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Construction and Validation of Hindi Naming Test for Person with Naming Disorder

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Abstract
Naming ability is skill which we developed throughout our life. It need to process in different level in human mind such as short term memory, long term memory. Angular gyrus structure of brain situated place in the brain identified by mainly researcher that play significant role in person naming ability. 80% population of CVA survives after stroke; suffer with aphasia which is very high across the world. In India, we have 32 languages which are registered and mainly used for official purpose. India nearly 5 million people are using Hindi language as official or day to day communication purpose. State like Uttar Pradesh, Bihar, Rajasthan, Uttarakhand, Jharkhand Madhya Pradesh Hindi speaking population is very high in number. Considering large number of Hindi speaking population and naming skill is one of important ability which speech language communication disorder need to evaluate regularly. There is severe dearth in this area therefore current research study taken up for to construct and validate test battery for assessing naming ability. Currently we mainly relay on English test which are not suitable for our Indian population because of culture, language difference. 254 Hindi speaking control subjects were recruited for study. In this control group 36 subject were illiterate not who didn't had any form of schooling. For experimental group consisted of 23 subjects with anomic aphasia with mean age of 46.4 years. Hindi naming test were constructed with five subsection each section as specific scoring criteria. Literate and illiterate normative value of naming test calculated .test – retest and intra tester high reliability was obtained by person correlation test. All test items were validated by Hindi speaking experienced speech therapist. This naming test has several advantages such as it is easy to administered, easy scoring, age specific norm and quick test. Test consisted items which are picturable arranged systematically from simple to most difficult words. These test findings are reliable and valid .Therefore we recommend that this naming ability test can be used in daily clinical practice to check the naming ability in Hindi of aphasic population.
Key word: *Aphasia, Naming ability, Reliability & validity, anomic aphasia*

Introduction

In adults who had been fully able to speak and understand their native language, a stroke, tumor,or encephalitis and neuro-physiological change in brain was sometimes found to severely and specifically reduce their language abilities (Goodglass et al 2001). Aphasia is an acquired neuro-communication disorder caused by brain damage, characterized by an impairment of language modalities: speaking auditory comprehension, reading and writing, naming (Devis 1985). Naming ability is skill which we developed throughout our life. It need to process in different level in human mind such as short term memory, long term memory(Boyle 2010). Angular gyrus structure of brain situated place in the brain identified by mainly researcher that play significant role in person naming ability (Franklin et al 1995). Amongst various aphasias (anomic aphasia) and dementia are special known for markedly reduced ability to name object due to word retrieval problem (Dickey et al 2010). Review of literature shows on picture naming in aphasia has contributed invaluable information about how words are accessed from the mental lexicon. In normal subject the task of picture naming with apparent ease, it is widely agreed by scientists that naming is a complex cognitive process that involves several ordered steps. According to Butterworth and Garrett (1980) the target is conceptualized as a lexical-semantic entity then next, the concept is mapped to a known word and final step the word's phonological constituents (syllables, phonemes) are retrieved and ordered (Butterworth, 1989; Dell, 1986; Garrett, 1980; Levelt, Roelofs, & Meyer, 1999). Rapp & Goldrick, 2000 has given another alternative theory for naming skill. In this they explained that aphasia alters the activation strength of the signal (i.e., the target representation), relative to various sources of noise in the system (including competition from other, related representations), thereby reducing the likelihood of a successful retrieval attempt. Therefore type of error seen in the aphasic naming ability has symmetrical pattern, it is characteristic of some individuals, and some clinically defined subtypes, that their deficit is greater at one stage of retrieval than others (e.g., Caramazza & Hillis, 1990; Schwartz, Dell, Martin, Gahl, & Sobel, 2006). Types of naming ability namely assessed confrontation naming, automatic serial naming, closure naming, categorical naming responsive naming . Confrontation naming: verbal naming in response to visual presentation is assessed by presenting objects, action, events and type of category. For example naming of objects, geometric forms, letters animals colors, body part etc. Automatic closure naming: The capacity to complete an open – ended sentence or phrase stem such as "the sky is …." These sentence or phrase stem can be varied in terms of constraint or the degree to which a stem generates a particular response . For both aphasia and non – aphasic and non brain damaged adults, automatic closure naming facilitated when the sentence or phrase stem is highly constrained or convergent and there are a limited number or closed set of response choices. (kay 1987)Automatic serial naming: The ability to produce rote or over learned material is also appraised. For example, the patient may be asked to count to 20, name the days of the week, name of month etc (Lambon et al 2000). Responsive naming ability in which person was asked specific question about the particular object and person have to name that thing e.g. what we use for writing. This ability shows the responsive ability to verbal question. In India, we have 32 language which are registered and mainly used for official purpose. India nearly 5 million people are using Hindi language as official or day to day communication purpose. State like Uttar Pradesh, Bihar, Rajasthan, Uttarakhand, Jharkhand Madhya Pradesh Hindi speaking population is very high in number. Considering large number of Hindi speaking population and naming skill is one of important ability which speech language communication disorder need to evaluate regularly. There is severe dearth in this area therefore current research study taken up for to construct and validate test battery for assessing naming ability. Currently we mainly relay on

English test which are not suitable for our Indian population because of culture, language difference. Considering above points, there is great need to have Hindi language test tool which can assess naming ability in depth.

Method

Subjects: Subjects were Hindi adult who speak only Hindi as their mother tongue, recruited from Mumbai, Indore, Delhi, Patna other part of Hindi belt. All subjects had normal hearing, vision and physical development. Pure tone audiological testing was conducted to for assessing normal hearing skills. The number of participants and subject age groups were different for each phase of the study.

Phase one: Familiarity check and arranging word in simple to complex order.

In the first phase of the study familiarity checking was done to ensure items used in the tests would be within Hindi vocabulary. A total of 156 adult subjects were assessed in three point scale for familiarity of word and made them to arrange rate them in very simple word, simple and complex word order.

Content Validity

Content validity evidence of the for all test items were collected from experience group of panelists that consisted of five audiologist & five speech therapist and five postgraduate audiology & speech sciences students. All members of the panel were native Hindi speakers and received Hindi education in primary and secondary schools. The members had experiences in administering speech tests and had basic knowledge on aphasia and other acquired language disorder.

Second phase: pilot study

A pilot study was conducted in the second phase which involved 20 normal adult, 5 aphasia patients.

Final phase:

1: 254 adult subjects were Field tested as control group. Subjects were selected from age range from18 – 50 years without any history of stroke and CVA or any neuro communication disorder. 36 subjects were illiterate i.e. not had any form of schooling and 218 literate subjects.

2: 23 acquired language disorder subjects were field tested as experimental group.

Reliability of the test:

Test – retest reliability: 52 of the subjects were retested after 1 month for test-retest reliability.

Inter tester reliability: 52 subjects were tested by other tester for inter- tester reliability study.

Tests Composition

1. Responsive naming: five items were kept for assessing responsive naming
   Instruction: Ask direct question that gives linguistic context for specific response (i.e. noun/ verb).
   Ex: what we use to write?
   Scoring: Correct response without any cue marked as score 2, Correct response with phonetic cues marked as score 1, No response even after phonetic cues marked as 0.
2. Closure naming: five items were kept for assessing responsive naming
   Instruction: Ask the client to complete sentence with one word (noun/ verb).
   Ex: Color of sky is ….
   Scoring: Correct response without any cue marked as score 2, Correct response with phonetic cues marked as score 1,No response even after phonetic cues marked as 0.
3. Categorical naming: five items were kept for assessing categorical naming
   Instruction: Ask client to name different categories items for 60 seconds
   Ex: tell me name of domestic animals as many as you can
   Scoring: Each number of correct name score 1, if client said 7 correct name in one minute score as 7.No response scored as 0.

4. Automatic naming: five items were kept for assessing automatic naming
   Instruction: Ask client to name automatic serial items.
   Ex: tell me name of month
   Scoring: Each number of correct name score 1, if client said 7 correct name in one minute score as 7.No response scored as 0.
5. Confortation naming: total 60 items were kept for assessing confortation naming
   Instruction: Ask the client to name the stimulus picture.
   This test section divided in to two part first 30 items, if client score more than 36 than only second part administered.
   Scoring: Correct response without any cue marked as score 2,Correct response with phonetic cues marked as score 1, No response even after phonetic cues marked as 0.

Field-Testing

The stimuli were presented using live voice. Even though the formal instruction of the test was for subjects to name the picture card, verbal responses were also accepted. Repetition of stimulus-presentation during the test was not allowed. In each subtest 2 item kept for practice trials to ensure that subjects understood the test procedure and the required responses. All test item result was tested and the scores of the subjects were recorded.

To obtain information on test-retest and inter-rater reliability, 53 subjects were retested by the same tester after four weeks of the field test sessions. To find out inter-test reliability another 53 subjects were retested by a different tester. Both testers were qualified speech therapist and had experience more than 2 years in field of speech language pathologist in hospital setup, native Hindi speakers. The testers were briefed on the testing and scoring procedures.

Validation

Validation of test tool same tool was used over 23 subjects with acquired language disorder.

Similar scoring and test procedure were followed as the normative subjects. All patients responses were scored from tape recorded testing sessions. Labored or distorted production of target words which were prompt and did not alter the phonemic structure of the word by omission, transposition, substitution, or addition were considered to be correct.

Result

Data were analyzed using SPSS 16 (Statistical Package for the Social Sciences).

Result were analyzed in two groups

Group 1 illiterate subject: 36 subjects without any formal schooling

Group 2 literate subject: 218 subjects with any kind of formal education.

Both the group further analyzed using descriptive data analysis and means value, range, standard deviation calculated.

Data were analyzed and descriptive score obtained from illiterate subject group. The table down serves as normative value for the illiterate subject group.

Table 1: showing data of illiterate subject performed in test with means score of each section of test

Descriptive Statistics illiterate					
	N	Minimum	Maximum	Mean	Std. Deviation
Responsive Noun	36	7.00	10.00	9.278	.88192
Responsive Verb	36	7.00	10.00	9.1278	.90982
Closure naming	36	7.00	10.00	9.2167	.90633
Categorical naming	36	29.00	50.00	40.2500	5.57738
Automatic naming	36	34.00	80.00	60.0000	10.58570
Confortation naming	36	40.00	57.00	51.1944	4.04842

Data were analyzed and descriptive score obtained from literate subject group. The table down serves as normative value for the illiterate subject group.

Table 2 showing data of literate subject performed in test with means score of each section of test

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Responsive naming Noun	218	5.00	10.00	9.2936	.92385
Responsive naming Verb	218	5.00	10.00	9.3532	.86350
Closure naming	218	5.00	10.00	9.4862	.89664
Categorical naming	218	24.00	58.00	56.4450	6.32158
Automatic naming	218	39.00	92.00	83.6101	6.64431
Confortation naming	218	40.00	60.00	65.9633	4.68240

Table 3 : showing group statistic means score of illiterate and literate subject in naming test

Group Statistics					
	group	N	Mean	Std. Deviation	Std. Error Mean
Responsive naming Noun	Literate	218	9.2936	.92385	.06257
	Illiterate	36	9.2778	.88192	.14699
Responsive naming Verb	Literate	218	9.3532	.86350	.05848
	Illiterate	36	9.1278	.90982	.15164
Closure naming	Literate	218	9.4862	.89664	.06073
	Illiterate	36	9.2167	.90633	.15105
Categorical Naming	Literate	218	56.4450	6.32158	.42815
	Illiterate	36	40.2500	5.57738	.92956
Automatic Naming	Literate	218	83.6101	6.64431	.45001
	Illiterate	36	60.0000	10.58570	1.76428
Confortation Naming	Literate	218	65.9633	4.68240	.31713
	Illiterate	36	51.1944	4.04842	.67474

Table 4 showing the't' tail test result of means score of illiterate and literate group

't' tail test result								
	F	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Responsive naming Noun	.417	.096	252	.924	.01580	.16518	-.30950	.34110
Responsive naming Verb	.000	2.079	252	.079	.32543	.15653	.01716	.63371
Closure naming	.001	3.526	252	.862	.56957	.16155	.25141	.88773
Categorical naming	.354	.174	252	.001	.19495	1.11963	-2.01007	2.39998
Automatic naming	11.172	17.929	252	.000	23.61009	1.31684	21.01667	26.20351
Confortation naming	1.043	5.763	252	.000	4.76886	.82748	3.13921	6.39851

From the table value responsive naming (noun, verb), closure naming ability in both the group found no statistical significant difference. In responsive naming ability mainly involve semantic representation in the brain, as both the group has similar experience in of name therefore, no significant difference obtained between groups. Whereas categorical naming, automatic naming, confortation naming ability effected with the level of education, the illiterate group showed statistical significant difference when compared to literate group . Educational exposure makes the person's categorical naming ability stronger , at young age in school child gets exposure of various kind of fruit , vegetable ,name of different cities , names of countries, domestic animals. This gives stronger long term memory which leads to better naming ability in literate subjects.

Similarly confortation naming and automatic serial naming ability also found superior in literate subjects. Confortation of naming section progressively simple to more complex items involved. Literate subjects have shown higher score in naming the higher section of words. First 30 items in both the groups had similar means score. Lecours et al 1987 studied one hundred neurologically healthy adults were tested for their pointing (choosing one of four or six line drawings as the match to an auditorily presented linguistic stimulus), naming (from line drawings), and repetition abilities. Their research study supports current finding that statistically significant differences were found to exist between the scores of the illiterate and literate. Lecours 1988 studied 188 unilateral stroke subject, result of research study indicate that representation of language is more ambilateral in illetrate than its is in school educated subjects.

Test- retest reliability

Correlation between of performance on the naming task

Correlation between 53 subjects on all subset naming and picture naming task were calculated to determine the extent to which a given subjects performance on test – retest Pearson correlation coefficients revealed that the strength of the relation between test – retest i.e. reliability of test score. Strong correlation obtained 0.7, 0.758, 0.813, 0.73, 0.725, 0.85 .These finding suggest that test – retest reliability of score is high.

Table showing value Pearson correlation test of test- retest

Test – retest reliability												
	closure	(closure)	automatic	(automatic)	confortation	(confortation)	categorical	(categorical)	responsive verb	(responsive) (verb)	(Responsive) Noun	(responsive)Noun
Pearson Correlation	1	.753**	1	.758	1	8.1300**	1	.703**	1	.725**	1	.850**
Sig. (2-tailed)		.000		.019		.0300		.000		.000		.000
N	53	53	53	53	53	53	53	53	53	53	53	53
Pearson Correlation	.753**	1	.758	1	8.1300**	1	.703**	1	.725**	1	.850**	1
Sig. (2-tailed)	.000		.019		.030		.000		.000		.000	
N	53	53	53	53	53	53	53	53	53	53	53	53
**. Correlation is significant at the 0.01 level (2-tailed).												

Intra – tester:

Correlation between 53 subjects on all subset naming and picture naming task were calculated to determine the extent to which a given subjects performance on intra- tester Pearson correlation coefficients revealed that the strength of the relation between test – retest i.e. reliability of test score. Strong correlation obtained 0.853, 0.818, 0.83, 0.803, 0.785, 0.810 .These finding suggest that intra– tester reliability of score is high.

Table showing value Pearson correlation test of intra- tester

Intra – tester reliability												
	Closure	(closure)	automatic	(automatic)	confortation	(confortation)	categorical	(categorical)	responsive verb	(responsive) (verb)	(Responsive) Noun	(responsive)Noun
Pearson Correlation	1	.853**	1	.818	1	.8330	1	.803**	1	.785**	1	.810**
Sig. (2-tailed)		.000		.000		.000		.000		.000		.000
N	53	53	53	53	53	53	53	53	53	53	53	53
Pearson Correlation	.853**	1	.818	1	8.3300**	1	.803**	1	.785**	1	.810**	1
Sig. (2-tailed)	.000		.000		.000		.000		.000		.000	
N	53	53	53	53	53	53	53	53	53	53	53	53
**. Correlation is significant at the 0.01 level (2-tailed).												

Validation

Validation 23 aphasic patient, with anomic aphasia were studied using the final set of test material. These patients were all medically stable as the time of assessment, and were able to produce at least some real words in a meaning context.

Table showing t tail value means score of aphasic and non aphasia group .

Group Statistics					
	group	N	Mean	Std. Deviation	Std. Error Mean
respNoun	1	218	9.2936	.92385	.06257
	0	23	4.4783	1.27456	.26576
respVerb	1	218	9.3532	.86350	.05848
	0	23	4.1739	1.23038	.25655
Closure	1	218	9.4862	.89664	.06073
	0	23	4.6957	1.25896	.26251
Categorical	1	218	40.4450	6.32158	.42815
	0	23	15.4783	2.48394	.51794
Automatic	1	218	83.6101	6.64431	.45001
	0	23	26.3478	4.91388	1.02462
Confortation	1	218	55.9633	4.68240	.31713
	0	23	19.4783	6.60489	1.37721

Table showing t tail value means score of aphasic and non aphasia group .

	t-test for Equality of Means						
						95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
respNoun	22.843	239	.000	4.81532	.21080	4.40006	5.23057
respVerb	26.147	239	.000	5.17930	.19809	4.78908	5.56952
Closure	23.348	239	.000	4.79059	.20518	4.38640	5.19478

Categorical	18.759	239	.000	24.96669	1.33090	22.34490	27.58849
Automatic	40.156	239	.000	57.26227	1.42599	54.45315	60.07138
Confortation	34.025	239	.000	36.48504	1.07231	34.37267	38.59742

As from the table value there is all test section having statistically significant difference between aphasic naming score and control group. As all experimental subjects were literate therefore finding were compared with literate group. After comparing the means score aphasic subject had score very poor score compare to control group. Therefore current test is able to indentified the naming difficulty in person with aphasia. Naming ability in aphasic interesting topics for investigation in the area of Brain / behavior relations concerns the understanding of the influence of the information content and its organizational rule on the structural organization of the brain. Mansur 2008 research study reports that in aphasic naming disturbances comprise paraphasias (or substitutions), which may be phonemic (substitution of one phoneme for another), semantic (substitution of one word for another semantically-related word, as in "boss" for "president", verbal (a combination of the former), neologisms (the creation of non words), circumlocutions (an attempt by the subject to "explain" the characteristics of items they cannot name properly), and perseverations (repetition of words or fragments of sentences, which are sometimes meaningless).

Discussion

Naming is one of the most important abilities in linguistic and cognitive processing. The task requires retrieval of phonological and semantic information, which is organized in a short term memory or long term memory system and assessed depending on the specificities of a given stimulus. Aphasic subject can provide cognitive neuropsychology understand the processing mechanisms of normal and injured brain. Naming is one of the most important abilities in linguistic processing. Naming of different semantic and grammatical categories differ in their lexical properties and have distinct neuro-anatomical substrates. Current research test found to be having high test – retest with intra tester reliability. Further test tool items got validate by experienced qualified speech therapist. Test tool was administered over the experimental group and test effectively able assess naming ability in disorder group. This naming test has several advantages such as it is easy to administered, easy scoring, age specific norm and quick test. Test consisted items which are picturable arranged systematically from simple to most difficult words. These test findings are reliable and valid .Therefore we recommend that this naming ability test can be used in daily clinical practice to check the naming ability in Hindi of aphasic population.

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