

**DEVELOPMENT OF NORMS FOR CONFRONTATION NAMING AND
GENERATIVE NAMING IN KANNADA**

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May, 2019

CERTIFICATE

This is to certify that this dissertation titled "*Development of Norms for Confrontation naming and Generative naming in Kannada*" is a bonafide work submitted in part fulfilment for degree of Master of Science (Speech-Language Pathology) of the student Registration number: 17SLP028. This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

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DECLARATION

This is to certify that this Master's dissertation titled "*Development of Norms for Confrontation naming and Generative naming in Kannada*" is the result of my own study under the guidance of Dr. S. P. Goswami, Professor of Speech Pathology & Head- Telecenter for Persons with Communication Disorders, All India Institute of Speech and Hearing, Mysuru, and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

Mysuru,

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*Dedicated to my parents
and my beloved sister*

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CHAPTER 1

INTRODUCTION

Language is one of the most striking feature a human being possess which makes him superior than the other creatures. Humans use language to transmit their thoughts, feelings and emotions through a versatile set of codes and arbitrary symbols. Various complex cognitive mechanisms combine and work together to decipher and express information using a particular language, allowing an individual to communicate effectively.

Naming is one of the significant subsystems of the language module. It is deployed in understanding the lexical semantic processing. The task requires retrieval of semantic and phonological information, which is organized in the memory system and assessed depending on the specificities of a given stimulus (Abhishek & Prema, 2013). This retrieval of information is facilitated by the semantic memory, which organizes details and enables to perform several naming activities such as coordinate naming, superordinate naming (Kamath & Prema, 2001), generative naming and confrontation naming.

Coordinate naming involves naming of proper nouns pertaining to the given category; whereas, superordinate naming, which is a task complimentary to coordinate naming, requires the identification of the class to which the given items belong to. Generative naming, which is a timed task, demands a person to generate appropriate words for a given class. Lastly, confrontation naming refers to the denomination of words in response to picture stimuli at various levels of difficulty.

Confrontation and generative naming are conventionally used to assess word retrieval deficits. Confrontation naming requires an individual to name the presented stimulus, which comprises both frequent and infrequent stimuli in order to vary the level of complexity. It is elicited in response to pictures, line drawings, photographs, or real objects among which pictures are most commonly used. This type of naming requires the selection of a specific label in congruous to a viewed picture, through the retrieval of conceptual information by accessing the semantic networks. The accuracy of response, the time taken for naming, error responses, response to cues and consistency of naming deliver information about the lexical access (Abhishek & Prema, 2013).

Generative naming involves word retrieval through associative exploration of the semantic networks. There are two ways of assessing generative naming; the semantic fluency test and phoneme fluency test. Semantic fluency test requires the examinee to recollect a list of words within a fixed lexical category (e.g., animals, fruits, and vegetables, or shopping items), whereas, the phoneme fluency test demands the examinee to recall a list of words beginning with a specific phoneme. Phoneme fluency is usually more taxing than semantic fluency since initial phoneme lexical stores are broader and less well defined than semantic categories (Auriacombe, Fabrigoule, Lafont, Amieva, Jacqmin-Gadda & Dartigues, 2001).

In spite of the fact that confrontation naming is sensitive in divulging naming deficits, some researchers opine that it over-simplifies the task by naming only the presented stimulus, unlike generative naming, where an individual has to name several entries to a particular category. 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. Thus, confrontation naming is to be integrated with generative naming

in order to study lexical retrieval deficits in detail (Abhishek & Prema, 2013). Hence, generative naming tests are widely used as estimates of language and executive functions in neuropsychological testing (Kim, Lee, Oh, Hong, Lee, Son, et al., 2013).

Word naming deficits negatively affect an individual's ability to communicate, express their needs and participate in social activities. It is a common feature associated with neurological disorders like aphasia, dementia, Alzheimer's disease, Parkinson's disease, and other cognitive impairments. Persons with Aphasia (PWA) exhibit various types of word retrieval errors such as paraphasias, neologisms, and circumlocutions. Individuals with Alzheimer's disease (AD), amnesic mild cognitive impairment (aMCI) displayed semantic errors, visual paragnosia, phonological errors and omission errors on confrontation naming tasks (Balthazar, Cendes & Damasceno, 2008).

Studies on normal individuals indicate that naming ability often decreases with age (Connor, Spiro, Obler & Albert, 2004; Tsang & Lee, 2003). Older adults have a tendency of increased word-finding difficulty with progressing age, as reflected by a decrease in accuracy and increase in the amount of time required to name items, even in the absence of pathological conditions (Tsang & Lee, 2003).

Although few studies are available on normal adults, the number of participants recruited in the studies are minimal and also on a very restricted age range. Studies documented in the literature have drawn comparisons between healthy adults and persons with naming deficits. However, limited resources are available on the normative performances on confrontation naming and generative naming tasks. Thus, a need has been felt to provide normative scores

in confrontation and generative naming tasks across various age groups of healthy individuals.

Need for the study:

The existence of naming deficits has been well documented for individuals with neurological impairment. Although the literature is replete with references to naming deficits in individuals with neuropathology, much less is known regarding the performance of normal adults. Understanding the normal patterns of naming will be important for differential diagnosis of individuals with neurological insult such as aphasia, traumatic brain injury, mild cognitive impairment, and also for progressive disorders such as dementia. Many studies have been done under this domain, but very few studies have been available in Indian languages, which assess the performance of normal adults in a wide age range.

Aim:

The aim of the present study is to develop normative data for confrontation naming and generative naming task.

Objective:

- To investigate the performance of confrontation naming in neuro-typical adults.
- To investigate the performance of generative naming in neuro-typical adults.
- To investigate the performance of males and females in confrontation naming and generative naming tasks.
- To investigate the differences in performances of generative naming tasks at different time intervals.

CHAPTER 2

REVIEW OF LITERATURE

Naming has long been acknowledged as one of the most sensitive aspects of language. The ability to represent objects with names is the basis for human language. Referring to things by name is, largely, mechanized and is not reviewed with great importance unless there is a glitch in accessing the right word at the right time. The strain to retrieve a word can be temporary or long-lasting. Hence, multiple language tests and test batteries are found that encompass naming tasks in it.

Few standardized tests, which assess confrontation naming, include Boston naming test (BNT) (Kaplan & Goodglass, 1983), Visual naming test (VNT) (Benton, Hamsher & Sivan, 1989) and Philadelphia naming test (PNT) (Roach, Schwartz, Martin, Grewal & Brecher, 1996). Test batteries used in the assessment of aphasia such as the Western Aphasia Battery (WAB) (Kertesz, 1982) and Boston Diagnostic Aphasic Examination (BDAE) (Goodglass & Kaplan, 1983) also employs confrontation naming.

Test batteries such as WAB and BDAE also comprise tests on generative naming. Naming tests are not only used during assessment but they are also useful in identifying individuals with early Alzheimer's disease or who are at risk for dementia, including age-associated memory impairment and mild cognitive impairment (Lonie et al., 2009). Performance on generative naming deteriorates in persons with Aphasia, frontotemporal lobar degeneration, Parkinson's disease, subcortical vascular dementia, Alzheimer's disease and traumatic brain injury (Kim et al., 2013; Zakzanis, McDonald & Troyer, 2013). The scores on the naming tasks not only

declines in pathological conditions, but research has found that the naming abilities deteriorate with progress in age.

Aging is an incessant process throughout life which brings about tremendous change in all the aspects such as physical, psychological, social, linguistic and cognitive to name a few. Several studies bear witness to an assertion that, the naming performance starts to sink with the progression in age.

Welch, Doineau, Johnson and King (1996) conducted a study on one hundred and seventy six normal individuals with an average age of 74 years to understand their naming abilities. They administered the 60-item Boston Naming Test (Kaplan & Goodglass, 1983) to find out that, age was negatively associated with the number of correct responses.

Gutherie, Seenly, Beacham, Schuchard, De I'Aune & Moore (2009) compared the performance of young (Mean age = 21 years) and older adults (Mean age = 67 years) on confrontation naming using a corpus of 150 black and white line-drawings which mimicked the standardized naming tests. The accuracy of young adults were found to be significantly higher than the older adults which supports the assertion that naming abilities decrease with increase in age.

When the performance on connected speech and confrontation naming was compared in PWA, the latter provided a better insight to the severity of aphasia as well as the treatment efficacy for lexical retrieval impairments. Hence, confrontation naming is found to be the most sensitive naming tool to distinguish the severity of a disorder (Mayer & Murray, 2003).

Research has established that aging has a negative impact on generative naming as well, as it requires sustained attention and effortful retrieval of the target items. A normal adult is known to list out a minimum of 10-15 items for semantic categories of animals, vegetables,

fruits, vehicles and others (Harold, 2001). Few studies reveal that age is negatively associated with category fluency (Borod, Goodglass, & Kaplan, 1980; Cardebat, Doyon, Puel, Goulet, & Joannette, 1990; Parkin, Walter, & Hunkin, 1995; Tomer & Levin, 1993; Whelihan & Leshner, 1985). The fewer correct responses in older adults can be attributed to the decline in cognitive functions as a consequence of aging (Baddeley & Della Sala, 1996; Troyer, Moscovitch & Winocur, 1997). The cognitive load is higher for generative naming compared to confrontation naming as the number of rules to provide an appropriate response are more stringent. As a consequence, the cognitive operations that has to be carried out are intricate such as intact semantic memory, activation of appropriate semantic lexicon, inhibition of irrelevant responses, elimination of intrusions, avoiding repetitions and apposite judgemental abilities. Phoneme fluency is more demanding than lexical fluency as the lexical stores are not clearly defined unlike for the semantic categories (Ober, Dronkers, Koss, Delis, & Friedland, 1986).

However, many authors support a contrasting opinion that phoneme fluency does not diminish with advancement in age (Bolla, Lindgren, Bonaccorsy, & Bleecker, 1990; Boone, Miller, Lesser, Hill, & D'Elia, 1990; Crossley et al., 1997; Mittenberger, Seidenberg, O'Leary, & DiGiuglio, 1989; Parkin et al., 1995; Tomer & Levin, 1993). Nevertheless, a large number of studies state that both phoneme and lexical fluency tends to decline with aging.

The reduction in naming scores may indicate either normal aging or the risk of having a neurolinguistic disorder. Healthy elderly adults on a neuropsychological examination exhibited depletion on generative naming tasks as a sign of healthy cognitive decline. Such decline in naming scores below the age-related norms is an early sign of dementia (DeJager, Blackwell, Budge & Sahakian, 2005). Hence, having an established norms becomes a topic

of concern. The naming tests can also be used in identifying various pathological conditions as the control and experimental groups showed significant differences in several studies.

Several researchers have compared the performances of PWA having neurologically healthy adults as a reference. Basso, Capitani and Laiciana (1998) compared the performances between PWA and normal adults. The participants included 6 PWA and 15 normal adults. Results yielded significant difference the two groups and it was found that persons with anomic aphasia performed better than the other variants of aphasia.

Warrington (1999) studied naming abilities in Wernicke's aphasia using semantic fluency task. On comparison with neurologically healthy adults the mean scores for PWA was significantly lower than the control group.

On similar lines, Zakzanis, McDonald & Troyer (2013) compared the performance of verbal fluency in normal adults with an average age of 44 years and age matched individuals with severe traumatic brain injury. The aim of the study was to see the sensitivity of verbal fluency tasks in the experimental group. A retrospective cross-sectional study design was used and the performances of phoneme and semantic fluency was assessed. Results revealed that the normal adults had obtained scores significantly higher than the experimental group both in lexical and phoneme fluency tasks. Also the component scores of semantic fluency yielded larger effect sizes overall than phoneme fluency.

Interestingly, there are also investigations that provide contrasting results on this claim stating that not all individuals exhibit naming difficulties with age, but they also retain excellent word-finding abilities throughout old age (Cruise, Worall, & Hickson, 2000; MacKay, Connor, & Storandt, 2005).

On a battery of neuropsychological tests which included 162 participants with no cognitive impairments in the age range of 65-84 years were compared with the control group diagnosed with dementia. The decline in performance was observed only after 80 years which is suggestive of intact cognitive functions till the 80 years of age. Therefore, aging cannot be always negatively associated with cognitive decline (Benton, Eslinger, & Damasio, 1981).

It is also observed that participants with higher educational levels tend to perform better (Cardebat et al., 1990; Crossley et al., 1997; Wiederholt et al., 1993) irrespective of different ethnic groups (Kempler, Teng, Dick, Taussig, & Davis, 1998). This suggests that the exposure they obtain throughout their education, principal occupation and living environment aids in their naming performance (Auriacombe, Fabrigoule, Lafont, Amieva, Jacqmin-Gadda & Dartigues, 2001).

In the Indian context, Shanthala (1997) studied naming abilities in PWA using confrontation naming, generative naming, and responsive naming. The participants were diagnosed as having Wernicke's aphasia, Broca's aphasia and Anomic aphasia. It was found that individuals with anomic aphasia performed better than the other variants.

Abhishek and Prema (2013) carried out a comparison study between PWA and normal adults. 30 neurologically healthy adults and 8 PWA in the age range of 45 to 50 years were included in the study. On carrying out both semantic and phoneme fluency tasks, the results reflected significantly poor performance of PWA on both the naming tasks.

Standardized tests such as Western Aphasia Battery Kannada (WAB-K) (Shyamala & Vijayashree, 2008) and Boston Naming Test in Bilinguals (English-Kannada & English-Telugu) (Shyamala, 2010) also examined the execution of naming tasks of PWA with normal adults and concluded that the normal adults obtained substantially greater scores than PWA.

Not much studies have exploited the naming abilities in healthy adults in reference to the Indian scenario.

Further, disruption in naming behaviour for older adults can accompany with neuro-linguistic disorders such as aphasia, dementia, delirium and mild cognitive impairment. A single age group, conventionally the geriatrics, may not be the target for naming impairment as the younger children and adults also exhibit such behaviours when the brain is insulted due to acquired conditions like head trauma, chemical toxicity and infection. Disturbances in naming may occur after an insult to any immature, adult and aging brain (Dennis, 1980; Goodglass, 1980; Luria, 1970; Opler & Albert, 1981; Rochford, 1971).

Naming, being one of the critical cognitive-linguistic functions, has to be assessed thoroughly to arrive at an unadulterated diagnosis. This is achieved based on the individual's performance on a battery of speech, language and cognitive appraisal measures to differentially diagnose normal adults from disordered population with neurogenic communicative disorders (Rosenbek, LaPointe, & Wertz, 1989). And for these tests to reveal appropriate information regarding a person's naming ability, knowledge about the performance of normal individuals is very much necessary. Understanding the normal naming behaviour across a wide age range is essential simply because, naming disturbances can occur in younger adults as well as the elderly.

CHAPTER 3

METHOD

The present study was undertaken to develop norms for confrontation naming and generative naming across a wider age range from 18 to 88 years.

Ethical Considerations:

The study was carried out adhering to the ethical guidelines stated by AIISH Ethical Committee. All the participants and/or caregivers were briefed about the study, its aims, method and duration of testing. Informed verbal and written consent was obtained from each participant.

Recruitment of participants:

A total of 140 Kannada speaking individuals ranging in age from 18 years to 88 years with no history of linguistic, physical/motor, sensory and cognitive deficits were recruited for the study. All participants were native residents of South India, Karnataka, who used Kannada as their native language (L1). Participants were recruited from each of seven 10-year age strata with equal numbers of males and females in each group as shown in Table-1.

Briefly, variables collected included socio-demographic factors (age, gender, marital status, educational level and principal occupation), living conditions and habits such as smoking, alcohol consumption, drugs intake if any was noted. Montreal Cognitive Assessment (Zaid Nasreddin, 1996) was administered on all the participants to assess the cognitive abilities, followed by the Language Experience and Proficiency Questionnaire (Marian, Blumenfeld & Kaushanskaya, 2007) to the participants who are exposed to more than one language.

Table 1: Details of the participants

Sub group	Age range	Total number of participants	
		Males	Females
Group I	18 to 28	10	10
Group II	29 to 38	10	10
Group III	39 to 48	10	10
Group IV	49 to 58	10	10
Group V	59 to 68	10	10
Group VI	69 to 78	10	10
Group VII	79 to 88	10	10

Procedure:

Each participant was comfortably seated in a quiet environment and tested individually. The instructions were clearly given to the participants and examples were given before administering the tests.

Confrontation naming: The stimulus was borrowed from the Kannada version of the Action Naming Test (ANT) (Girish & Shyamala, 2015) and the Boston Naming Test (BNT) (Sunil, Vijetha & Shyamala, 2010). The stimulus consisted of 57 black and white line drawing of action verbs and nouns respectively. The pictures were presented one after the other on a MacBook Pro laptop having the participants seated at a comfortable distance and position. The participants were instructed to name the stimulus in their native language only, and the responses were audio recorded. Semantic cues were provided followed by phonemic cues if the participant failed to name the item presented. If the participant was unable to name the presented item correctly, the response was not considered.

Scoring: The scores for all the stimulus in confrontation naming were calculated as follows:

- For each correct response (excluding the cues) a score of one was given.
- A score of zero was given for each incorrect response.

For each confrontation naming test, the following data was collected:

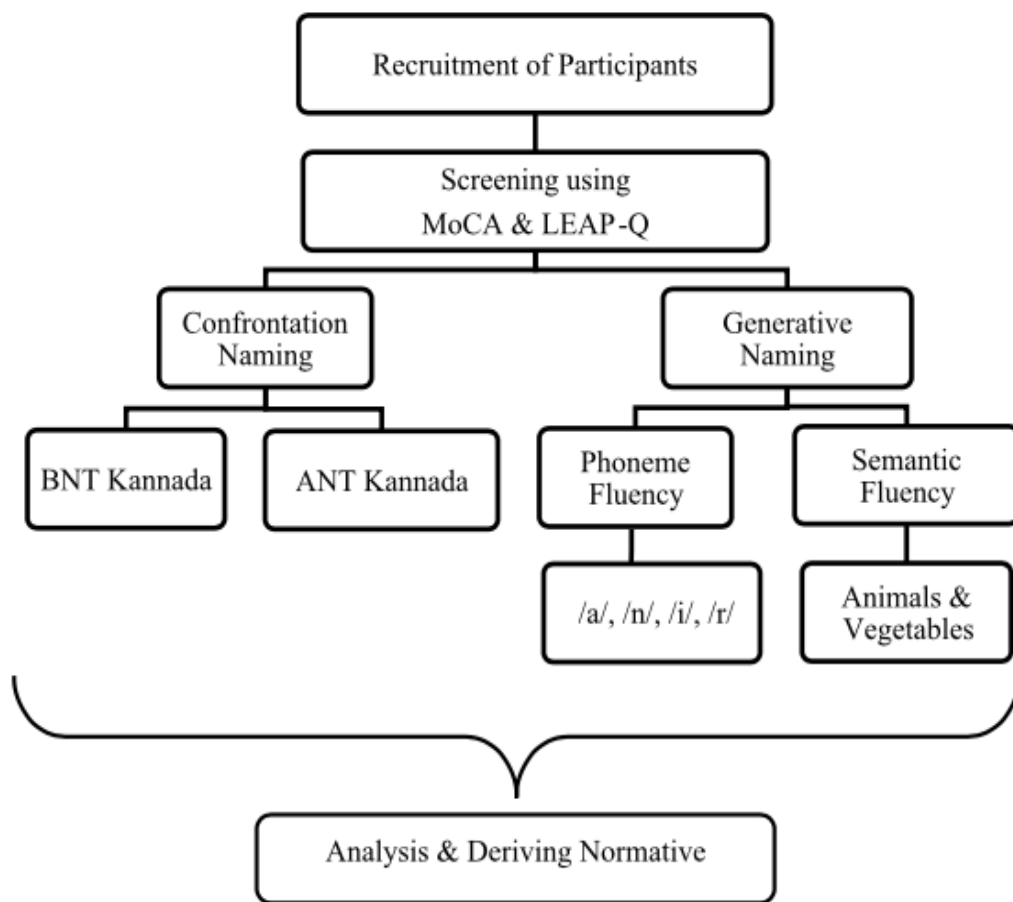
- a. Total number of correct responses.
- b. Total number of semantic cues provided.
- c. Total number of phonemic cues provided.

Generative naming/ Verbal fluency test: The test consisted of two tasks, phoneme fluency and lexical fluency. In the phoneme fluency task, the participants were asked to enumerate as many words as possible beginning with the phonemes /a/, /n/, /i/ and /r/ within 90 seconds. The participants were instructed to perform the task without using proper nouns, reiterating previously named words, or using the same word with a different prefix or suffix.

In the semantic fluency task, the participants were asked to name as many animate objects (animals) and inanimate objects (vegetables) as possible in 90 seconds.

For each fluency test, the total number of words produced in the first 30 seconds, 30-60 seconds and 60-90 seconds was collected.

Figure 1: Flow chart of the method



Statistical analysis:

The raw data collected from 140 participants was tabulated according to their age groups. The data was cross verified to ensure that no inaccurate data was included for statistical analysis.

In confrontation naming, Mean, Median, Standard Deviation & Interquartile Range was calculated for correct responses (without cueing), responses obtained from semantic cueing and the responses obtained from phonemic cueing.

In generative naming, Mean, Median, Standard Deviation & Interquartile Range was calculated for semantic fluency and phoneme fluency separately. Further, the Mean and S.D was calculated for the responses obtained at different time intervals i.e., the initial 30 seconds, 30 to 60 seconds and 60 to 90 seconds.

These scores were then tabulated in an appropriate form suitable for subsequent statistical analysis using SPSS software (version 20.0).

- The data was subjected to Shapiro-Wilk test for normality. The results revealed that the data does not follow normal distribution ($p < 0.05$). Therefore, a non-parametric test Mann-Whitney U test was performed to see the effect of gender.
- Descriptive statistics was carried out to find the Mean, Standard Deviation, Median and Interquartile Range of the naming tasks.
- Kruskal-Wallis test was carried out to see the significant difference across the age. As there was a significant difference found across the age range, Mann-Whitney U test was performed to see the pair-wise differences.
- Friedman test was carried out to see the significance difference across the duration i.e., 30, 60 and 90 seconds followed by Wilcoxon signed rank test to see the pair-wise comparison.

CHAPTER 4

RESULTS

The aim of the present study was to establish normative (Mean, Median, Standard Deviation and Interquartile Range) scores for confrontation naming and generative naming for normal adults. A total of 140 individuals including both males and females in the age range of 18 to 88 years participated in the study. They were divided into seven groups and each group consisted of 20 individuals (10 males and 10 females). The tasks were carried out for two categories of naming viz., confrontation naming tasks and generative naming tasks. In confrontation naming task, the responses were collected from two tests, Boston naming test and Action naming test. In generative naming task, two categories were used namely, semantic fluency task and phoneme fluency task. In semantic fluency task, the responses were obtained for the category of animals and vegetables. Further, in phoneme fluency task, the responses were obtained for the phonemes /a/, /i/, /n/ and /r/. All these responses were obtained from each of the participants.

The results of the present study will be discussed with respect to;

- Confrontation naming
- Generative naming

Confrontation naming

The results for confrontation naming tasks are tabulated with respect to each age group. The Mean, Median, Standard Deviation and Interquartile Range values are presented with respect to Boston naming test (BNT) and Action naming test (ANT) in Table 2.

Generative naming

The results for generative naming tasks are tabulated with respect to each age group. The Mean, Median, S.D and IQR values are presented with respect to semantic fluency (SF) and phoneme fluency tasks (PF) in Table 3.

Table 2: Mean, Median, Standard Deviation and Interquartile Range for confrontation naming.

Age range	Statistical parameters	Boston Naming Test		Action Naming Test	
		Males	Females	Males	Females
Group I (18-28)	M	54.67	55.60	55.00	54.90
	Mdn	55.00	56.00	56.00	56.00
	S.D	1.500	1.265	2.062	2.378
	IQR	3	3	4	5
Group II (28-38)	M	55.00	55.30	54.30	54.10
	Mdn	55.00	56.00	55.00	55.00
	S.D	1.414	1.636	2.359	3.178
	IQR	3	2	4	7
Group III (38-48)	M	54.00	54.30	53.80	51.00
	Mdn	54.00	54.00	53.50	51.60
	S.D	2.211	3.771	2.700	2.836
	IQR	2	5	4	4
Group IV (48-58)	M	53.90	52.40	54.00	51.60
	Mdn	54.00	54.50	53.50	53.00
	S.D	1.370	5.147	2.173	5.719
	IQR	2	4	4	5
Group V (58-68)	M	53.33	42.90	53.44	40.00
	Mdn	53.00	44.00	53.00	42.30
	S.D	1.581	6.983	2.186	8.430
	IQR	3	9	4	11
Group VI (68-78)	M	53.00	42.60	49.80	45.50
	Mdn	53.00	42.50	50.00	68.900
	S.D	2.828	7.877	5.432	8.301
	IQR	4	13	10	16
Group VII (78-88)	M	51.60	32.50	48.60	26.20
	Mdn	52.00	32.50	50.00	24.50
	S.D	3.204	5.911	4.526	4.541
	IQR	5	9	8	6

M = Mean, Mdn = Median, S.D = Standard Deviation, IQR = Interquartile Range

Table 2 shows obvious quantitative differences between the seven groups for all the parameters evaluated for confrontation naming (Boston naming test and Action naming test). Mean, Median, Standard Deviation and Interquartile Range was provided for each group for both males and females.

Group I included participants from the age group of 18 to 28 years. For Boston naming test, the Mean and Median for males and females was 55.67 (S.D = 1.500) and 55.00 (IQR = 3), 55.60 (S.D = 1.265) and 56.00 (IQR = 3) respectively. For Action naming test, the Mean and Median for males and females was 55.00 (S.D = 2.062) and 56.00 (IQR = 4), 55.90 (S.D = 2.378) and 56.00 (IQR = 5) respectively.

Similarly, in Group II the Mean and Median for males and females was 55.00 (S.D = 1.414) and 55.00 (IQR = 3), 55.30 (S.D = 1.636) and 56.00 (IQR = 2) respectively on Boston naming test. Further, for Action naming test, the Mean and Median for males and females was 54.30 (S.D = 2.359) and 55.00 (IQR = 4), 54.10 (S.D = 3.178) and 55.00 (IQR = 7) respectively.

On Boston naming test, the participants in the age group 38 to 48 years obtained Mean and Median values for males and females was 54.00 (S.D =2.211) and 54.00 (IQR =2), 54.30 (S.D =3.771) and 54.00(IQR =5) respectively. On Action naming test, the Mean and Median for males and females was 53.80 (S.D =2.700) and 53.50 (IQR =4), 51.00 (S.D =2.836) and 51.60 (IQR =4) respectively.

In the next age group i.e., from the age range 48 to 58 years, for Boston naming test, the Mean and Median for males and females was 53.90 (S.D =1.370) and 54.00 (IQR = 2), 52.40

(S.D =5.147) and 54.50 (IQR =4) respectively. For Action naming test, the Mean and Median for males was found to be 54.00 (S.D =2.173) and 53.50 (IQR =4) respectively. The females on this age group, obtained Mean and Median scores of 51.60 (S.D =5.719) and 53.00 (IQR =5) respectively.

The participants in the age range 58 to 68 years obtained a value of 53.33 (S.D =1.581) and 53.00 (IQR =3) for Mean and Median respectively on Boston naming test for males. The females, obtained scores for Mean and Median of 42.90 (S.D =6.983) and 44.00 (IQR =9) respectively. In Action naming test, the Mean and Median for males was found to be 53.44 (S.D =2.186) and 53.00 (IQR =4) respectively. Whereas for females, the Mean and Median was 40.00 (S.D =8.430) and 42.30 (IQR =11) respectively.

On the other hand, participants in the age group of 68 to 78 years had Mean and Median values of 53.00 (S.D =2.828) and 53.00 (IQR =4) respectively for males. Whereas for females, the Mean and Median was found to be 42.60(S.D =7.877) and 42.50 (IQR =13) respectively for Boston naming test. For Action naming test, the Mean and Median for males was found to be 49.80 (S.D =5.432) and 50.00 (IQR =10) respectively. For females, the Mean and Median was found to be 45.50 (S.D =8.301) and 48.900 (IQR =16) respectively.

Finally, Group VII included participants from the age range 78 to 88 years. For Boston naming test, the males and females obtained Mean and Median 51.60 (S.D =3.204) and 52.00 (IQR =5) 32.50 (S.D =5.911) and 32.50 (IQR =9) respectively. For Action naming test, the Mean and Median for males and females was 48.60 (S.D =4.526) and 50.00 (IQR =8) 26.20 (S.D =4.541) and 24.50(IQR =6) respectively.

Table 3: Mean, Median, Standard Deviation and Interquartile Range for generative naming.

Age range	Statistical parameters	Semantic Fluency		Phoneme Fluency	
		Males	Females	Males	Females
Group I (18-28)	M	33.800	36.900	38.400	43.700
	Mdn	30.500	38.000	34.500	42.000
	S.D	11.583	9.538	17.328	25.647
	IQR	11.25	16.50	12.50	43.00
Group II (28-38)	M	32.600	34.400	46.200	43.200
	Mdn	33.000	36.000	49.000	46.500
	S.D	5.660	4.221	25.050	16.321
	IQR	7.00	8.25	34.50	20.50
Group III (38-48)	M	37.300	29.200	45.600	14.300
	Mdn	39.000	29.500	46.000	8.500
	S.D	6.815	7.671	11.654	12.944
	IQR	8.50	12.75	18.25	25.50
Group IV (48-58)	M	40.400	28.600	52.000	34.300
	Mdn	41.500	28.500	64.500	35.500
	S.D	6.719	7.904	22.881	19.922
	IQR	10.75	13.50	39.25	41.50
Group V (58-68)	M	30.200	24.000	44.900	24.100
	Mdn	30.000	24.500	47.000	22.500
	S.D	4.491	6.815	21.392	17.412
	IQR	4.00	11.25	33.00	25.50
Group VI (68-78)	M	37.100	22.800	53.600	16.700
	Mdn	39.000	22.000	44.000	15.500
	S.D	7.248	8.879	33.119	4.191
	IQR	12.25	13.75	45.75	5.25
Group VII (78-88)	M	32.600	17.500	53.700	8.500
	Mdn	32.000	19.500	57.500	9.000
	S.D	3.533	6.078	12.229	5.254
	IQR	4.25	11.75	14.50	9.50

(M = Mean, Mdn = Median, S.D = Standard Deviation, IQR = Interquartile Range)

From Table 3, it appeared that Group I included participants from the age range 18 to 28 years. For Semantic fluency tasks, the Mean and Median for males was 33.800 (S.D =11.583) and 30.500 (IQR =11.25) respectively. Whereas for females, the Mean and Median was found to be 36.900 (S.D =9.538) and 38.000 (IQR =16.50) respectively. For Phoneme

fluency tasks, the Mean and Median for males and females was 38.400 (S.D =17.328) and 34.500 (IQR =12.50), 43.700 (S.D =25.647) and 42.000 (IQR =43.00) respectively.

Similarly, Group II consisted participants from the age range 28 to 38 years. For Semantic fluency tasks, the males and females in this group obtained Mean and Median of 32.600 (S.D =5.660) and 33.000 (IQR =7.00), 34.400 (S.D =4.221) and 36.000 (IQR =8.25) respectively. For Phoneme fluency tasks, the Mean and Median for males and females was reported to be 46.200 (S.D =25.050) and 49.000(IQR =34.50), 43.200 (S.D =16.321) and 46.500 (IQR =20.50) respectively.

A Mean and Median score for males and females on Semantic fluency tasks was 37.300 (S.D =6.815) and 39.000 (IQR =8.50), 29.00 (S.D =7.671) and 29.500 (IQR =12.75) respectively. For Phoneme fluency tasks, the Mean and Median for males and females was 45.600 (S.D =11.654) and 46.000 (IQR =18.25), 14.300 (S.D =12.944) and 8.500 (IQR =25.50) respectively. These scores represent the values of Generative naming for the age group 38 to 48 years.

In the next age group i.e., from the age range 48 to 58 years, for Semantic fluency tasks, the Mean and Median for males was seen to be 40.00 (S.D =6.719) and 41.500 (IQR =10.75) respectively. The females on the other hand, obtained Mean and Median values of 28.600 (S.D =7.904) and 28.500 (IQR =13.50) respectively. Mean and Median for males was 52.000 (S.D =22.881) and 64.500 (IQR =39.25) respectively. And for females, the Mean and Median was found to be 34.300 (S.D =19.922) and 35.500(IQR =41.50) respectively on Phoneme fluency tasks.

The participants in the age range 58 to 68 years obtained Mean and Median of 30.200 (S.D =4.491) and 30.000 (IQR =4.00) , 24.000 (S.D =6.815) and 24.500 (IQR =11.25) respectively for Semantic fluency tasks. For Phoneme fluency tasks, the Mean and Median for males and females was found to be 44.900 (S.D =21.392) and 47.000 (IQR =33.00), 24.100 (S.D =17.412) and 22.500 (IQR =25.50) respectively.

On the other hand, participants in the age group of 68 to 78 years had Mean and Median for males and females as 37.100 (S.D =7.248) and 39.000 (IQR =12.25), 22.800 (S.D =8.879) and 22.000 (IQR =13.75) respectively on Semantic fluency tasks. Whereas, on Phoneme fluency tasks, the Mean and Median for males and females was observed to be 53.600 (S.D =33.119) and 44.000 (IQR =45.75), 16.700 (S.D =4.191) and 15.500 (IQR =5.25) respectively.

Lastly, Group VII included participants from the age range 78 to 88 years. For Semantic fluency tasks, the Mean and Median for males and females was 32.600 (S.D =3.533) and 32.000 (IQR =4.25), 17.500 (S.D =6.078) and 19.500 (IQR =11.75) respectively. For Phoneme fluency tasks, the Mean and Median for males and females was found to be 53.700 (S.D =12.229) and 57.500 (IQR =14.50), 8.500 (S.D =5.254) and 9.000 (IQR =9.50) respectively.

The results of the present study are discussed in the following sub headings with respect to naming;

- Effect of gender
- Effect of age
- Effect of duration

Effect of gender

The data was subjected to Shapiro-Wilk test for normality and the results revealed that the data does not follow normal distribution ($p < 0.05$). Therefore, a non-parametric test, Mann-Whitney U test was performed to see the effect of gender. The comparison between males and females was carried out in two conditions viz., irrespective of age and with respect to age. It was found that there was no statistically significant difference ($p > 0.05$) between males and females on any task in both conditions. Hence, it was concluded that age did not have a main effect on both confrontation naming and generative naming.

Effect of age

As mentioned previously, there was no effect of age on confrontation naming and generative naming tasks. Hence, the scores for Boston naming test, Action naming test, Semantic fluency tasks and Phoneme fluency tasks irrespective of gender are represented in the following figures to individually observe the effect of age groups.

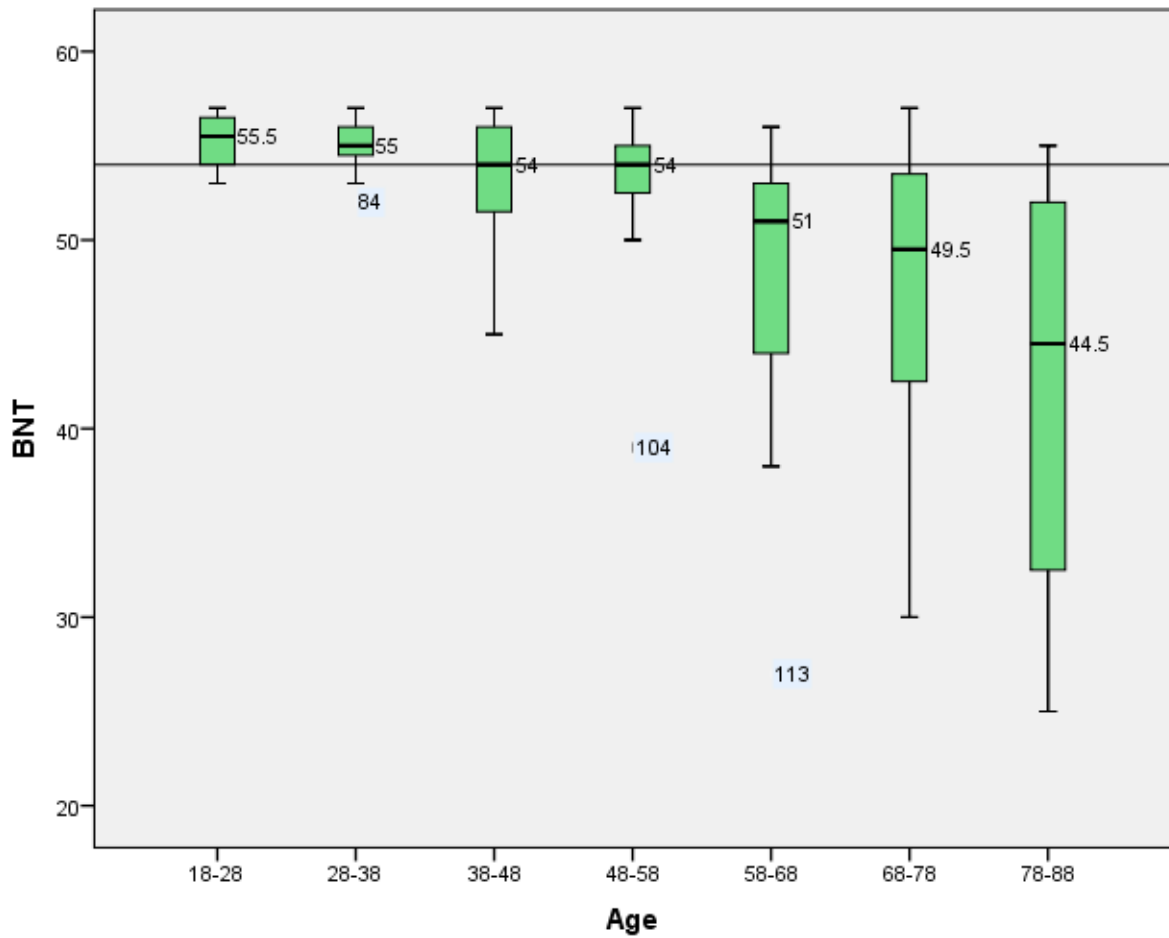


Figure 2: Median and IQR for Boston naming test across age groups.

Figure 2 represents Median and IQR for Boston naming test across age groups. It is clearly evident that as age increases the performance decreases. It was observed that the naming performance for Boston naming test started deteriorating from Group V (58-68 years) onwards.

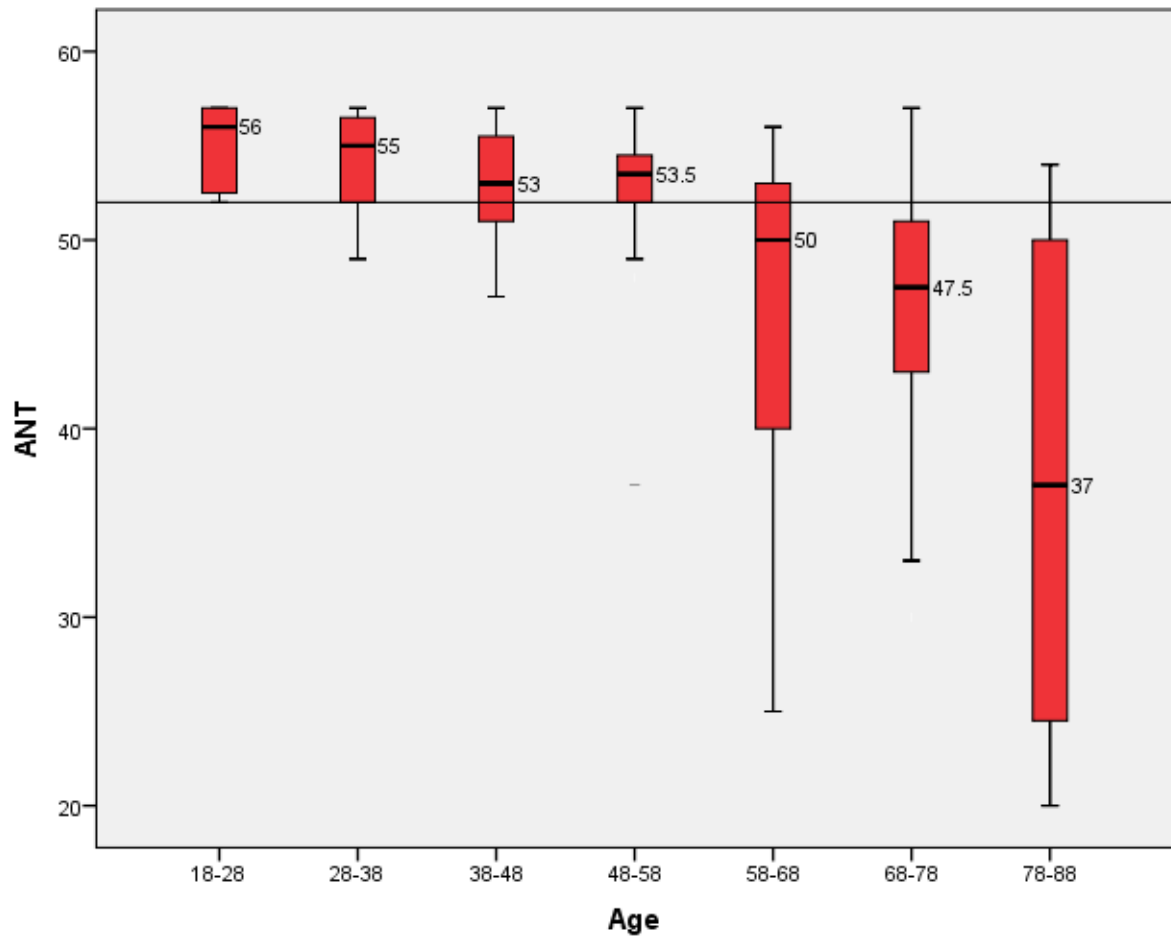


Figure 3: Median and IQR for Action naming test across age groups.

With respect to Action naming test, the decline in naming performance follow similar trends with that of Boston naming test. From Figure 3, it can be inferred that the naming performance started declining from Group V (58-68 years) onwards.

To conclude, it was observed that the performance of confrontation naming tend to decrease with age.

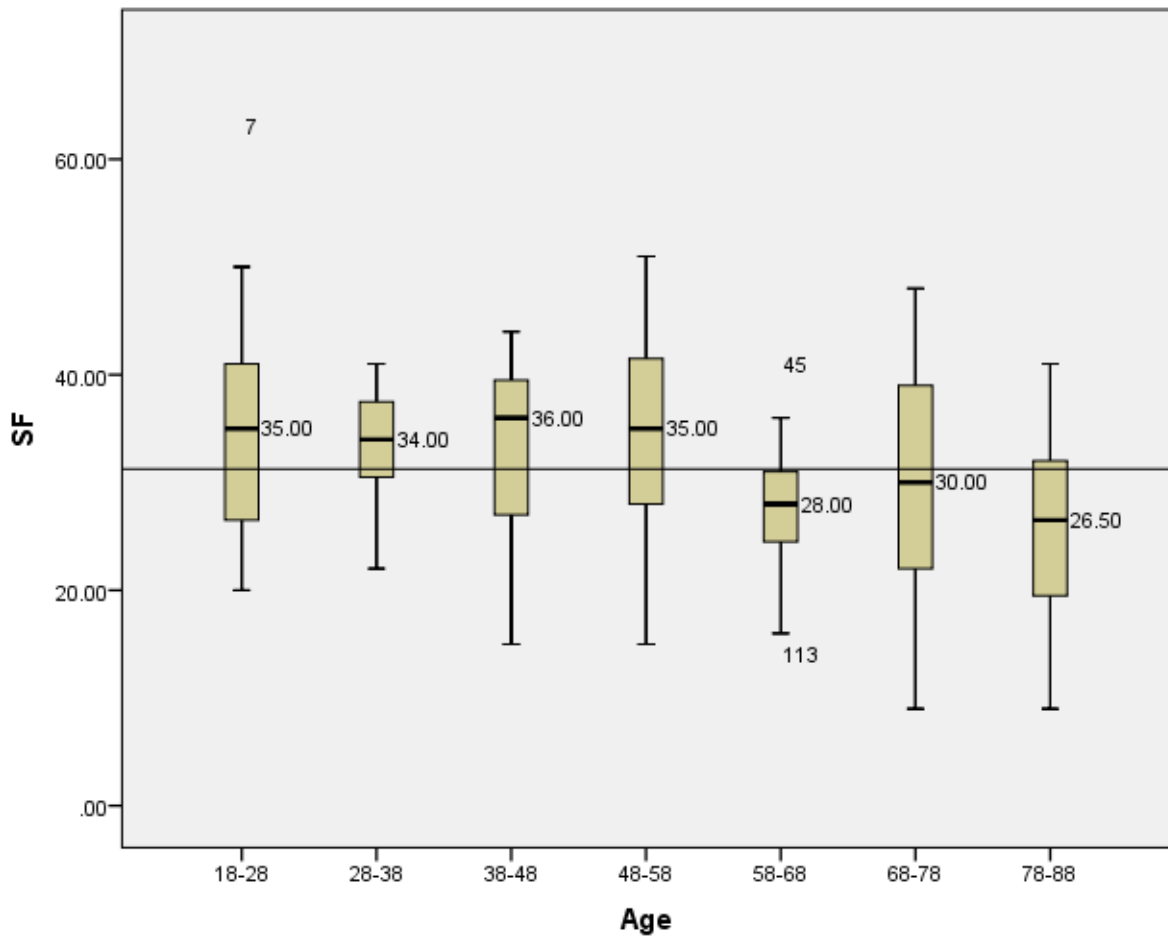


Figure 4: Median and IQR for Semantic fluency across age groups.

In Semantic fluency tasks, there was no pattern observed similar to confrontation naming. However, from Figure 4 it can be implied that participants from Group V (58-68 years) onwards tend to perform below the reference line indicating a decline in category fluency with progression in age.

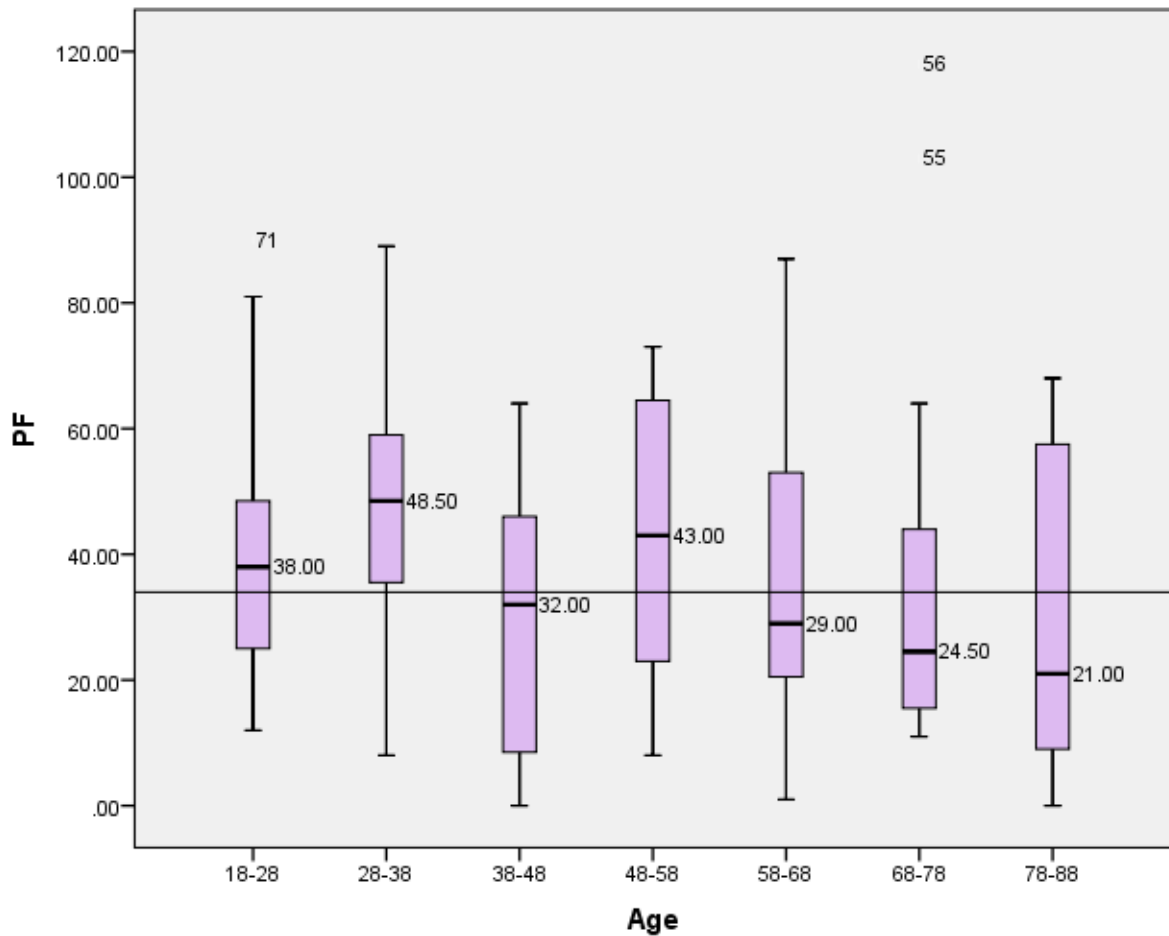


Figure 5: Median and IQR for Phoneme fluency across age groups.

Lastly, with respect to Phoneme fluency, again there was no pattern observed similar to confrontation naming as depicted in Figure 5. Nevertheless, it can be implied that participants from Group V (58-68 years) onwards showed a decline in naming performance. However, the participants in Group III performed poorer compared to their consecutive age groups. The reason for this is elaborated in the discussion section of the study.

Since the data does not follow normality, Kruskal Wallis test was performed to observe the effect of age on confrontation naming and generative naming. The comparison between age groups was carried out in one condition viz., irrespective of gender since it was found from the previous non-parametric test (Mann-Whitney U test) that, gender had no main effect on naming. Statistically significant difference for Boston naming test ($p=0.000$), Action naming test ($p=0.000$) and Semantic fluency task ($p=0.003$) was found between the age groups. Further, Mann-Whitney U test was performed to see the pair-wise significant differences across seven age groups.

The results revealed that there was no significant difference between Group I and Group II and between Group V and Group VI ($p>0.05$), which states that both the groups performed equally on all tasks. Further, the pair-wise results obtained for the rest of the groups revealed that there was a significant difference in the naming tasks. The results of the same has been presented in Table 4.

Table 4: Results of the Mann-Whitney U test for pair-wise age group comparison on naming.

Groups	BNT		ANT		SF		PF	
	/z/	p-value	/z/	p-value	/z/	p-value	/z/	p-value
I vs III	-1.866	0.062	-2.657	0.008*	-0.312	0.755	-1.326	0.185
I vs IV	-2.500	0.012*	-2.186	0.029*	-0.081	0.935	-0.409	0.685
I vs V	-4.517	0.000*	-4.078	0.000*	-2.520	0.012*	-0.812	0.417
I vs VI	-4.006	0.000*	-4.284	0.000*	-1.205	0.228	-1.664	0.096
I vs VII	-4.702	0.000*	-5.046	0.000*	-2.817	0.005*	-1.326	0.185
II vs III	-1.784	0.074	-1.554	0.120	-0.257	0.797	-2.355	0.019*
II vs IV	-2.504	0.012*	-1.445	0.149	-0.528	0.597	-0.027	0.978
II vs V	-4.451	0.000*	-3.384	0.001*	-3.260	0.001*	-1.448	0.148
II vs VI	-3.910	0.000*	-3.763	0.000*	-1.017	0.309	-1.719	0.086
II vs VII	-4.703	0.000*	-4.710	0.000*	-3.061	0.002*	-1.462	0.144
III vs IV	-0.370	0.712	-0.574	0.566	-0.406	0.684	-2.016	0.044*
III vs V	-3.057	0.002*	-2.431	0.015*	-2.302	0.021*	-0.500	0.617
III vs VI	-2.744	0.006*	-3.107	0.002*	-0.907	0.364	-0.095	0.925
III vs VII	-3.745	0.000*	-4.190	0.000*	-2.667	0.008*	-0.365	0.715
IV vs V	-3.064	0.002*	-2.528	0.011*	-2.680	0.007*	-1.272	0.204
IV vs VI	-2.656	0.008*	-3.180	0.001*	-1.300	0.194	-1.407	0.159
IV vs VII	-3.686	0.000*	-4.360	0.000*	-2.898	0.004*	-1.705	0.088
V vs VII	-1.599	0.110	-2.373	0.018*	-0.501	0.616	-0.609	0.542
VI vs VII	-1.681	0.93	-2.142	0.032*	-1.287	0.198	-0.907	0.364

*p<0.05

From Table 4, it is perceivable that for Boston naming test, Group I performed better than Group IV, V, VI and VII. For Action naming test, Group I performed better than Group II, IV, V, VI and VII. In Semantic fluency tasks, Group I performed better than Group V and VII. On the other hand, Group II performed better than IV, V, VI and VII on Boston naming test and Action naming test. Further, Group II outraced Group III on Phoneme fluency tasks; V and VII on Semantic fluency tasks. Whereas, Group III performed superiorly than Group V, VI and VII on the confrontation naming tasks. Additionally, Group III obtained better scores than Group IV on Phoneme fluency tasks. With respect to Semantic fluency tasks, Group V and VII performed poorer than Group III. Furthermore, Group IV had better scores than Group V, VI and VII on confrontation naming tasks. Also, Group IV performed better than Group V and VII on semantic fluency tasks. Lastly, Group VII had poorer scores than Group V and VI only on Action naming test. Therefore, on pair-wise comparison across groups, it was concluded that age has a main effect on the performance of naming tasks.

Effect of duration

Friedman's test was carried out to see the effect of duration on naming performance. In the present study, the time intervals considered were 0 to 30 seconds, 30 to 60 seconds and 60 to 90 seconds for generative naming tasks. Results revealed that there was a significant difference ($p=0.000$) between the time intervals. The highest mean rank was obtained for the time interval from 0 to 30 seconds followed by 30 to 60 seconds. This implies that the participants were able to name the highest number of responses during the first 30 seconds, followed by the subsequent 30 seconds. The participants provided the least number of responses in the last 30 seconds.

Wilcoxon signed rank test was performed to see the pair-wise significant differences between the time intervals. The comparison between duration was carried out in four conditions viz.,

irrespective of age and gender, with respect to age, with respect to gender and with respect to age and gender.

i. Irrespective of age and gender

Pair-wise comparison across time intervals was performed irrespective of age groups and gender. The results are presented in Table 5.

Table 5: Results of Wilcoxon sign rank test irrespective of age and gender on duration.

Duration	/z/	p-value
30 vs 60	-10.205	0.000*
30 vs 90	-10.267	0.000*
60 vs 90	8.825	0.000*

The results revealed that there was a significant difference ($p=0.000$) across all the three pair-wise intervals namely, 30 vs 60, 30 vs 90 and 60 vs 90. The highest mean rank obtained was 2.99 for the time interval between 0 to 30 seconds, followed by 1.90 for 30 to 60 seconds and lastly 1.11 for 60 to 90 seconds. It could be inferred that most of the accurate responses provided by the participants were during the first 30 seconds, compared to the last 60 seconds.

ii. With respect to age groups

On acquiring significant difference in Friedman's test, pair-wise comparison across time intervals was performed with respect to age groups. The results are presented in Table 6.

Table 6: Results of Wilcoxon sign rank test with respect to age groups.

Age group	Statistical parameter	30 vs 60	30 vs 90	60 vs 90
Group I	/z/	-3.922	-3.927	-3.511
	p-value	0.000*	0.000*	0.000*
Group II	/z/	-3.924	-3.923	-2.945
	p-value	0.000*	0.000*	0.003*
Group III	/z/	-3.922	-3.923	-2.822
	p-value	0.000*	0.000*	0.005*
Group IV	/z/	-3.921	-3.922	-3.401
	p-value	0.000*	0.000*	0.001*
Group V	/z/	-3.921	-3.921	-3.748
	p-value	0.000*	0.000*	0.000*
Group VI	/z/	-3.790	-3.920	-3.627
	p-value	0.000*	0.000*	0.000*
Group VII	/z/	-3.826	-3.922	-3.813
	p-value	0.000*	0.000*	0.000*

*p<0.05

The results indicated that there was a significant difference ($p < 0.05$) observed between the three pair-wise time intervals across age groups. The mean rank follows the previous pattern with the initial 30 seconds having the highest mean rank for all the age groups. Again it could be concluded that the participants provided the highest number of responses during 0 to 30 seconds, followed by the subsequent time intervals.

iii. *With respect to gender*

Pair-wise comparison across time intervals was performed between males and females. The results have been presented in Table 7.

Table 7: Results of Wilcoxon sign rank test with respect to gender.

Duration	Males		Females	
	/z/	p-value	/z/	p-value
30 vs 60	-7.273	0.000*	-7.162	0.000*
30 vs 90	-7.274	0.000*	-7.272	0.000*
60 vs 90	-6.362	0.000*	-6.177	0.000*

The results revealed that there was a significant difference ($p=0.000$) observed between males and females. Comparison of the mean ranks on Friedman's test concluded that that males performed better than females in all the three pair-wise time intervals. The results regarding pair-wise comparison yielded conclusions on similar lines indicating that the participants were able to enumerate more number of responses in the first 30 seconds compared to the next 30 seconds.

iv. *With respect to age groups and gender*

Pair-wise comparison across time intervals was performed with respect to age groups and gender. The results have been presented in Table 8.

Table 8: Results of Wilcoxon sign rank test with respect to gender and age groups

Age group	Gender	Statistical parameter	Duration		
			30 vs 60	30 vs 90	60 vs 90
Group I	Males	/z/	-2.807	-2.821	-2.807
		p-value	0.005*	0.005*	0.005*
	Females	/z/	-2.807	-2.803	-2.091
		p-value	0.005*	0.005*	0.037*
Group II	Males	/z/	-2.805	-2.809	-2.670
		p-value	0.005*	0.005*	0.008*
	Females	/z/	-2.805	-2.805	-1.601
		p-value	0.005*	0.005*	0.109
Group III	Males	/z/	-2.805	-2.807	-0.970
		p-value	0.005*	0.005*	0.332
	Females	/z/	-2.807	-2.803	-2.812
		p-value	0.005*	0.005*	0.005*
Group IV	Males	/z/	-2.807	-2.805	-2.527
		p-value	0.005*	0.005*	0.012*
	Females	/z/	-2.803	-2.805	-2.349
		p-value	0.005*	0.005*	0.019*
Group V	Males	/z/	-2.805	-2.805	-2.670
		p-value	0.005*	0.005*	0.008*
	Females	/z/	-2.807	-2.803	-2.659
		p-value	0.005*	0.005*	0.008*
Group VI	Males	/z/	-2.805	-2.803	-2.805
		p-value	0.005*	0.005*	0.005*
	Females	/z/	-2.448	-2.803	-2.201
		p-value	0.014*	0.005*	0.028*
Group VII	Males	/z/	-2.805	-2.807	-2.501
		p-value	0.005*	0.005*	0.012*
	Females	/z/	-2.668	-2.807	-2.814
		p-value	0.008*	0.005*	0.005*

*p<0.05

The results revealed that there was a significant difference ($p < 0.05$) between males and females across age groups in all the three pair-wise time intervals. Furthermore, it was again established that the participants provided the highest number of responses in the time interval between 0 to 30 seconds followed by 30 to 60 seconds and 60 to 90 seconds. Lastly, it was clear that the participants produced the highest number of responses and lowest number of responses at 0 to 30 seconds and 60 to 90 seconds respectively. To conclude, there was a main effect of duration on the performance of generative naming. However, there was no interaction effect observed.

Table 9: Normative scores for Confrontation naming across age groups.

Confrontation naming		
Age group	Mean	S.D
Group I (18-28 years)	55.052	1.815
Group II (28-38 years)	54.75	2.273
Group III (38-48 years)	53.325	2.981
Group IV (48-58 years)	52.7	4.007
Group V (58-68 years)	47.075	8.477
Group VI (68-78 years)	47.35	7.580
Group VII (78-88 years)	40.6	11.254

*M=Mean, S.D=Standard Deviation

Table 9 shows the normative score values for confrontation naming across age groups. These normative values have been obtained by averaging the Boston naming test and Action naming test scores. Thus, from Table 9 it is clear that Group I (18 to 28 years) obtained highest value of mean scores for confrontation naming whereas, the least values were

obtained for Group VII (78 to 88 years). This shows that as the age advances there is a decline in confrontation naming performances.

Table 10: Normative scores for Generative naming across age groups.

Generative naming								
Age groups	M	S.D	30s		60s		90s	
			M	S.D	M	S.D	M	S.D
I (18-28years)	37.75	16.783	6.8	3.745	3.575	2.588	2.208	1.965
II (28-38years)	48.825	14.323	8.075	4.140	3.658	2.031	2.875	2.243
III (38-48 years)	41.45	21.301	7.541	3.884	3.633	2.725	2.641	2.410
IV (48-58 years)	41.725	16.591	7.491	3.547	3.833	2.363	2.583	2.232
V (58-68 years)	30.275	15.191	6.000	4.377	2.5	2.264	1.591	1.626
VI (68-78 years)	27.75	14.314	5.15	3.547	2.483	2.418	1.616	2.042
VII (78-88 years)	16.375	7.998	3.341	2.917	1.516	1.791	0.6	0.911

*M=Mean, S.D=Standard Deviation

Table 10 shows the normative scores for generative naming tasks across age groups for a duration of 30 seconds, 60 seconds and 90 seconds. From Table 10 it is observed that

younger adults (Group I & II) obtained a maximum mean score compared to older adults. Group VII (78 to 88 years) scored the minimum scores which is a clear evidence that as age advances, the number of responses provided by the older adults was lesser than younger adults.

To summarize the results of the present study; the study provided the normative scores for confrontation naming and generative naming which included Mean, Median, Standard Deviation and Interquartile Range with respect to males and females in seven age groups from 18 to 88 years. It was also found that gender does not have an influence on naming performance which implied that males and females performed equally. The study stated that age has an effect on the naming performance. Additionally, there is an age effect and gender effect on the duration of naming response. It was also observed that in generative naming, the highest number of responses were obtained during the initial 30 seconds and the lowest number of responses were obtained during the final 30 seconds (60 to 90 seconds) after the presentation of stimulus. As there was no effect of gender on naming performance in the present study, the Mean and S.D scores are combined for males and females. The scores for confrontation naming and generative naming are presented in Table 9 and Table 10 respectively. Table 10 consists of Mean and S.D scores at different time intervals for generative naming viz., 0 to 30 seconds, 30 to 60 seconds and 60 to 90 seconds. Table 9 and Table 10 can be used as reference to predict the normative scores for confrontation naming and generative naming respectively during clinical assessment.

CHAPTER 5

DISCUSSION

The aim of the present study was to develop norms for confrontation naming and generative naming in Kannada. A total of 140 individuals participated in the study with an age range of 18 to 88 years. The participants were divided into seven age groups accordingly. The norms were obtained using several tasks in confrontation and generative naming. In confrontation naming, Boston naming test and Action naming test were used. In generative naming, semantic fluency tasks and phoneme fluency tasks were utilized. In confrontation naming, the measures included total number of correct responses. In generative naming, the measures included total number of words produced and total number of words produced during different time intervals i.e., from 0 to 30 seconds, from 30 to 60 seconds and from 60 to 90 seconds. The data was subjected to statistical analysis using appropriate non-parametric tests. The Mean, Median, S.D and Interquartile Range scores were obtained for each age group and tabulated. The results were further analysed and tabulated for comparisons between age, gender and duration.

The comparison between males and females was carried out in two conditions viz., irrespective of age and with respect to age. It was observed that gender did not influence the naming performance in both confrontation naming and generative naming tasks. This result supports the findings of most of the studies including Whelihan & Leshner, 1985; Cardebat, Doyon, Puel, Goulet, & Joannette, 1990; Parkin, Walter, & Hunkin, 1995; Welch, Doineau, Johnson and King, 1996; Tomer & Levin, 1993; Tsang & Lee, 2003; Connor, Spiro, Obler & Albert, 2004; and Guthrie, Seenly, Beacham, Schuchard, De l'Aune & Moore, 2009, that gender has no effect on naming performance.

However, this results refute the findings of other studies which stated that gender has an effect on naming (Coppens & Frisinger, 2005; Laws, 1999, 2004; Marra, Ferraccioli, and Gainotti, 2007; Knight, McMahon, Green, and Skeaff, 2006; & Capitani, Laiacona, and Barbarotto, 1999).

To conclude, gender can be considered as one of the variable which has got mixed results where few authors have reported findings in support and others have contrasting opinions. However, the present study states that gender does not influence the naming performance. Thus it can be concluded that gender is not a strong indicator to differentiate the performance of males and females on both confrontation naming and generative naming tasks. The study shows that the performance of participants are equal in both males and females on performance and speed task.

Next, the impact of age related changes on naming was investigated in two conditions viz., confrontation naming and generative naming. In the present study confrontation naming was carried out using two tests namely, Boston naming test and Action naming test. The participants performed better on Boston naming test compared to Action naming test. This could be attributed to the fact that the access for nouns are easier than verbs. Figure 2 and Figure 3 represents the performance on Boston naming test and Action naming test respectively, between age groups and the decline in performance between young and old adults can be clearly visualized.

The performance was found to be quite stable till Group V(58-68 years) after which the scores tend to decrease. Previous studies support this finding where it is suggested that the age related neurological symptoms are more likely to be seen during late 50s. Although aging has an effect on other groups as well, the signs exhibited are still trivial (Spieler & Balota, 2000). Further, there is a significant fall on confrontation naming scores for Group VII (78-

88 years) compared to all the other groups. As age progresses, the swiftness to access the semantic information decreases along with reduction in appropriate selection of semantic lexicon. Education plays a major role in improving the representation of lexical knowledge (Coppens & Frisinger, 2005; Mack et al., 2005 & Capitani, Laiacona, Barbarotto, & Trivelli, 1994). In Group VI and VII, males had better scores as their educational level was higher compared to their female peers, however this difference was not statistically significant. Participants with poor educational background failed to name certain items that were presented. For instance, in Boston naming test these participants were unable to name items such protractor and globe. In Action naming test, items like volcanic eruption and knitting were difficult to name. Further, the initiation and execution of the articulatory program to provide an accurate verbal response becomes slow compared to the young adults (Balota & Abrams, 1995; Balota & Chumbley, 1985). The frequency at which the individuals were exposed to the items presented in the stimuli also has a strong influence on performance. Interpreting black and white line drawings was laborious as visual recognition tend to diminish along with slow generalized information processing (Owsley, Sekular, & Siemsen, 1983; Avidan et al., 2002; Biederman & Kalocsai, 1997; Braje, Tjan, & Legge, 1995; Collin, Liu, Troje, McMullen, & Chaudhuri, 2004). These visual constraints could affect the naming performance proving as a barrier to appreciate the true lexical-semantic fund of knowledge (Gutherie, Seenly, Beacham, Schuchard, De l'Aune & Moore, 2009).

Many studies have discussed about the facilitation effects of both semantic and phonemic cueing (Li & Williams, 1989; Marshall, Neuburger, & Phillips, 1992; Stimley & Noll, 1991; Howard, Patterson, Franklin, Orchard-Lisle, & Morton, 1985a, 1985b; Marshall, Freed, & Phillips, 1994). Consequently, participants in the older age groups procured more number of semantic and phonemic cues which helped them provide better number of accurate responses.

The performance was also evaluated in generative naming across age groups. Generative naming was assessed using Semantic fluency and Phoneme fluency tasks. It was found that highest number of correct responses were obtained for the phoneme /a/ followed by /r/, /i/ and /n/. Thus, these phonemes in the same order can be used for phoneme fluency tasks in clinical settings. The results were in similar lines as of confrontation naming. Figure 4 and Figure 5 depicts the performance of Semantic fluency and Phoneme fluency respectively across age groups. Although the figures do not show obvious patterns, it is still visible that the generative naming scores declined with age. The importance of education on naming has already been mentioned previously which contributed to the disparity on naming performance in Group V. Hence, in Figure 4 it is observed that Semantic fluency scores for Group V was lesser than Group VI. This was due to the variability in the educational status of the participants who were considered in Group V. With advancement in age the inhibition of lexical neighbourhood becomes difficult which activates related semantic lexicons leading to incorrect responses (Coltheart, Davelaar, Jonasson & Benser, 1997). For instance, when the category of vegetable was given for generative naming, the erroneous responses included grains and fruits which were semantically related to the stimulus provided.

The cognitive load is comparatively greater for generative naming compared to confrontation naming. The cognitive operations that has to be carried out are much more intricate than confrontation naming such as intact semantic memory, activation of appropriate semantic lexicon, inhibition of irrelevant responses, elimination of intrusions, avoiding repetitions and apposite judgemental abilities (Ober, Dronkers, Koss, Delis, & Friedland, 1986). All these factors tend to be challenging as the age progresses which in turn affects the performance negatively. Further, the presentation of stimulus in visual mode facilitates participants to provide better responses in confrontation naming than generative naming.

Overall, the results on the effect of age having a negative impact on both confrontation naming and generative naming is in agreement with the studies by Guthrie, Seenly, Beacham, Schuchard, De l'Aune & Moore, 2009; Welch, Doineau, Johnson and King, 1996; Cardebat, Doyon, Puel, Goulet, & Joannette, 1990; Parkin, Walter, & Hunkin, 1995; Tomer & Levin, 1993; Whelihan & Lesher, 1985; Baddeley & Della Sala, 1996; Troyer, Moscovitch & Winocur, 1997.

However, the findings of the present study are in contrast with other studies stating a contrasting opinion that naming abilities does not diminish with advancement in age (Bolla, Lindgren, Bonaccorsy, & Bleecker, 1990; Boone, Miller, Lesser, Hill, & D'Elia, 1990; Crossley et al., 1997; Mittenberger, Seidenberg, O'Leary, & DiGiuglio, 1989; Parkin et al., 1995; Tomer & Levin, 1993).

Literature provides both supporting and contrasting studies on the effect of age. However, the results of the present study suggests that age has a negative impact on naming performance.

Furthermore, this study also investigated the effect of duration on generative naming. It was found that the participants provided the highest number of responses in the initial 30 seconds followed by the consecutive 30 seconds. The least number of responses were obtained during the last 30 seconds. This finding was observed across all the age groups between both males and females. The largest activation of mental lexicon occurs immediately after the presentation of stimulus, to access the highest possible responses (Levelt, Schriefers, Pechmann, & Havinga, 1999). Hence, the number of responses were greater in the first 30 seconds compared to the remaining durations. By the end of 60 seconds, the responses accessed by the lexicon were already provided and exhausted. This led to the performance being poorer in the last 30 seconds which indicated that the activation was sparse in the end compared to that during the first 30 seconds.

Also, participants with poor sustained attention, desolated personal and social life provided fewer errorless responses. However, these factors are individualistic and purely based on observation. Hence, cognitive functions, emotional state and other behavioural aspects play a pivotal role in providing accurate responses during naming tasks.

CHAPTER 6

SUMMARY AND CONCLUSION

The present study was aimed to establish normative scores for confrontation and generative naming tasks for normal adults. The study included seven age groups from 18 to 88 years with equal number of males and females in each group who were native speakers of Kannada. The study considered Boston naming test and Action naming test for confrontation naming. For generative naming, semantic fluency and phoneme fluency tasks were chosen. The Mean, Median, S.D and IQR scores were obtained and tabulated according to the age groups separately for males and females. Further, the naming performance on both confrontation naming and generative naming was compared with respect to gender, age groups and duration. The duration measures were considered only for generative naming tasks.

The results revealed that there was no effect of gender on naming performance across age groups. However, age had a significant effect on the performance for both confrontation naming and generative naming. It was observed that each group had a significant difference on both types of naming. Hence, it was conclusive of a fact that aging affected naming performance negatively. The study also suggested that, the adverse effect of aging had an impact on naming only from Group V and continues to decline with advancement in age. Further, the study also provides an insight to the effect of duration in generative naming stating that the highest number of responses are provided during the first 30 seconds and the least number of responses are obtained during the last 30 seconds.

Implications of the study

- A comprehensive review of literature revealed the significance of confrontation and generative naming to predict, identify and to differentially diagnose individuals with neuro-linguistic disorders such as traumatic brain injury, aphasia, dementia, mild cognitive impairment and delirium.
- The results obtained can be used clinically as normative scores for confrontation naming and generative naming for individuals from 18 to 88 years for Indian population. Hence, with these normative scores, critical cognitive-linguistic functions can be assessed which in turn helps in arriving at an unadulterated diagnosis.
- The effect of aging on naming performance can be understood and applied in clinical settings while assessing individuals across different age groups.
- Lastly, duration acts as a crucial biomarker in identifying and differentiating cases with mild cognitive impairment, Alzheimer's disease, traumatic brain injury and dementia.

Limitations of the present study

- Education level of all the participants could not be equalized as it was difficult to find older adults with good educational background, especially females.

Future directions

- Latency or reaction times can be measured for both confrontation and generative naming tasks.
- The normative scores can be compared between other Indian languages.

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