LANGUAGE IN INDIA

Strength for Today and Bright Hope for Tomorrow

Volume 13 : 1 January 2013

ISSN 1930-2940

Comparison of Confrontation Naming and Generative Naming Abilities in Neurologically Healthy individuals and Persons with Aphasia

Abhishek. B. P.
Prema K.S. Rao, Ph.D.

==========

Alterations in Communications

Advanced research methods in cognitive neuropsychology have emerged from different theoretical approaches and cognitive principles. These methods facilitate better understanding in the alterations in communication resulting from neurological disorders in adults. Cognitive Neuropsychology aims to understand the processing mechanisms of normal and injured brain by means of functional architectural models of information processing. It assumes that linguistic abilities are organized into multiple processes within subsystems that interact with each other, while maintaining some degree of independency.

Naming Process

Naming is one of the most important subsystems of the language module. It is also a simple method, employed in understanding the lexical semantic processing. The task requires retrieval of semantic and phonological information, which is organized in a memory system

and assessed depending on the specificities of a given stimulus. Based on the principles of Cognitive Neuropsychology, the visual confrontation naming process (in which the participant has to name a representational picture or object, based on visual input) comprises of three basic stages:

1. Identification of the represented object, which activates the mental structural representation
2. Access to its semantic representation, which allows the object to be recognized
3. Lexicalization or activation of its phonological representation, by which the name of the picture or object is retrieved and uttered.

Lexical and Non-lexical Processing

Naming involves lexical and non-lexical processing. The lexical processing refers to the storage and retrieval of semantic information and abstract representations connected with a particular word. The non-lexical processing refers to the detection and perception of the visual stimuli that triggers the lexical process.

Naming Disturbances

Naming disturbances encompasses paraphasias (unintended word substitutions), which may be, phonemic (substitution of one phoneme for another), semantic (substitution of one word for another semantically-related word, as in *"crow"* for *"parrot"*, or random paraphasia where the substituted word is not related to the target word by any means, ne-ologisms (the creation of non-words), circumlocutions (an attempt by the participant to "explain" the characteristics of items when they cannot name properly), and perseverations (repetition of words or fragments of sentences, which are sometimes meaningless.

The language disturbances such as paraphasia, circumlocution, and neologism and the utility of cues, in naming tasks can explain the nature of breakdown in various stages of lexical access. The need for semantic cues, in which the meaning of the word (through its function, for example), indicates a visual deficit, or inability to recognize the picture or object which indicates the breakdown at the first stage of lexical access whereas the need for

phonemic cues, whereby the first phoneme or syllable of the word is given to the participant by the examiner, is found useful for persons who have difficulty in retrieving the phonemic segments related to the word and is suggestive of breakdown in the latter part of lexical access

Naming Deficits

Naming deficits is the most common symptom found in aphasia irrespective of the type of aphasia. Aphasia is the most frequent language disorder, it is defined as a linguistic impairment caused by a neurological lesion that may compromise comprehension and/or production of language in its oral or written forms. Aphasia is caused due to numerous reasons including the vascular etiologies (such as stroke), brain trauma, inflammatory processes and tumours. In persons with aphasia, naming difficulties may occur due to breakdown at either semantic or the phonemic levels.

Confrontation Naming

Confrontation naming is the most commonly used task in assessment of word retrieval deficits in persons with aphasia. Most of the test batteries used in the assessment of aphasia (WAB, BDAE) employs confrontation naming. It involves naming of proper nouns. In response to pictures, mainly line drawings. The target items in any confrontation naming test comprises of frequent and infrequent nouns in order to test various levels of difficulty. The responses are elicited in response to question by the examiner such as "What is this"? Confrontation naming test is sensitive for persons with aphasia ranging from mild to severe aphasia. Persons with mild aphasia may experience difficulty in naming infrequent nouns whereas persons with severe aphasia may exhibit difficulties in naming most of the proper nouns.

Confrontation Naming and Lexical Semantic Deficits

Several researchers have employed confrontation naming in studying lexical semantic deficits in persons with aphasia. Some of the studies are summarized in this section. Goodglass and Kaplan (1976) administered confrontation naming task on five persons each, with Wernicke's, Broca's, conduction and anomic aphasia, and found that persons with

conduction and Broca's aphasics produced initial sound correctly and they also produced, the correct number of syllables as in the target word's metrical frame. Persons with Wernike's and anomic performed the tasks in all or none fashion.

Goodglass (1981) conducted a qualitative analysis in order to study the nature of errors in these types of aphasics and reported phonemic paraphasias to be associated with conduction aphasia, neologism and unrelated errors to be more in persons with Wernike's aphasia and circumlocutions to be associated with persons with anomic aphasics.

Martin and Safron (1992) administered confrontation naming on persons with fluent aphasia and observed a high proportion of formal paraphasias (word utterance that are phonologically similar to target words). William and Canter (1987) found high concentration of semantic paraphasias elicited on confrontation naming for persons with posterior Aphasia.

Shantala (1997) studied aphasic naming ability in persons with Broca's, anomic and Wernicke's aphasia using confrontation naming, generative naming and responsive naming tasks in Kannada language. Error analysis in confrontation naming showed neologisms and phonemic errors to be the most in Brocas Aphasics. Phonemic errors were found in persons with anomic aphasia.

Lexical Retrieval and Confrontation Naming

Although confrontation naming is sensitive in exposing the naming deficits in persons with aphasia, some researchers opine that the confrontation naming task over-simplifies the mechanisms underlying lexical retrieval and it is known to assess for convergent lexical retrieval which is one aspect of lexical retrieval mechanism, where a person names the picture when shown to him and node with the highest threshold gets activated, unlike word list generation/generative naming where a person has to name all the entries under a lexical category which uncovers another facet of lexical retrieval, the divergent mechanism of lexical retrieval.

Generative Naming

Generative naming is advantageous compared to confrontation picture-naming as the task taps a different component of word retrieval by constraining the speaker to a semantic category and not to a specific label in contrast to the picture naming task Hence confrontation naming task is to be combined with generative naming/word list generation in order to study lexical retrieval deficits in detail.

Generative naming involves free recall of names in a particular semantic category. The tester names a semantic category and the participant has to name entries under the category. It assesses for the divergent retrieval. It is found to be the most difficult task for persons with aphasia. A neurologically healthy individual is known to name at least 10-15 entries for semantic categories like animals, vegetables, fruits, vehicles and others (Harold 2001).

WAB (Western Aphasia Battery) involves listing the name of animals within 120 seconds. BDAE (Boston Diagnostic Aphasia Test Battery) also involves a similar task, listing down the names of animals within 120 seconds.

Generative naming abilities are often studied in degenerative conditions such as dementia and some researchers have even used generative naming task or word list generation task in aphasia and compared the performance of persons with aphasia with neurologically healthy individuals.

Basso, Captaini and Laiciona (1998) studied generative naming ability in six persons with aphasia (Broca's, Wernike's & anomic) and 15 neurologically healthy individuals by using 4 categories, i.e. animals, vehicles, vegetables and birds. They found out a statistically significant difference between neurologically healthy individuals and persons with aphasia. Highest mean value was obtained for the lexical category animals followed by vehicles, fruits and vegetables. Within the aphasia group, persons with anomic aphasia performed better followed by persons with Broca's and Wernike's Aphasia.

Warrington (1999) studied word generation task in persons with Wernicke's aphasia using four lexical categories animals, birds and food items and common objects. The performance was compared with the performance of neurologically healthy individuals.

Mean values were extracted and was found that the mean scores were considerably less for persons with Wernike's aphasia.

The performance of persons with aphasia on generative naming or word list generation has been combined/ compared usually with confrontation naming task. Shanthala (1997) used three types of naming tasks confrontation naming, generative naming or word productivity task, and responsive naming. The study was carried out on 3 persons each from Wernicke's and Broca's Aphasia and anomic aphasia type. Persons with anomic aphasia performed better compared to others on all the three naming tasks. High correlation was between generative naming and the confrontation naming for all persons with all the three type of aphasia.

Generative Naming in Bilingual Aphasia

Generative naming or word list generation have been carried out even in persons with bilingual aphasia. Robert and Dorze (1991) used word list generation task in persons with Spanish-English bilingual aphasia. Performance was better in English which was the native language of the participants. Among persons in the aphasia group, persons with anomic aphasia outperformed persons with Wernicke's and Broca's aphasia.

Arpitha (1997) used generative naming task, confrontation naming and responsive naming tasks on 10 Kannada-English bilingual aphasics and found statistical significant difference between the two languages in aphasics, better performance was seen for Kannada language. High positive correlation was found among generative naming and other naming tasks. Generative naming tasks are a part of all the naming test batteries and standardized tests used for aphasia assessment. It can be employed easily to test word retrieval but few issues, such as the lexical category/categories to be undertaken for testing, number of lexical categories and the duration to be given for the list generation have to be taken into consideration.

Correlation Studies

Although a few studies have been carried out in the past, studying the performance of persons with aphasia on confrontation naming and generative naming tasks, most of the

studies employ correlation to study the relationship in performance on these two tasks rather than comparing the results qualitatively and quantitatively, i.e., in terms of the number of correct entries for a lexical category in confrontation naming tasks and number of correct entries in the corresponding lexical category under generative naming task to see if the performance is alike or unlike for the two tasks in persons with aphasia hence supporting a need to study the performance by employing this type of analysis.

The performance of persons with different types of aphasia has not been highlighted in context to these two tests on these tasks hence raises a need to study the performance of persons with different type of aphasia on these two tasks

Need of the Study

1. Confrontation naming assesses for convergent retrieval and generative naming assesses for divergent retrieval, by combining these two tasks, information about the two mechanisms of lexical retrieval can be tapped in persons with aphasia.

2. A detailed analysis by computing the number of correct entries under each lexical category of confrontation naming and comparing the number of correct entries in the corresponding lexical category of generative naming task would reveal the difference in performance across the two tasks and would provide an insight about the complexity of the tasks.

Objectives

1. To compare the performance of neurologically healthy individuals and persons with aphasia on generative naming and confrontation naming tasks.
2. To analyse the number of correct entries on confrontation naming under each lexical category and compare the value, with the number of correct entries under each lexical category, on generative naming task.
3. To study the performance of persons with different types of aphasia on confrontation naming and generative naming tasks.

Method

The primary objective of the current study was to study generative naming ability in neurologically healthy individuals and persons with aphasia. The second objective of the study was to explore category specific naming deficits in persons with aphasia.

Participants: Thirty neurologically healthy adults and eight persons with Aphasia were considered for the study. The neurologically healthy adults were screened using Mini Mental State Examination (MMSE) to rule out neurological, communicative or sensory impairment. Persons with aphasia who had a history of cerebrovascular accident confirmed by neurologist and computerized tomography scan were enrolled. Western Aphasia Battery (Kertez, 1983) was administered on each of these participants. Out of seven persons with aphasia, three persons had anomic aphasia; two participants each had Wernicke's and Broca's type of aphasia. The age of the participants ranged from 45 to 60 years. Kannada was the native language of all these participants. The details of each participant in the aphasia group is summarized in Table 1.

Sl No	Age / Gender	Native language	Type of aphasia
1	38/M	Kannada	Wernicke's aphasia
2	60/M	Kannada	Anomic aphasia
3	54/M	Kannada	Anomic aphasia
4	48/M	Kannada	Anomic aphasia
5	50/F	Kannada	Anomic aphasia
6	52/M	Kannada	Broca's aphasia
7	56/M	Kannada	Wernicke's aphasia
8	63/M	Kannada	Broca's aphasia

Table 1: Details of the participants

The test was administered in two phases. In the first phase, generative naming/verbal fluency task was administered on the participants. .and in the second phase Kannada version of BNT(Sunil & Shymala. 2009) was administered.

I Phase: The lexical categories selected, under the generative naming/word fluency task for the study were animals, fruits, vegetables, common objects, vehicles, body parts and birds Generative naming/ word list generation task was administered to test for category specific naming and also determine divergent retrieval across the different lexical categories

Test administration: The examiner named a lexical category/semantic field and the participant had to name as many items as possible in that given category in Kannada. The participants were given a time interval of approximately 120 seconds (two minutes) to respond with as many entries under a specific category, as they could recall within the stipulated time.

Scoring: The number of items named under a lexical category was noted. A score of '1' was given be given for each correct response. Incorrect responses were given a score of 0.

II Phase Kannada version of Boston Naming Test (BNT) was administered on the neurologically healthy individuals and the seven persons with aphasia. BNT (Boston naming test) (Sunil, Vijetha & Shyamala, 2010) is a test used in confrontation naming It comprises of 57 line drawings of noun objects. The participants were asked to name the stimulus within 60 seconds. Scoring: The response was scored as correct or incorrect response. The correct response was given a score of '1' and the incorrect response was given a score of '0'.

The errors committed by persons with aphasia on confrontation and generative naming tasks was analysed by employing Table 2

Table 2: Response scoring pattern

Sl no	Error type	Description
1	Phonemic error	Responses which were approximations of target word with one or more phonemes
2	Extended circumlocutions	Responses which were extended utterances related to the utterance
3	Semantic Errors	Responses which were semantically related to the target
4	Unrelated response	Responses which were not related to the target semantically
5	Neologisms	Responses which were not real words
6	Grammatical errors	Responses which were deviated from

		the target only by alteration of the grammatical forms
7	Perseveration	Repetitions of the previous response
8	Interference	Responses which were named other than the tested language
9	Category interference	Responses which belonged to any other lexical category other than the intended category tested
9	No response	If no response was elicited within the stipulated period
10	Half word responses	Responses which were half word or part word response to the target
11	Gestures	Responses where gestures were used to indicate the target

Results and Discussion

The primary objective of the current study was to compare the performance of neurologically healthy individuals and persons with aphasia on generative naming and confrontation naming tasks and the second objective was to analyse the number of correct entries on confrontation naming under each lexical category and compare the value, with the number of correct entries under each lexical category obtained on generative naming task.

The first task, i.e., the generative naming task is a free word association/open list generation task. The number of entries obtained under each of the 7 categories within the time period of 2 minutes was considered. Mean values were computed separately for neurologically healthy individuals and persons with aphasia and the score of each person was converted into percentage, for further analysis by dividing the score against the mean scores. This was done separately for the neurologically healthy individuals and persons with aphasia.

Lexical Category	Neurologically healthy individuals	Persons with aphasia
Vegetables	12	03
Fruits	08	03
Animals	11	03

Birds	09	03
Common objects	14	04
Vehicles	08	04
Body parts	06	03

The second task, i.e., confrontation naming, is a closed task. The items on BNT were divided under 7 categories, i.e., animals, birds, vegetables, fruits, common objects, vehicles and body parts for the purpose of analysis in par with the generative naming task. Out of the 57 pictures on BNT 53 pictures belonged to the either of the 7 lexical categories mentioned above and the rest of the pictures were not undertaken for analysis as they did not belong to the any of these 7 categories.

The 53 pictures shortlisted for analysis comprised of pictures of 8 animals, 4 birds, 4 vegetables, 4 fruits, 21 common objects, 5 vehicles, and 4 body parts. Mean scores for each category was obtained separately for the neurologically healthy individuals and persons with aphasia. The scores derived on confrontation naming task was also converted into percentage by dividing it with the maximum score, for each category.

Table 3: Mean value for neurologically healthy individuals and persons with aphasia on generative naming task

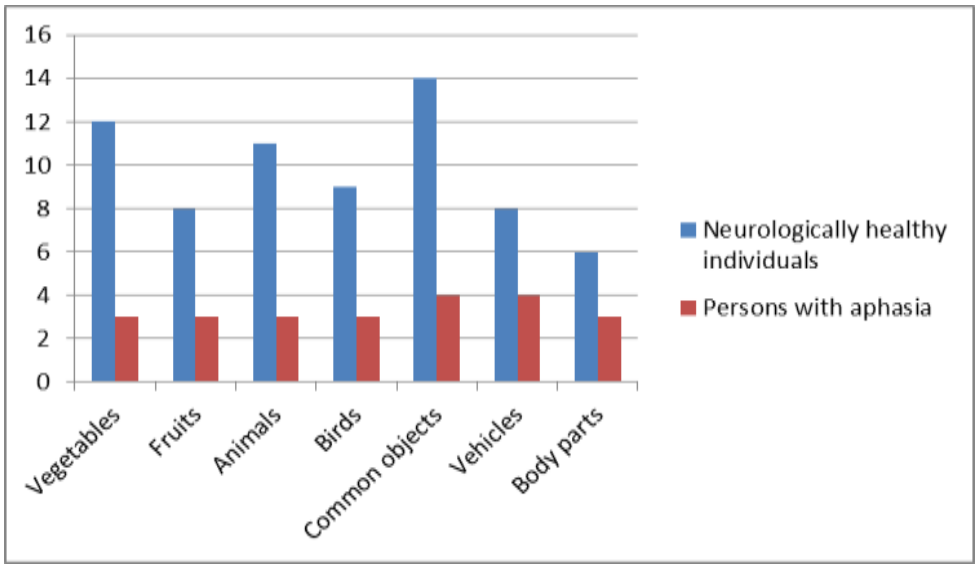

Fig 1: Mean value for neurologically healthy individuals and persons with aphasia on generative naming task

Lexical Category	Neurologically healthy individuals	Persons with aphasia
Vegetables	4	2.5
Fruits	3.84	3
Animals	8	4.75
Birds	3.25	2.25
Common objects	19.25	12.5
Vehicles	5	2
Body parts	4	3

Table 4: Mean value for neurologically healthy individuals and persons with aphasia on confrontation naming task.

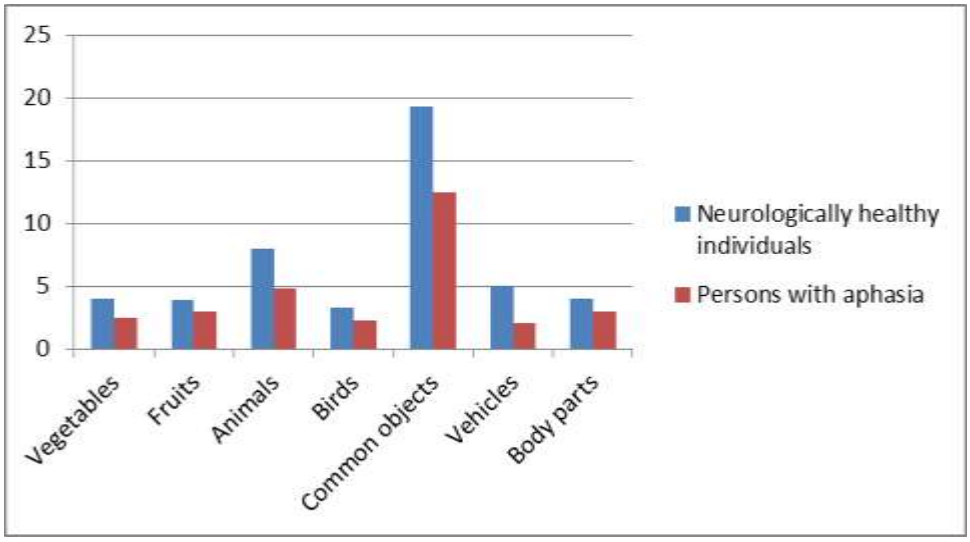

Fig 2: Mean value for neurologically healthy individuals and persons with aphasia on confrontation naming task

As shown in table 3 and figure 1, the mean scores were higher for neurologically healthy individuals compared to persons with aphasia on the generative naming task; highest mean value was obtained for the lexical category common objects followed by vegetables, animals, birds, fruits, vehicles and body parts. For persons with aphasia, the highest mean value was obtained for the lexical categories common objects and vehicles, and the scores for the remaining lexical categories i.e. animals, birds, vegetables, fruits and body parts were same.

The mean values of neurologically healthy individuals and persons with aphasia on confrontation naming task is shown in table 4 and figure 2. For neurologically healthy individual's highest mean value was obtained for common objects, followed by animals, vehicles, body parts, vegetables, birds and fruits. For persons with aphasia, the lexical category common objects obtained the highest mean score followed by animals, body parts, fruits, vegetables, birds, and vehicles

As the objective was to compare the two tasks, the scores converted into percentage for each of the lexical categories for neurologically healthy individuals and persons with aphasia group were compared. As the data followed non normal distribution Non parametric tests were chosen. Wilcoxon's signed rank test for carried out to compare the generative naming task and confrontation naming test, For neurologically healthy individuals, the Z value and P value obtained for the different categories is summarised in table 5. No significant difference was seen across the two tasks for any of the lexical categories. For persons with aphasia, as shown in table 5, significant difference was seen for the lexical categories, common objects animals, birds vegetables, and body parts no significant difference was seen for the other two lexical categories, fruits and vehicles.

Lexical Category	P value Neurologically healthy individuals	P value Persons with aphasia
Vegetables	0.77	0.02
Fruits	0.63	0.17
Animals	0.10	0.04

Birds	0.10	0.04
Common objects	0.22	0.01
Vehicles	0.18	0.09
Body parts	0.09	0.027

Table 5: P values obtained on Wilcoxon's signed rank test.

The number of positive and negative ranks was also taken into consideration as the objective was to compare the complexity of the two tasks; the number of negative ranks was high for persons with aphasia depicting that the performance of generative naming task was poor compared to confrontation naming.

The third objective was to compare the performance of persons with different types of aphasia on confrontation naming and generative naming tasks. Four persons with anomic and two persons each with Broca's and Wernicke's aphasia were enrolled for the study. The mean values for the various lexical categories on Generative naming task and responsive naming are as shown in table 6 and table 7. Mean values depict that persons with anomic aphasia perform better compared to persons with Wernicke's aphasia and Broca 's aphasia.

Sl No	Anomic aphasia	Wernicke's aphasia	Broca's aphasia
Animals	07	03	02
Birds	05	05	01
Vegetables	07	06	03
Fruits	05	04	00
Common objects	05	05	02
Vehicles	04	05	03
Body parts	05	03	02

Sl No	Anomic Aphasia	Wernicke's aphasia	Broca's aphasia
Animals	5	3	2

Birds	3	2	2
Vegetables	5	4	2
Fruits	4	3	1
Common objects	5	5	1
Vehicles	4	4	1
Body parts	4	4	1

Table 6: Mean values for various persons with anomic, Broca ‘s and Wernicke’s aphasia on Generative naming task

Table 7: Mean values for various persons with anomic, Broca ‘s and Wernicke’s aphasia on confrontation naming task

Discussion

The implications which can be drawn from the results is that

1) Neurologically healthy individuals performed better compared to persons with aphasia on generative naming task as well the confrontation naming task.
2) There was no significant difference across confrontation naming and generative naming tasks for neurologically healthy individuals on all the lexical categories
3) There was statistically significant difference across generative naming and confrontation naming tasks on 5 out of 7 lexical categories for persons with aphasia
4) The number of positive and negative ranks elicited on Wilcoxon’s signed rank out to determine the task complexity revealed that the persons with aphasia performed well on confrontation naming task compared to generative naming task.
5) Among persons with aphasia, persons with anomic aphasia performed well compared to persons with Wernicke’s aphasia and Broca’s aphasia.

The mean values derived on generative naming and confrontation naming tasks showed the neurologically healthy individuals performed well compared to persons with aphasia on generative naming and confrontation naming task further, the mean values, obtained for these two groups, showed that there was a statistically significant difference in

the performance between the two groups. This is in consonance with the studies carried out William and Canter (1987); Shantala (1991).

The study also focuses on determining if there is difference in the performance of neurologically healthy individuals on confrontation naming and generative naming tasks. The results derived on Wilcoxon's signed rank test showed there was no significant difference on the two tasks for the neurologically healthy individuals whereas there was significant difference for the persons with aphasia group.

The persons with aphasia performed well on confrontation naming over the generative naming. Confrontation naming is regarded as a simple task compared to generative naming as the confrontation naming task supplements the person with pictures which makes the task more redundant compared to generative naming. (William & Canter 1987).

Neurologically healthy individuals were able to perform well on the task of generative naming as well as confrontation naming which means that they did not require clues in the form of pictures to perform or in other words the absence of pictures in the generative naming did not make any difference; whereas persons with aphasia could recall the names well, in the presence of pictures as in confrontation naming but performed poorly when they were asked to recall names without presenting the pictures.

The third objective was see if there was difference in the performance of persons with different type of aphasia on confrontation and generative naming task, Mean values showed among persons with aphasia, persons with anomic aphasia performed well compared to persons with Wernicke's aphasia and Broca's aphasia. The results obtained are in consonance with the findings by Basso,Captaini and Laiciona (1998) who studied generative naming and confrontation on 20 neurologically healthy individuals and two persons each with Wernicke's, anomic and Broca's aphasia and reported highest mean value for persons with anomic aphasia. The results are also in congruence with the study carried out by Shantala (1997), who studied generative ability alongside the other types of naming in two persons each with Wernicke's, Broca's and anomic aphasia, persons with anomic aphasia obtained highest mean value on generative naming task.

The conclusions which can be drawn from the present study is that the generative naming task is relatively complex compared to confrontation naming task and is likely to tap the severity of aphasia. Generative naming assesses for divergent retrieval which is one facet of lexical semantic processing and confrontation naming assesses for convergent retrieval though the two tests serve different purposes, two tests are combined will provide useful information about the two mechanisms of lexical semantic processing. Though there is no significant difference between the two mechanisms in neurologically healthy individuals, one of these mechanism may be selectively impaired or may be relatively intact over the other in persons with aphasia. Persons with anomic aphasia performed well on both the tasks compared to the persons with Broca's and Wernicke's aphasia, however the sample size of this subgroups considered for the study is less and generalisation could not be drawn.

==========

References

Arpitha(1997) Comparison of naming performance in bilingual aphasics and normal's. Unpublished dissertation, AIISH, University of Mysore.

Basso D. Capatani ,R. & Laciona.E.J. 1987. Some experimental investigations of language in aphasia. Research in verbal behavior and some neurophysiological implications. New York: Academic Press. Pp. 181-199.

Goodglass, H., Kaplan, E., Weintraub, S., & Ackerman, N. (1976). Tip-of-tongue phenomenon in aphasia. *Cortex,* 12, 145–153.

Goodglass, H. (1993). *Understanding aphasia*. San Diego, CA: Adademic Press, Inc.

Martin, C. A., Saffron , R.E., (2000). Case study: Semantic feature analysis as a treatment for aphasic dysnomia: A replication. *Aphasiology*, *14*(2), 133-142.

Roberts, P. M., & Le Dorze, G. 1997. Semantic organization, strategy use and productivity in bilingual semantic verbal fluency. *Brain and Language,* **59,** 412–449

Shanthala (1997) Comparison of naming in aphasics and normals. Unpublished dissertation, AIISH, University of Mysore.

Warrington, R.R. 1979. Word fluency measures. In F. Darley (Ed.), *Evaluation of appraisal techniques in speech and language pathology*. Reading, MA: Addison-Wesley. Pp. 243–246.

William, M., & Canter, G. 1987. Semantic verbal fluency in aphasia: A quantitative and Qualitative study in test-retest conditions. *Aphasiology*, **8,** 569–5

==========

Abhishek. B. P.
Junior Research Fellow
All India Institute of Speech and Hearing
Mysore 570 006
Karnataka
India
abhiraajaradhya@gmail.com

Prema K. S. Rao, Ph.D.
Professor
All India Institute of Speech and Hearing
Mysore 570 006
Karnataka
India
premarao@aiishmysore.com