correct responses to any 2 items.

(4) Correct responses to any 3 items.

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

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

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

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

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

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

B. Fluency, Grammatical Competence, and Paraphasias:

(0) No words or short, meaningless utterances.

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

(2) Single words, often paraphasias, of fortful 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 sentencesonly e.g. 'Oh I don't know'

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

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

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

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

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

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

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

	Verbal	Gestural	EyeBlink

1. നിങ്ങളുടെ പേര് കൃഷ്ണൻ എന്നാണോ?
("no" should be correct)

2. നിങ്ങളുടെ പേര് നാമർ എന്നാണോ?
("no" should be correct)

3. നിങ്ങളുടെ പേര് _(real name)_
എന്നാണോ?

4. നിങ്ങൾ കോടമത്താണോ താമസിക്കുന്നത്?
("no" should be correct).

5. നിങ്ങൾ real residenceതാമസിക്കുന്നത്?

6. നിങ്ങൾ മദിരാശിയിലാണോ താമസിക്കുന്നത്?
("no" should be correct)

7. നിങ്ങൾ പുരുഷനാണോ/സ്ത്രീയാണോ ?
("yes" should be correct)

8. നിങ്ങൾ ഡാക്ടറാണോ?
("no" should be correct)

9. ഞാൻ പുരുഷനാണോ/സ്ത്രീയാണോ?
("yes should be correct)

10. ഈ മുറിയിൽ ലൈറ്റ് കത്തുന്നുണ്ടോ?
("yes" should be correct)

11. ഈ മുറിയിലെ വാതിൽ അടച്ചിട്ടുണ്ടോ?
("yes" should be correct)

12. ഇത് ഹോട്ടലാണോ?
("yes should be correct)

13. ഇത് real(location) ആണോ?

14. നിങ്ങൾ ചൂവന്ന കാർഡാണോ
ധരിച്ചിരിക്കുന്നത്?
("no should be correct)

15. കടലാസ് തിയിൽ കത്തുമോ?

16. മാർച്ച് മാസം ജൂൺ മാസത്തിനു
മുൻപെ വരുമോ?

17. നിങ്ങൾക്ക് പഴം പൊളിക്കുന്നതിനു മുൻപെ തിന്നുമോ?

18. ജൂലൈ മാസത്തിൽ മഴ പെയ്യുമോ?

19. കുതിര പട്ടിയേക്കാൾ വലുതാണോ?

20. മഴ കൊണ്ട് പൂമ്പാറ്റ മുറിക്കുമോ?

Maximum Score 60
Patients 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 hemianopsiaispresent. Present cards of the pictured objects, forms, letters, numbers and colors. Ask the patient to point to the furniture, hisor her body parts, and fingers, in the order listed. Ask the patient to point to each item, by saying, "Point to the_____or 'Show me the_____. One repetition of each command is allowed. If the patient points to more than one item, score 0, unless it is clear that the patient recognizes his or her error and corrects it. For the seven items requiring left-right discrimination, the patient must get both the side and body part correct to receive credit. If the room does not have certain furnitute, substitute comparable items.

Real objects	Drawn objects	Forms	Letters	Numbers
കപ്പ്	തീപ്പെട്ടി	സമചതുരം	ക	S
തീപ്പെട്ടി	കപ്പ്	ത്രികോണം	ഖ	61
പെൻസിൽ	ചിപ്പ്	വൃത്തം	S	500
പൂവ്	കത്തി	ദീർഘചതുരം	പ	1867
ചിപ്പ്	പെൻസിൽ	കുരിശ്	ത	32
കത്തി	പൂവ്	ചന്ദ്രൻ	ഗ	5000

colours	Furnitures	Body parts	Fingers	Reft-Left
നീല	ജനൽ	ചെവി	തള്ളവിരൽ	വലത്തേ തോൾ
ഓറഞ്ച്	കസേര	മൂക്ക്	മോതിര വിരൽ	ഇടത്തേ കൂർമുട്
ചുവപ്പ്	മേശ	കണ്ണ്	ചൂണ്ടുവിരൽ	ഇടത്തേ ചെവി
പച്ച	ലൈറ്റ്	തല	ചെറുവിരൽ	വലത്തെ കണ്ണ്
കറുപ്പ്	ഭിത്തി	കഴുത്ത്	വലത്തെ വിരൽ	ഇടത്തെ കൈ മുട്

maximum score 60
patients score _____

C. Sequential Commends: Score for partial execution of the commands according to the numbers above each segment that 13 coi-rectly executed. If the patient requests repetition or looks confused, repeat the command as a full sentence. On the table before the patient line up the pen, comb, and book in this respective order and label each, verbally: "See the pen, the comb, and the book? I will ask you to point to them and do things with them, just as I say. Are you ready? "If the patient does not seem to understand the task, point with the comb to the pen to demonstrate, and start again.

	Scores
നിങ്ങളുടെ കൈ പൊക്കു	2
നിങ്ങളുടെ കണ്ണ് അടയ്ക്കു	2
കസേരയിലേയ്ക്ക് ചൂണ്ടി കാണിയ്ക്കു	2
ജനലിലേയ്ക്ക് ചൂണ്ടികാണിയ്ക്കു എന്നിട് കതകിലേയ്ക്കും	4
പേനയിലേയ്ക്കും ബുക്കിലേയ്ക്കും ചൂണ്ടികാണിയ്ക്കു	4
പേനകൊണ്ട് ബുക്കിലേയ്ക് ചൂണ്ടികാണിയ്ക്കു	8
പേനയിലേയ്ക് ബുക്കുകൊണ്ട് ചൂണ്ടികാണിയ്ക്കു	8
ചിപ്പിലേയ്ക് പേനകൊണ്ട് ചൂണ്ടികാണിയ്ക്കു	8
ബുക്കുകൊണ്ട് ചിപ്പിലേയ്ക് ചൂണ്ടികാണിയ്ക്കു	8
പേനയെ ബുക്കിന്റെ മുകളിൽ വയ്ക്കു എന്നിട് എന്നിക്കു തരു	14
ചിപ്പിനെ പേനയുടെ അരികെ വശത്ത് വയ്ക്കുകയും ബുക്കിനെ തിരിച്ചു വയ്ക്കുകയും ചെയ്യുക	20

Maximum Score 80
patients Score _____

III. REPETITION:

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

	Maximum score
1. കിടക്ക	2
2. മൂക്ക്	2
3. കൈ	2
4. ജനൽ	2
5. പഴം	2
6. മഴവില്ല്	4
7. നാൽപ്പത്തഞ്ച്	4
8. തൊള്ളായിരത്തഞ്ച് ശതമാനം	6
9. അറുപത്തി നൻടര	10
10. കർഷകൻ നാറു നടുന്നു	8
11. ഭോഷ്ക് തിരിച്ചും വരുന്നില്ല	10
12. മിന്നുന്നതെല്ലാം പൊന്നല്ല	10
13. ഭാരതത്തിന്റെ ആദ്യത്തെ പടയാളി	8
14. ഇല്ല, ഒരു പക്ഷേ അഥവാ മേലെ ഉടൻടെന്കിൽ	10
15. എന്റെ കാളവണ്ടിയിൽ ഗോതമ്പിന്റെ അഞ്ച് ചാക്ക് എടുത്ത് വയ്ക്കൂ	20

Maximum Score 100
Patients 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 articulator./ error, 2 points for a recognizable phonemic paraphasia, and 1 point if a phonemic or tactile cue is required.

Stimulus	Response	Tactile Cue	Phonemic Cue	Score
പൈസ				
പന്ത്				
കത്തി				
കപ്പ്				
സൂചി				
വള				
ടൂത്ത് ബ്രഷ്				
റബ്ബർ				
പൂട്				
പെൻസിൽ				
പുസ്തകം				
താക്കോൽ				
പാത്രം				
കണ്ണാടി				
ചിപ്പ്				
പൂവ്				
സ്പൂൺ				
വാച്ച്				
കത്രിക				
തീപ്പെട്ടി				

Maximum score 60
Patient's score _____

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

Maximum Score: 20

Patient's Score_____

C. Sentence Completion:

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

1. പുല്ല് _____ ആണ് (പച്ച)

2. പഞ്ചസാര _____ ആണ്)മധുരം അല്ലെങ്കിൽ വെളുത്തത്)

3. ടൊമാറ്റോകൾ ചുമന്നത് ആണ്, മുല്ലപൂക്കൾ _____ ആണ് (വെളുത്തത്)

4. അവർ പുഷ്പങ്ങളെപോലെയും_____പോലെയും പൊരുതി (പടികളെ)

5. ക്രിസ്തുമസ് _____മാസത്തിലാണ് (ഡിസംബർ)

Maximum Score 10

Patient's score _____

D. Responsive Speech:

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

1. നിങ്ങൾ എന്തുകൊണ്ടാണ് എഴുതുന്നത് ? (പേന, പെൻസിൽ)

2. പാലിനെന്തു നിറമാണ് ? (വെളുപ്പ്)

3. ഒരാഴ്ചയിൽ എത്ര ദിവസങ്ങളുണ്ട്? (ഏഴ്)

4. ഡോക്ടർമാർ എവിടെയാണ് ജോലി ചെയ്യുന്നത്? (ആസ്പത്രിയിൽ)

5. നിങ്ങൾക്ക് എവിടുന്നാണ് സ്റ്റാമ്പ് കിട്ടുന്നത്? (പോലാഫീസ്)

Maximum score - 10
patient's score - ____

V. Reading:

A Reading Comprehension of sentences

Present test sentences, one per card. Instruct the patient to: "Read these sentences and point to the missing word. Choose the" best from those. "The oral instructions should be accompanied by gesture and by pointing to the words missing and the choice of answers. The instructions may be repeated if the patient does not seem to understand. Ask the patient to do the example. If the patient does not do it correctly, point to the correct answer and say: "See, this is the missing word, e.g.....

ഒരു മരത്തിൽ --------ഉണ്ട് (പൂല്, ഇലകൾ, ചക്ക, തീ)

	Scores
1. മഴ _____ ആണ്	2
നീല	
നനവുള്ളത്	
വളവുള്ളത്	
കടൽ	
2. പടയാളി _____ ആണ് കൊണ്ടുനടക്കുന്നത്	2
തോക്ക്	
വെടി	
തമാശ	
പലഹാരം	
3. രാമു വസ്ത്രങ്ങൾ തുന്നുന്നു. അവൻ ഒരു _____ ആണ്	4
ചെരുപ്പുകുത്തി	
തുന്നൽക്കാരൻ	
തുണി	
തയ്യൽമെഷീൻ	

4. അദ്ധ്യാപികമാർ എല്ലാ ജൂണിലും സ്കൂളിലേയ്ക്ക് തിരിച്ചുവരുന്നു. അവർ _____ നെ പഠിപ്പിക്കുന്നു. 4

ഇലകൾ
കുടികൾ
വസന്തം
ബുക്കുകൾ

5. പുൽക്കൊടികളും വാളുകളും സാധാരണ ഓരുജലങ്ങളിലാണ്. അവയുടെ ഭാഗങ്ങൾ ഉണ്ടാക്കി യിരിക്കുന്നത് _____ കൊണ്ടാണ്. 6

കർഷകൻ
വനം
ലോഹം
മുറിയ്ക്കുക

6. കർഷകൻ സാധാരണ ഗോതമ്പും, അരിയും മറ്റു ധാന്യങ്ങളും കൃഷിചെയ്യുന്നു. അവർക്ക് _____ഉം ഉണ്ടാക്കാൻ സാധിക്കും. 6

കർഷകി
ട്രാക്ടർ
ഭൂമി
പച്ചക്കറികൾ

7. ഊർജ്ജം പണ്ട് ധാരാളം ഉണ്ടായിരുന്നു. എണ്ണയുടെ കുറവുകാരണം ധാരാളം രാജ്യങ്ങൾ മറ്റുവിടങ്ങളിലെ _____ നെ യോടുന്നു. 8

തിളയ്ക്കുന്ന വെള്ളം
തിരമാല
സൂര്യൻ
സാംപത്തികനില

8. ടൈറ്റാനിക് ഒരു വലിയ കപ്പലായിരുന്നു. അത് മുങ്ങുകയില്ലെന്ന് വിചാരിച്ചിരുന്നു. എന്നാൽ അത് 1912-ൽ ഒരു മഞ്ഞുകട്ടയിൽ ഇടിച്ച് ആയിരത്തോളം മനുഷ്യരെ കൊന്നു കൊണ്ട് മുങ്ങിപോയി. ഇതിന് _____ ഇല്ലായിരുന്നെങ്കിൽ മുങ്ങിപോകു മായിരുന്നില്ല.

ശക്തി നഷ്ടപ്പെടിരുന്നു.
നന്നായി കേടുവന്നിരുന്നു.
യാത്രക്കാരെ കൊണ്ടുപോയിരുന്നു.
വടക്കോട്ടു പോയിരുന്നു.

Maximum score 40

Patient's score _____

B. Heading commands:

Present each card and say, 'I want you to read this aloud and then dp what it says". Instructions may be repeated if the patient only does or the other part of the tank. Give a partial score if only part of the command is read or contains paraphasias or if only part of the command is performed.

	Reading aloud	Performing
1. നിങ്ങളുടെ കൈ പൊക്കു.	1	1
2. നമസ്തേ കാണിക്കു.	1	1
3. നിങ്ങളുടെ കണ്ണ് അടയ്ക്കു	1	1
4. നിങ്ങളുടെ കാലുകൊണ്ട് ഒരു കുരിശു വരയ്ക്കു	2	2
5. കടലാസിലേയ്ക്കും പിന്നെ വഴിയിലേയ്ക്കും ചൂണ്ടിക്കാണിയ്ക്കു	2	2
6. പെൻസിൽ എടുത്ത്, ഒരു പാവ വരച്ചിട്ട് മുടിയിട് പിന്നെ തിരിച്ചുവയ്ക്കു.	3	3

Maximum Score 20

Patient's score _____

If the conbained score of A and B is 50 or more, discontinue reading tests and give full credit of 100 minus twice the difference from 60. Score=100 - 2 (60 - Patient's score). Continv With testing if combined score (A + B) is less than 50.

Prorated Score _____

G. Written Word stimulus-object Choice Matching

Place the objects in a random order before the patieftt Ask: the patient to point to the object that correspond to the word presented on cards 22 - 27. Score 1 point for each correct response.

കപ്പ്
ചിപ്പ്
പെൻസിൽ
പുല്ല്
തീപ്പെട്ടി
കത്തി

Maximum Score 6

Patient's score _____

D. Written Word stimulus - Picture choice Matching

Card 2 with pictures 6n it isplaced before the patient. Instruct the patient to point to the picture that matches the word that is presented. The words are presented individaally on cards 22 - 27. Score 1 point for each correct response.

Maximm Score 6

Patient's score_____

E. Picture stimulus written word Choice Matching

Card 34 which has the words listed on it, is placed before the patient. The patient is then requested to point to the word that is the same as the picture. The pictures are presented individually on cards 28 - 33. Score 1 point for each correct response.

Maximum Score 6

Patient's score _____

F. Spoken Words - Written word choice Matching

G. Letter Discrimination: Use the score obtained on the letter identification section of the auditory word recognition subtest. If that score is 3 points or less, use a letter matching task by presenting singly letters (cutouts). G-ŋj ç_ -!_/, nn, en and have the patient point to the choice of letters on card 4.

Maximum Score 6

Patient's Score _____

H. Spelled Word Recognition Ask the patient to name the word that is spelled orally by the examiner. If the patient does not understand the task, give an example not listed on the tesy. Score 1 point for each correct

ഇ - ല്ല

ക - ന - ക്

ച - ട്ടി - കാ - ര

വ - ന - ചെ - ല - സം

വ - ന - ഴ - ാ - ധ - ന

ര - ന - ണ - ി - ക - ന് - ക - ൾ

Maximum Score 6

Patient's Score _____

I. Spelling Askin the patient to spell each of the following words presented orally. Give an example, " വള വ - ള " if the patient does not understand the task. Score 1 point for each correct answer.

തല

ചലക

തലവാതി

കടകളി

ചന്ദ്രകുടകണം

വിദ്യാലയങ്ങൾ

Maximum Score 6

Patient's Score _____

VI. WRITING

Use unlined paper, labeled with the name of the patient and the date of examination.

A. Writing on Rpqnest: Ask the patient to write his or her name and address. Score 1 point for each recognizable word or number. Deduct *h* point for each spelling mistake or paraphasic error.

Maximum Score 6
Ratient's Score_____

B. Written output: Present the picture (Card 1). Instruct the patient to "Write a story about what is going on in the picture" Allow about 3 minutes. Encourage the patient to write in sentences if it appears that he or she is going to list words. Score 34 points for a full description, S points for each complete sentence with 6 words or more, 1 point for each correct word in incomplete or short sentences. Deduct 1/2 point for each spelling or paraphasic error. Score isolated words 1 point, to a maximum of lO points, Punctuationis not scored,

„ Maximum Score. 34
Patient's Score _____

C. Writing to Dictation: Ask the patient to write the sentence that you will dictate: (ഒരൺറ കാളവണ്ടിയിൻ ഗോതമ്പിൻറ ചാക്ക് കിടന്ന വഴിക്കു) The sentence may be rboekn up if the patient canot remember it and parts repeated once. Score lO points, for the complete sentence or 1 point for each correct word. Deduct 1/2 point for each spelling or parapasic error.

Maximum score 10
Patients score

Discontinu writing test if a score of 40 or more is reached on B, and C, Enter as the score for writing 2 X patients

Prorated Score._____

D. Writing of Dictated or Visually Presented Words: Ask the p a t i e n t to write the following words as you dictate them. If the patient does not understand, show the real object. and gesture to the patient to write its name. If the patient fails(unrecognizable or not written it all, spell the word orally, ; and if the patient still fails, provide cut-out letters with 2 extra letters. Subtract 1/2 point for incorrect letters.

Max.score:10
P. score:

	Full Score for Eieher Written Response Dictated	Written Response Visual Stimulus	½ Score for Either Oral Spelling	Cut-out Letters
കുപ്പായം	1			
മൊബൈൽ	2			
വാച്ച്	1			
കാപ്പി	2			
കണ്ണാടി	2			
പത്രക്കാരൻ	2			

E. Alphabet and Numbers : Ask the patient to write the alphabet and then the numbers from O through 20. Score 1/2 point for each letter or number, even if it is out of order.

l. Alphabet. 'അ' മുതൽ 'ഃ' വരെ

2. Numbers (O through 20)

Maximum Score 12.5
Patient's score _____

Maximum Score 10
Patient's Score _____

F. Dictated Letters and Numbers: Ask the patient to write each of the following dictated letters and numbers. Score 1/2 point each for correctly written letter and one for each complete number.

1. Dictated: ഭ, ര, ള, ഞ, ച

2. Dictated: 5, 61, 32, 700, 1867

Maximum Score 2.5
Patient's socre _____

Maximum Score 5
Patient's Score_____

G. Copying of words of a sentence: Present card 39 with the test sentence printed on it and ask the patient to copy it. The patient may print or write. Score 1 point for each correct word, 10 points for the complete sentence. Subtract 1/2 point for each incorrect letter.

Maximum Score 10
Patient's Score _____

VII. Apraxia

Tell the patient, "I am going to ask you to do some things, try and do them as well as you can 'If the patient fails to perform the command well, then show him or her how (imitate the action). If this fails, then give the patient the real object, where applicable (asterisks.) Allow for variations in normal performances.- .Score 3 points for a good performance in the command column. Score 2 points for approximate performance or good performance on imitation only. Score 1 point for approximate performance- on imitation or if performed with the actual object. If the patient uses a body part for an object, score 2 points (e.g. fingers used as a comb through the hair).

Examples

"Whistel". If the patient purses his or her lips and blows, but there is no sound, score 2 points for an approximate performance. If the patient declares that he or she can not do it or purses him or her lips but does not blow, then demonstrate. Then if the patient purses his or her lips and blows, score 1 point for approximate performance on imitation; if the patient fails to exhale then score 0 (no., points).

"Sniff". If the patient grimaces or. inhales through mouth, score 1 point only. If performance improves on imitation, score 2 points. If the patient does it only with a flower, score 1 point only. If the patient rubs the flower on his or her nose, score 0 (no points).

	Command	Imitated	With Object
Upper Limb			
1. മുഷ്ടി ചുരുട്ടുക			
2. നമസ്തേ കാണിയ്ക്കുക			
3. സലൂട്ട് ചെയ്യുക			
4. തല ചൊറിയുക			
5. വിരൽ തൊടിയ്ക്കുക			
Facial			
6. സാവ് പുറത്തേക്കിടുക			
7. കണ്ണ് തുടയ്ക്കുക			
8. ശകുനം നടിയ്ക്കുക			
* 9. പൂവ് മണപ്പിയ്ക്കുക			
10. വെയ്കുന്നിരി ഏതിനെടുത്തുക			
Instrumental			
* 11. ഒരു ചീപ്പ് ഉപയോഗിക്കുക			
* 12. ഒരു സ്പൂൺ ഉപയോഗിക്കുക			
* 13. തിന്നുവാൻ ഒരു സ്പൂൺ ഉപയോഗിക്കുക			
* 14. ഒരു കത്തികൊണ്ട് മുറിയ്ക്കുക			
* 15. ഒരു ഗ്ലാസ്സിൽ വെള്ളം കുടിക്കുക			
Complex			
16. ഒരു കാൽ ചവിട്ടുന്നതായി നടിയ്ക്കുക			
17. വണ്ടിൽ മുട്ടുന്നതായും തുറക്കുന്നതായും നടിയ്ക്കുക			
18. ഒരു കടലാസ് വലിച്ചുകീറുന്നതായി നടിയ്ക്കുക			
19. ഒരു സിഗരറ്റ് കത്തിക്കുന്നതായി നടിക്കുക			
20. ഓടക്കുഴൽ വായിക്കുന്നതായി നടിക്കുക			

Maximum Score 60
Patient's Score_____

VIII. CONSTRUCTIONAL, VISUOSPATIAL AND CALCULATION TASKS

A. Drawing — The subject is asked to freehandedly draw the figures listed below on a separate sheet of paper. Encourage completion by saying "Is that as complete as you can make it"? The scoring system is listed for each figure.

If the patient appears to have a comprehension problem, then he or she may be shown examples for 10 seconds.

1. വൃത്തം (2)
Score 2 points for closed circle
Score 1 point for curved segments

2. ക്യൂബ് (5)
Score 5 points for perspective and form subtract 1 point for each inappropriate angle
Score 1 point if all 9 lines are shown

3. സമചതുരം (2)
Score 2 points for closed square
Score 1 point for 4 lines

4. ക്ലോക്ക് (5)
Score 5 points for correct figure
Score 4 points if numvers are partially absent or wrong
Score 3 points for all numbers and no hands
Score 2 points if most numbers are absent or out of circle
Score 1 point for circle only

5. ത്രികോണം (3)
Score 3 points for quality
Score 2 points for symmentry
Score 1 point for asymmetry

6. ക്യൂബ് (5)
Scpre 5 points for complete perspective
Substract 1 point for lack of perspective
Substract 1 point for missing detail
Score 2 points for an approximation

7. ഒരു മനുഷ്യന്റെ ചിത്രം വരയ്ക്കുക (5)
Score 5 points for completeness and symmetry
Substract 1 point for each body part missing
Score 1 point for an approximation

8. ഒരു വരവരച്ചിട്ട്, നടുവിൽ ഒരു സ്പേസ് ഇടുക (3)
Instruct the patient to place a mark at the middle (or center) of the line. Deduct ½ point for each 5 mm deviation.

Maximum Score 30

Patient's Score _____

2. Division 8 12 64 13 18 4
4 2 8 56 3 24
32 8 15
4 72 6

Maximum Score 24
Patient's Score ____

D.Raven's Colored
Progressive Matrices

Administer the R.C.P.M. as indicated in its manual. The Maximum score is 37, 1 point for each-correct item and award 1 additional point for completion in 5 minutes or less.

Maximum Score 37
Patient's Score _____

B. Block Design

Place four blocks before the patient- Say "You see these blocks, they are all alike. On some sides; they are all red/ on some all white,, and on come, half red and half white. I am going to put the blocks together to make them look like this picture. Watch me first, Now, look at the picture and make one just like it with the blocks. "Demonstrate how to do the example, moving slowly, then mix up the blocks and have the patient do it, using the same blocks If he or she fails to do it in 90 seconds, mix up the blocks and have him or her try again. If the patient fails on the second attempt, go on and show the next picture. Mix up the blocks after each design. Except for the example, the patient is not shown how to do it or is given a second attempt.. Score 3 points for correct design, completed in 60 seconds; score 2 points for correct design, with extra time allowed (2 min) Score 1 point for blocks put together.

Practice
Score 3 points for correct design within 60 seconds
Score 2 points for correct design with extra time
Score 1 points for 4 blocks put together

Maximum Score 9
Patient's Score _____

C.Calculation:

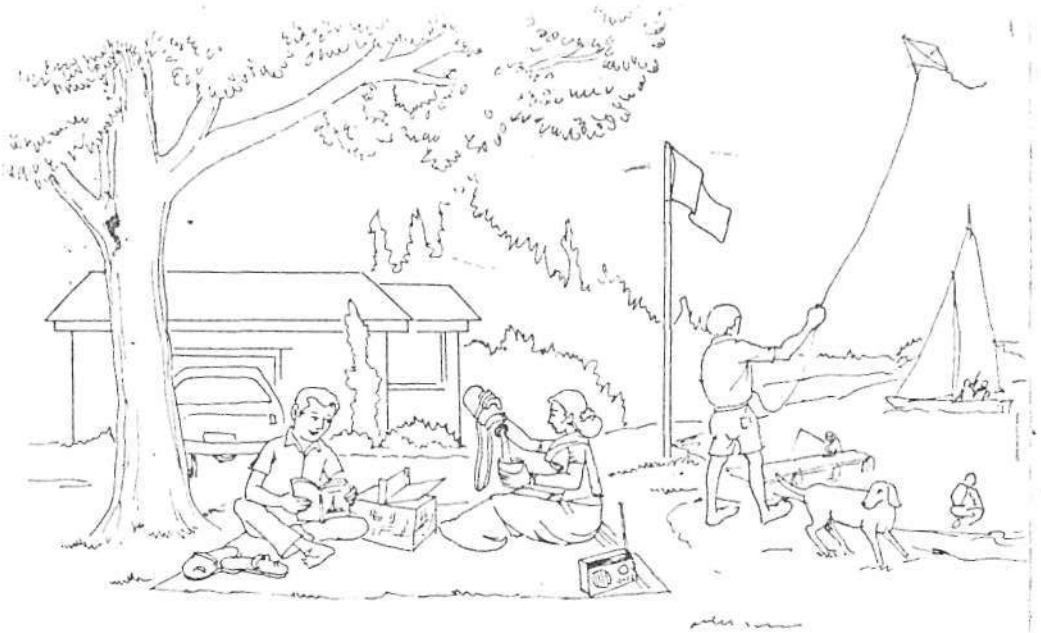
Present the card with the first calculation on it and say to the patient "I would like you to add. What is_____?" then, "I would like you to subtract. What is_____?" etc. Continue with oral stimuli and allow the patient to look at the card at the same time (combined oral and visual stimulation). Score 2 points for each correct response. The patient may respond orally or point to the correct" * answer. There is no partial score given.

1. Addition	5	9	6	4	4	6
	+4	20	+2	12	+3	12
		1		8		7
		8		3		4
2. Subtraction	6	8	9	16	8	5
	-2	4	-7	2	-3	3
		12		5		24
		3		63		11
3. Multiplication	4	7	5	6	6	2
	x 2	2	x3	2	x7	11
		8		8		42
		6		15		25

SCORE SHEET

	Maximum	Patient's Subscores	Total For AQ
Spontaneous Speech			
Information Content	10		
Fluency	10		
Total	20		
Comprehension			
Yes/No Questions	60		
Auditory Word Recognition	60		
Sequential Commands	8O		
Total			
(Divide By 20 For AQ)	10		
(Divide By lO For CO)	20		
Repetition	100		
Total			
(Divide By 10)	10		
Aphasia Quotient (Add Totals And Multiply By 2 For AO)			
Reading and Writing			
Reading	100		
Writing	l00		
Total			
(Divide By 10)	20		
Praxis	60		
Total			
(Divide By 6)	l0		
Construction			
Drawing	30		
Block Design	9		
Calculation	24		
Raven's Score	37		
Total			
(Divide By 10)	10		
Cortical Quotient			
Add Totals	lOO		

APPENDIX - II



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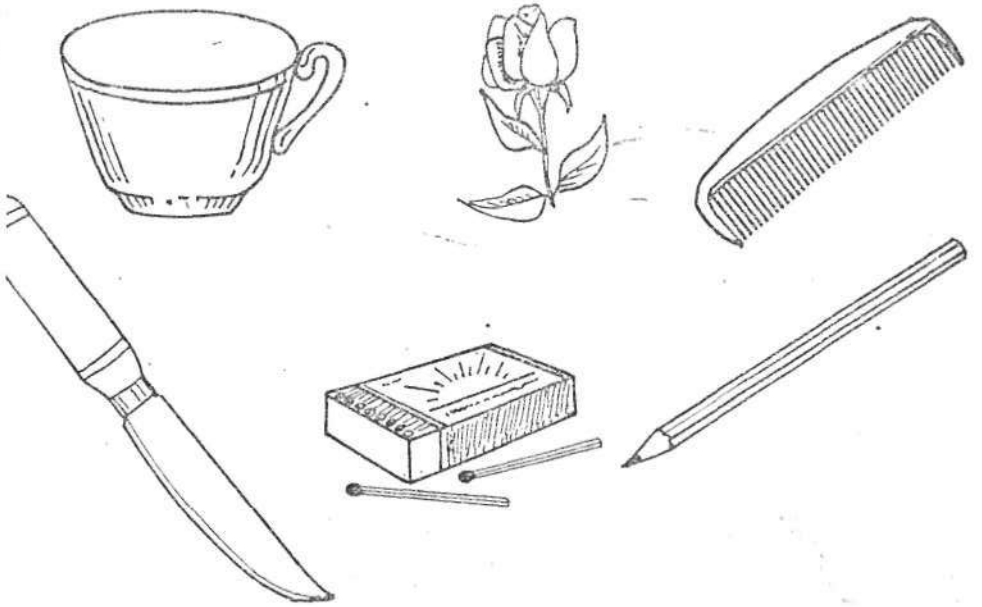

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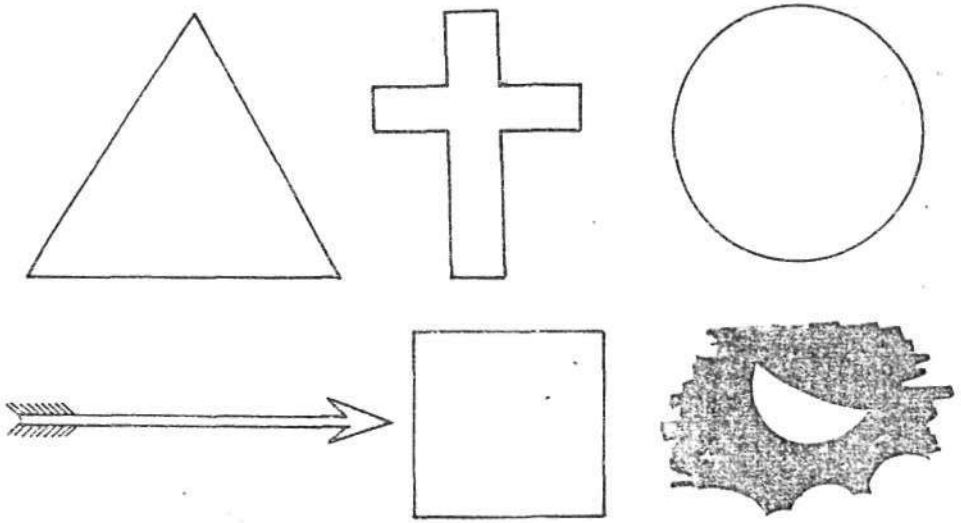

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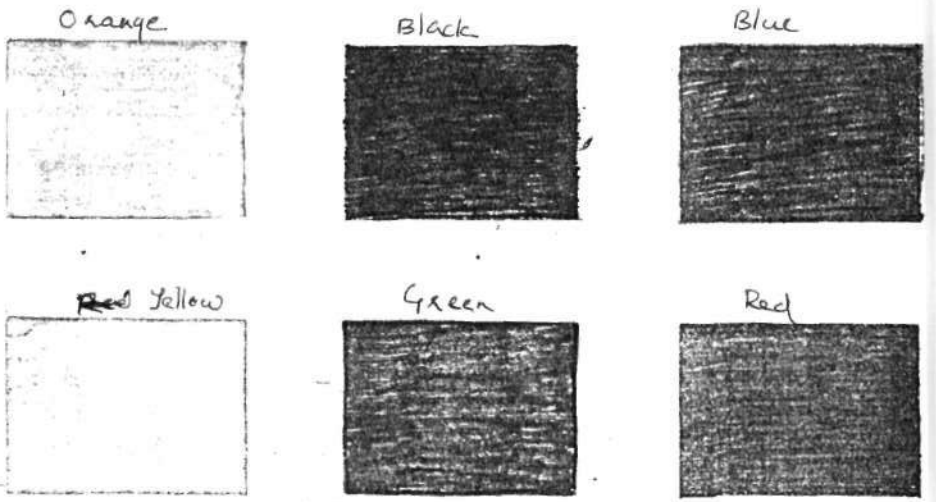


(4)

ക പ ഗ

ബ S ത

(4)

61 5 1867

5000 32 500

(5)

ഒരു മരത്തിൽ ____ ഉണ്ട്.

പുല്ല്
ഇലകൾ
ചക്രം
തീ

(7)

മഴ ആണ്

നീല
നനവുള്ളത്
വളവുള്ളത്
കടൽ

(8)

പടയാളി ആണ് കൊണ്ടുനടക്കുന്നത്

നോക്ക്

വെടി

തമാശ

പടപ്പുരക്ക്

(9)

രാമു വസ്ത്രങ്ങൾ തുന്നുന്നു.

അയാൾ ഒരു ആണ്.

ചെരുപ്പ് കുത്തി

തുന്നൽക്കാരൻ

തുണി

നെയ്യൽ മഷീൻ

(10)

അദ്ധ്യാപികമാർ എല്ലാ ജൂണിലും

സ്കൂളിലേയ്ക്ക് തിരിച്ചു വരുന്നു.

അവർ നെ പഠിപ്പിയ്ക്കുന്നു.

ഇലകൾ

കുട്ടികൾ

വസന്തം

പുസ്തകങ്ങൾ

(11)

ചുറ്റികകളും വാളുകളും സാധാരണ

ആയുധങ്ങളാണ്. അവയുടെ ഭാഗങ്ങൾ

ഉണ്ടാക്കിയിരിക്കുന്നത് കൊണ്ടാണ്.

കർഷകൻ

വനം

ലോഹം

മുറിയ്ക്കുക

(12)

കർഷകർ സാധാരണ ഗോതമ്പും അരിയും
മറ്റു ധാന്യങ്ങളും കൃഷി ചെയ്യുന്നു. അവർക്ക്
ഉം ഉണ്ടാക്കാൻ സാധിയ്ക്കും.

കൽക്കരി
ട്രാക്ടർ
ഭൂമി
പച്ചക്കറികൾ

(13)

ടൈറ്റാനിക് ഒരു വലിയ കപ്പലായിരുന്നു. അത്
മുങ്ങുകയില്ലെന്ന് വിചാരിച്ചിരുന്നു. എന്നാൽ
അത് 1912-ൽ ഒരു മഞ്ഞുകട്ടയിൽ മുട്ടിച്ച് ആയിര-
ത്തോളം മനുഷ്യരെ കൊന്നുകൊണ്ട് മുങ്ങിപ്പോയി.
ഇതിന് ഇല്ലായിരുന്നെങ്കിൽ
മുങ്ങിപ്പോകുമായിരുന്നില്ല.

ശക്തി നഷ്ടപ്പെട്ടിരുന്നു.
നന്നായി കൊടുവന്നിരുന്നു
യാത്രക്കാരെ കൊണ്ടുപോയിരുന്നു
വടക്കോട്ട് പോയിരുന്നു

(15)

ഊഷ്മം പണ്ട് ധാരാളം ഉണ്ടായിരുന്നു.
എണ്ണയുടെ ക്ഷാവ് കാരണം ധാരാളം രാജ്യങ്ങൾ
മറ്റനവിടങ്ങളായ നെ തേടുന്നു.

തിളയ്ക്കുന്ന വെള്ളം
തീരങ്ങൾ
സൂര്യൻ
സാന്ദ്രതികനില

(14)

നിങ്ങളുടെ കൈ പൊക്കൂ

(16)

നമസ്തേ കാണിയ്ക്കൂ

(17)

നിങ്ങളുടെ കണ്ണ് തുടയ്ക്കൂ

(18)

നിങ്ങളുടെ കാലുകൊണ്ട് ഒരു കുരിശ് വരയ്ക്കൂ

(19)

കമ്പിയിലേയ്ക്കും പിന്നെ വാതിലിലേയ്ക്കും ചൂണ്ടിക്കാണിയ്ക്കൂ

(20)

പെൻസിൽ എടുത്ത് ഒരു വര

വരച്ചിട്ട് തിരിച്ചു വെയ്ക്കുക

(21)

കപ്പ്

(22)

ചീപ്പ്

(23)

പെൻസിൽ

(24)

പൂവ്

(25)

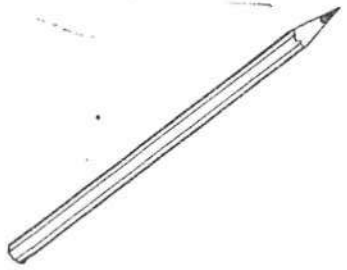
തീപ്പെട്ടി

(26)

കഞ്ഞി

(27)

(28)



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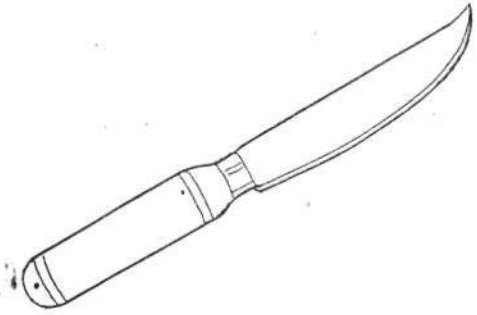

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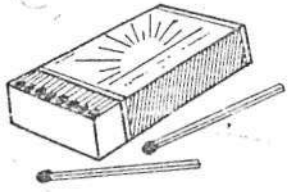


(31)

(32)

(33)

പൂവ്

നാവ്

മാവ്

കായ്

നായ്

(35)

മല

വല

തല

കല

ബലം

(36)

ചെവി

തവി

മറവി

കവി

കവിത

(37)

വഴി

പഴം

മഴ

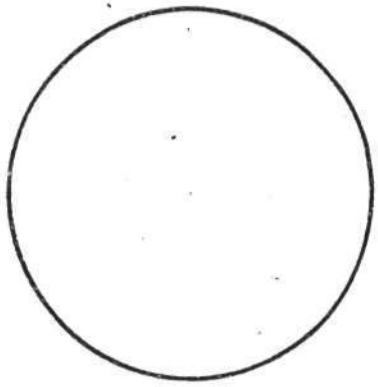
മഴു

താഴ

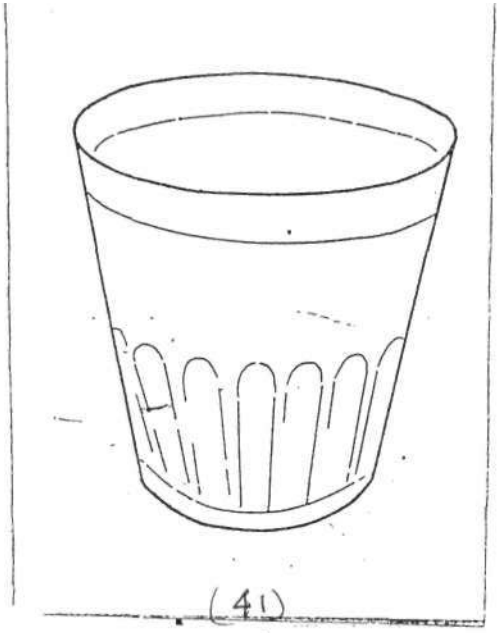
(38)

എന്റെ കാളവണ്ടിയിൽ ഗോതമ്പിന്റെ

ചാക്ക് എടുത്ത് വെയ്ക്കൂ



(40)



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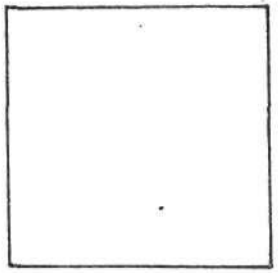
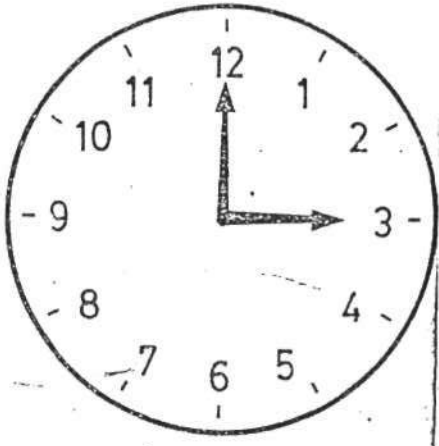


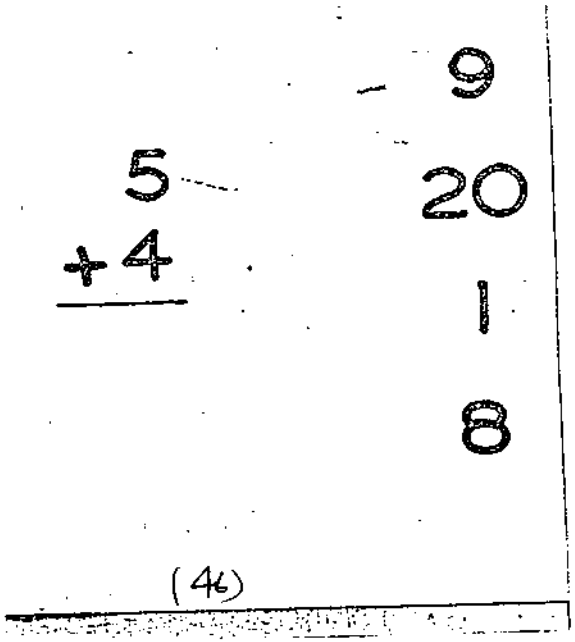
(42)



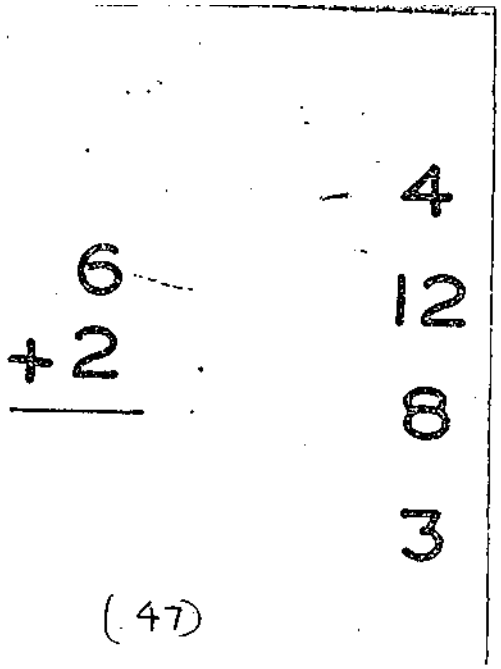
43

(44)

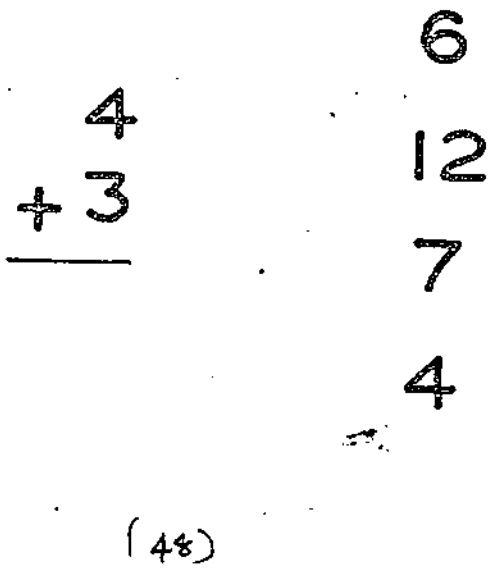
(45)



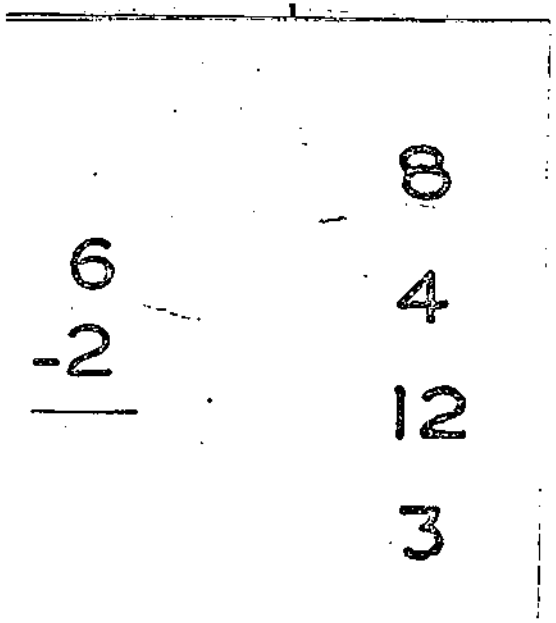
(46)



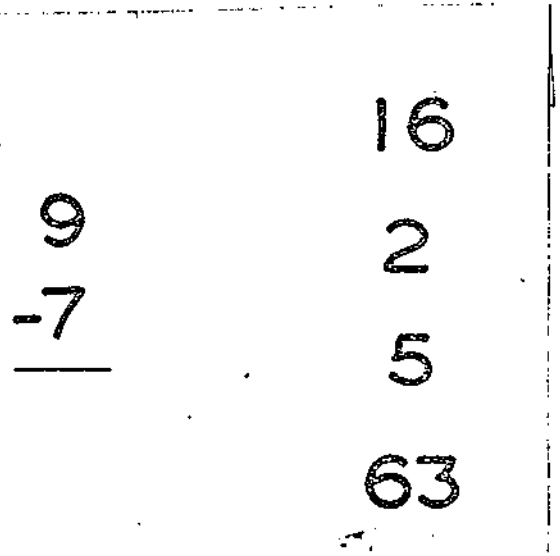
(47)



(48)



(49)



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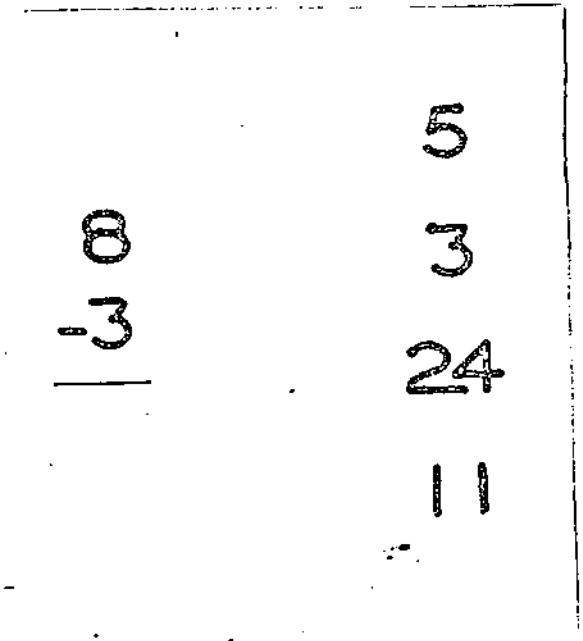

(51)

$$\begin{array}{r} 4 \\ \times 2 \\ \hline \end{array}$$

7
2
8
6

(52)

$$\begin{array}{r} 5 \\ \times 3 \\ \hline \end{array}$$

6
2
8
15

(53)

$$\begin{array}{r} 6 \\ \times 7 \\ \hline \end{array}$$

2
11
42
25

(54)

$$\begin{array}{r} 8 \\ \div 4 \\ \hline \end{array}$$

12
2
32
4

(55)

$$\begin{array}{r} 64 \\ \div 8 \\ \hline \end{array}$$

13
56
8
72

(56)

$$\begin{array}{r} 18 \\ \div 3 \\ \hline \end{array}$$

4
21
15
6

(57)