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Verbal Perseveration in Geriatric Tamil Speakers

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MAY, 2001

Dedicated
To my
Brothers & Sister

CERTIFICATE

This is to certify that this dissertation entitled **"Verbal Perseveration in Geriatric Tamil Speakers"** is the bonafide work in part fulfillment for the degree of Master of Science (Speech & Hearing) of the student with (Register No. M9907),

Mysore,

May, 2001

Dr. M. Jayaram
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CERTIFICATE

This is to certify that this dissertation entitled **"Verbal Perseveration in Geriatric Tamil Speakers"** has been prepared under my supervision and guidance. It is also certified that this dissertation has not been submitted earlier in any other University for the award of any other Diploma or Degree.

Prema K.S.

Guide

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DECLARATION

This dissertation entitled **"Verbal Perseveration in Geriatric Tamil Speakers"** is the result of my own study under the guidance of **Dr. K.S. Prema,** Lecturer in Language Pathology, Department of Speech Pathology, All India Institute of Speech & Hearing, Mysore, and has not been submitted earlier in any other University for the award of any other Diploma or Degree.

Mysore, Register No. 9907

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My Cordial feelings towards U are
Realistic,
U are undoubtly, self
Sculptors with
Abundant ideas &
Daring to do anything with
Enthusiasm for friends, will
Reside permanently without
Separating from my memories.

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INTRODUCTION

Study on speech and language acquisition, development and changes with age have been the focus of research of many disciplines such as linguists, cognitive psychologists and also speech language pathologists. SLP's in particular are concerned with the study of speech and language characteristic of geriatrics as it has direct implications of clinical population. Of particular interest to them is the study of speech behavior, with reference to changes in voice characteristics, fluency, prosody and overt speech parameters such as preseveratory behaviour.

The term "perseveration" refers broadly to any morbid tendency to maintain a mental set or to report an act not appropriate to the situation to which a response is required. (Eisenson, 1973a).

Perseveration is the repeated production of the same word in response to several different stimuli during a naming task. (Lecours, 1983). This is often seen in the speech of geriatrics.

Neisser (1895) first formulated the term "Perseveration" to indicate the persistent repetition or continuation of an activity once started. More recently, it has been defined as the inappropriate recurrence or continuation of an earlier response. (Sandson and Albert 1984).

Although, perseveration is a characteristic of fluent speech of normal speakers, clinicians are concerned about the appearance of perseverative responses in brain injured adult due to its contaminating effect on test results, its influence on clinical examination and because it is an obstacle to therapy. Despite the common acceptance of perseverarion as a pathognomic sign of disturbed brain

functioning and the recognition of its influence on the performance of clients with neurogenic disorders of speech and language, there is a noticeable lack of objective data concerning the nature and occurrence of perseverative behaviour in normals as well as selected categories of brain injury. In addition data on geriatric population is found to be very scanty.

Geriatrics is a word derived from two Greek words and means the medical care of aging persons. The elderly are more liable than the young to suffer from diseases of a degenerative type and they are more prone to accident when elderly persons become ill or injured there is a tendency for the condition to become chronic.

Literature on perseveration in individuals with brain damage has documented three types of perseveration:

a. 'Stuck-in-set' perseveration is the inappropriate maintenance of a framework of response after introduction of new task. (Sandson and Albert, 1984).
b. 'Recurrent' perseveration is the inappropriate occurrence of part or all of a previous response, which occurs because of a different intervening stimulus, response, or both.
c. "Continuous" perseveration is defined as the inappropriate prolongation or continuation of a response beyond the point of completion and without interruption by any intervening event. (Sandson and Albert, 1984).

There have been several studies to find the site of lesion in brain damaged individuals who perseverate. According to Luria (1965), perseveration arise from frontal lobe involvement. Hudson (1968) feels that perseveration is intimately tied up with lesions that disconnect the limbic system from the frontal lobes.

Perseveration and susceptibility to proactive interference have usually been related to frontal lobe lesions (Fuster et al. 1980), but appear also in demented, aphasic and other brain damaged patients.

Sandson and Albert (1984) proposed that recurrent perseveration is related to posterior left-hemisphere damage, whereas stuck-in-set perseveration is related to frontal lobe damage. Albert and Sandson (1986) demonstrated that left posterior lesions producing aphasia also produce abundant perseveration, primarily recurrent in type. Santo-Pietro and Rigrodsky (1986) however found no support for the hypothesis that site of lesion may account for the amount or pattern of perseveration, an aphasic exhibits.

Goldberg (1968) was reluctant to postulate specific association between types of perseveration and neuroanatomical locus.

Investigations to study perseveration in addition to revealing the types of perseveration in individual with brain damage, diverse opinion on the tasks that elicit perseveration. While confrontation naming which is a verbal task has been the potential task often quoted as that which elicits perseveration, certain motoric tasks have also been tried on individuals with brain damage. The results of the study are interesting specially from the point of differentiating normal healthy geriatrics from those with subtle deficits/ degenerative changes in the brain.

Need for the study:

The foregoing review of literature reveals that the perseveration as the phenomenon has been extensively studied in clinical population. There exists little literature on normal healthy geriatrics particularly in native speakers of

Indian languages. Study of preseveratory characteristics in the above group, apart from revealing age related changes, would help a SLP to screen/evaluate geriatric population for their speech and language deficits, if any.

Objectives of the study:

i. The main objective of the present study was to look for preseveratory utterance, if any, in normal healthy geriatrics who are native speakers of Tamil, a south Indian language.

ii. The study also aimed to check for

   a. Type of perseveration, if any, in the above population and

   b. The potential tasks that elicit perseveration.

iii. Parallely, performance of the subject with reference to age and sex has also been analysed.

REVIEW OF LITERATURE

Human species is gifted with the faculty of speech and language. While speech could be considered as a set of code with an incessant flow of articulatory behaviour governed by rules of pause, stress and those of linguistic components such as phonology, morphology etc. Language could be conceived as a set of agreed upon symbols, which are socially governed.

Study of speech and language acquisition, development, changes with age has been the focus of research of many disciplines such as linguists, Cognitive psychologists and also speech language pathologists. SLP's in particular are concerned with the study of speech and language characteristic of geriatrics as it has direct implications of clinical population. Of particular interest to them is the study of speech behaviour, with reference to changes in voice characteristics, fluency, prosody and overt speech parameters such as perseveratory behaviour.

Perseveration:

Neisser (1895) to indicate the inappropriate occurrence or continuation of a response first used the term 'Perseveration[1] in the face of changing task requirements. This behaviour, when it occurs in speech is called as 'verbal perseveration'. This is known to occur in-patients having a variety of neurological and psychiatric conditions including head injury, stroke, dementia and psychosis. Verbal perseveration is one of the most common behavioural phenomena associated with aphasia (Albert and Sandson; 1986).

Eisenson (1973a) defines perseveration as the abnormal persistence of a response when the stimulus which initially elicited, it is no longer present and another response to a subsequent stimulus has been presented.

Perseveration may manifest either in obvious repetition or in blocking. Sometimes, perseveration produces a partial interference which carries over from one response to another, as when a patient identifies a series of objects such as key, button, spoon, fork by calling them key, cutty, skoon, sfork. Perseveration may be observed in errors in spelling which often parallel those in naming, in motor acts, in drawing figures or forms such as in Bender Gestalt drawings and even in maintenance of such acts as block tapping when a patient continues his repetitive performance "indefinitely" in response to direction to tap a given number of time.

Growing body of evidence suggest that perseveration play a major role in the communication breakdown in aphasia. (Emery and Helm-Estabrooks, 1989).

Perseveration in normals:

Aging is a dynamic series of biologic, social and psychological changes. Often these changes are subtle and may be manifested in the elderly adult as minor frustrations or as severe handicaps. (Garstecki, 1981). One such behaviour often noticed is verbal perseveration in the aging population.

Goldstein (1916) holds a general view with regard to perseveration which is well supported among psychologists: namely, that the patient perseverates because he cannot make quick changes in attitude which the shift from one performance to another necessitates.

Kreindler and Fradis (1968) observe that failure of a patient to evoke a proper response for instance, to repeat a word as directed may be a result of one or more factors. One of these is "impaired mobility" of nervous processes, the patient fixing himself upon or becoming "intoxicated" with a stimulus or previous

reaction because he has lost his capacity to pass with normal readiness to another reaction. Another factor is a "State of fatigability," the whole verbal system being in a state of inhibition.

Intentional perseveration according, to Hudson (1968) is observed when some new performance is intended but is not realized. Hudson's findings are based on data collected from experimental testings where there was a constant changing of stimulus items presented to the subject. The subject was consequently required to switch from one response to another when intending to produce the proper answer to the stimuli. A large part of the data is derived from confrontation naming.

Hudson (1968) analyses "intentional" perseveration. This term, comes from Liepmann who regarded is an ideational disorder in which there is an impasse in the area of sensory preparation of movement with the result that new stimuli excite a previous idea and the movement caused there by .Hudson concludes that "Intentional perseveration" may be due to impairment of an inhibitory system which causes an increase in facilitatory activity and involuntary recall of recently established memory.

Earlier investigators have believed that perseveration was caused by abnormal physiology-abnormally facilitated and persistent after effects of ideation, memory or motor performance. Perseveration is due to repeating previously correct and reinforced responses and perseveration is controlled by irrelevant stimulus patterns. Both these types are consistent with established principles of behavior and neither requires any abnormal physiology. There are probably a number of different processes by which perseveration is produced. (Leichester, Sidman, Stoddart, Mohur, 1971).

Perseveratory phenomena is also seen in normal persons when they are fatigued; they tend to perseverate under conditions which demand more rapid and more frequent change than they can achieve. Epileptic persons increase twice the frequency of perseveration after seizures.

Perseveration in general, may be the human mechanism's way of reacting to situations, which demand adaptations and call for responses which the individual is not capable, momentarily or chronically, of making. If the failure to make the adaptation is momentary, the repetition of a previous act, which requires little or no conscious effort, affords the individual opportunity to select or to organize a new response, which he hopes is appropriate. The individual is aware that some response is expected, repeats an old response to avoid the embarrassment of failing to make any response. In general, perseveration may be recorded as a manifestation of inadequacy or for coping with a situation on a part of the performer. (Eisenson, 1973a).

In general, perseveration may be thought of as a disturbance of volition. Perseveration becomes manifest when the usually potent tendencies for a given performance task are some how blocked or diverted in some way by an inhibiting event or idea or completely overcome by an interfering act or idea. (Eisenson. 1973b).

Perseveration can sometimes be observed instances of literal paraphasia in which phonetic error patterns reoccur (Noll, 1983).

Normal speech errors (Slip of the tongue) consist mainly of anticipations, perseveration and metatheses (Dressier, 1988).

Perseveration in patients with Aphasia:

Perseveration is a common symptom of brain damage, defined "as the recurrence, out of context and in the absence of the original stimulus of some behavioral act". Behaviour is repeated involuntarily and seems to occur particularly when a patient is fatigued or frustrated. In verbal behaviour such as naming a series of objects, an object may be named correctly as "pencil", but then a cup is called a "pencil", a fork is called a "pencil" and so on. The patient seems to be struck on a particular response. (Buckingham, Whitaker and Whitaker, 1979).

Many brain-damaged patients exhibit perseveration. They continue a particular response long after it is appropriate. For e.g., in a confrontation-naming test, the examiner might present a picture, which the patient names. On subsequent pictures the patient still answers the name of the first picture. The patient is having difficulty shifting the response. (Noll, 1983)

Kreindler and Fradis (1968) describe perseveration as one of the most frequently noted aphasic defects. Perseveration is not only seen in reactive speech, but also occurs in spontaneous speech. It occurs both at the phonological and at the semantic level and also it seems at the syntactic level; frequent stereotyped productions have been reported in some kinds of aphasic speech. (Buckingham, Whitaker and Whitaker, 1975).

Marcie et al. (1965) observed that nine patients in their study tended to perseverate in grammatical tests.

Wepman (1972) describes the perseveration behaviour of an aphasic on a naming task, like the one Rochford gave, as due to switching off of attention. He

suggests that stimuli received while the patient is working out a verbal formulation to other stimuli are inhibited and that the patient continues to respond with whatever item was appropriate when his attention "shutter" was open. The shutter like behaviour of the patient, in Wepman's opinion, is probably involuntary; he can only handle incoming stimuli at his own, now reduced speed.

The "Shutter Principle" which Wepman puts forth to explain perseveration and delayed responses is defined as the time after stimulus. There is a period of involuntary inhibition when the "mind is shut off'. Wepman feels this construct may be of extreme importance to the clinician who must recognize the patient's need for time to internalize and associate to the stimulus and to formulate and practice acceptable responses.

Eisenson (1973b) gives the example of an aphasic patient who, when asked to say the sentence, "persistence is essential to success" said "Mestense is instans to sesatins", note the repetitive nature of the error sounds, such as the st and ns clusters.

Eisenson (1973b) makes the cogent observation that perseveration tends to increase when any of the following conditions exist: (i) the aphasic patient is confronted with difficult new contexts, (ii) the patient is experiencing fatigue (iii) situations change rapidly (iv) the patient is in a state of anxiety and feels the need to say something, despite his ability at the moment to say what is required. Eisenson goes on to say that perseveration may indicate the demands being made by the clinician are excessive. In this case the patient is unable to respond appropriately and the unconscious repetition of a previous act is a natural consequence. The clinician should alter the pace or change the activity to reduce perseveration.

Rochford (1974) gives some intriguing examples of perseveration at the semantic level. He asked a patient with jargon aphasia to name nineteen outline drawing of objects and found that the patient was sometimes able to give the right name but at the wrong time. Having failed to name "skull", three times later the patient called a scare crow a "skull-bound".

Buckingham and Kertesz (1976) have described three patients with whom neologistic utterances often seemed to result not so much from phonemic distortions of target words but from perseveration and recombinations of various phonemic units, which had already been uttered.

Very few aphasics perseverated the position of a drawing. This type of response pattern was observed in six severely impaired aphasics. but results from these patients were not considered for analysis, since the testing was not completed due to the Perseveratory tendency. (Dressier, 1998).

The frequency and persistence of perseverative responses seems to be related to the severity of the patients brain damage. Perseverative behaviours are seen after unilateral damage in either hemispheres, after generalized damage caused by traumatic injuries and in the middle to later stages of dementia. The neurophysiologic causes of perseveration are not known, although it is likely that perseveration may arise from a number of neurologic or cognitive anomalies. (Brookshire, 1992).

Studies of perseveration in different aphasics:

The disturbances in understanding are often only a small part of the cortical sensory aphasia. Indeed, other disturbances are sometimes so marked that many investigators object to the use of the terms "sensory" or "receptive" to describe the picture. These other disturbances may be considered in two groups: first, the expressive changes and second, the more general changes such as perseveration and the various signs of intellectual deterioration. (Weisenberg and McBridge, 1964)

Perseveration was also regarded as fluency related, albeit not without resevations (Kerschensteiner et al., 1972) but these were problematic categories because they could be uttered either fluently or not, for example Bleser and Poeck (1983) reported both fluent and non-fluent production in highly perseverative patients, where speech comprised a single consonant - vowel syllable.

Theoretically, one could have expected, for example predominance of fragmentary movements in patients with broca's aphasia or of augmentation of movements in Wernicke's aphasia and of perseveration of movements in global aphasia (Poeck and Kerschenstainer, 1975)

Buckingham et al., (1978) studied jargon aphasics and reported that the neologisms contain more alliteraton and assonance than would be expected by chance. They (1981) also studied two aphasic patients with posterior parietal lesions. Analysis of large samples of spontaneous and elicited speech with emphasis on delayed repetitions was done. The words were the linguistic unit more often perseverated. The perseverated response was not always appropriate initially. The perseveration was sometimes a slightly altered version of a

previous response, sometimes a phonological, lexical or semantic blend and sometimes a neologism. The perseveration frequently had a glottal sound as if it had been cut off.

Yamadori (1981) studied 38 aphasic patients 24 anterior, 14 posterior, 4 with mixed etiology. The tasks were repetition of meaningful and non meaningful stimuli varying in length. Perseveration was observed in 33 patients out of 38. Perseveration did not correlate with severity, duration or type of aphasia.

Shindler et al., (1983) studied 20 aphasic patients; 6 Wernicke's, 8 anomic and 6 Broca's. The task were visual confrontation naming, word associations: WAIS vocabulary subtest. 83% of Wernicke's, 50% of Broca's and 38% of anomic aphasics made atleast one perseverative error. Perseveration correlated positively with naming.

Johansen - Horbach et al. (1985) used BLISS symbol with four globally aphasic patients who had previously received atleast 6 months of traditional treatment. Individual sessions were conducted twice a week for atleast two months. The goals were for patients to acquire a basic lexicon of BLISS symbols, to produce and understand simple BLISS sentences and to use BLISS to communicate in home environment. Although all four patients reportedly acquired a symbol lexicon, one patient with extensive left hemisphere brain damage, including the thalamus, was discontinued because of extreme perseveration. In the other three, perseveration was milder with the symbols than with natural language.

Types of perseveration:

Three types of perseveration have been described in the literature after detailed studies with brain damage.

a. Stuck-in-set perseveration is the inappropriate maintenance of a framework of response after introduction of new tasks (Sandson and Albert, 1984). Eg: Generative naming task where an individual continues to name vegetables after being asked to now name fruits. The individual can be aware of a change in task demands, but either doesnot recognize the intended response has already been produced or is unable to formulate a new category of response. Other terms used are tonic perseveration (Liepmann, 1905), cortical perseveration (Luria, 1965) and impairment of switching (Freeman and Gatherale, 1966).

b. "Recurrent" perseveration is the inappropriate occurrence of part or all of a previous response, which occurs because of a different intervening stimulus, response, or both. Eg, when a subject names "brown' then "pink" correctly but repeats 'brown" when shown blue, a confrontation naming task. Other labels include intentional (Liepmann, 1905), Repetitious (Helmick and Berg; 1976). Noncontiguous (Buckingham, 1985) and ideational perseveration (Bayles, et al., 1985).

c. "Continuous", perseverations defined as the inappropriate prolongation or continuation of a response beyond the point of completion and without interruption by any intervening event (Sandson and Albert, 1984), example: a patient with lesions in frontal lobes and basal ganglia had no difficulty switching from one activity to the next or carrying out conditioned responses to verbal instructions. But when asked to draw circle, however she made multiple circular movements and was unable to stop. Other terms are clonic (Liepmann, 1905), efferent motor (Luria,

1965), contiguous preseveration (Buckingham. 1985) and compulsive repetition (Freeman and Gathercole, 1966).

Studies on types of perseveration:

Helmick and Berg (1976) observed 30 brain-injured patients, 18 aphasic, 12 nonaphasic, 28 left hemisphere, 12 right hemisphere, mixed etiology and 10 controls. The task given were naming and reversing series, writing sentences and a letter, drawing designs from verbal memory, constructing designs; naming and describing the functions of sighted objects, describing a picture; defining words and answering simple question. The findings were the brain-damaged group as a whole perseverated on 10% of all trials. There was significantly more perseveration in language disturbed than in non-language disturbed subjects. 66% of all perseverate were of repetitious variety; 34% of all perseverates were continuous. Preseveration was seen most often on the least automatic tasks. Perseveration was more common on reversing series, writing sentences and drawing designs from memory and less common on answering question, defining words and describing a picture

Helmick and Berg, (1976) reports indicate that perseverative responses occur more often in brain-injured than in normal subjects. Two types of perseveration, repetitious and continuous were noted in the responses of the brain-injured with higher incidences of the repetitious types occurring.

Although several types of perserveration have been described, the most common with aphasia is the recurrent variety. Recurrent perserveration is defined as the inappropriate repetition of a previously emitted response following an intervening stimulus. According to Sandson and Albert (1984), of all linguistic tasks we undertake with aphasic patients, task of confrontation naming is most

likely to elicit recurrent perseverative responses, particularly from patients with posterior lesions.

Albert and Sandson (1986) studied the effect of selected task, stimulus and subjects variables on perseveration in aphasics. They reported that aphasics produce significantly more perseveration than normals and right hemisphere damaged individuals in confrontation naming and drawing task. The perseveration observed were mostly of recurrent type. There was no significant difference among the three groups on word list generation and design generation task.

Troster, Salmon, McCollough and Butters (1989) using ratios of perseveration to responses, reported that 20 older normal individual had significantly more recurrent perseveration on the verbal fluency section of the demantia rating scale than 20 younger normal individuals.

The latest study done in this area by Ramage, Bayles, Helm-Estabrooks and Cruz (1999). Their primary purpose of the study was to determine the frequency of perseveration in normal individuals by type and in relation to task. Because some evidence exists that perseveration may increase with normal aging, they also studied the possibility of age effect and finally the possible role of gender in the frequency of perseveration was also considered. Results demonstrated that 4% of all responses were perseverative. The average rate of perseveration of a single task was 1%. 56 of the 60 subjects (93%) perseverated atleast once. No statistically significant effects were seen for gender and age effects. Significantly higher rate of perseveration was found in Modified Wisconsin Card Sorting Task (MWCST) of all types of perseveration, the "Stuck-in-set" variety accounted for 73% and was found only in the MWCST. Instance of

recurrent perseveration was observed on all tasks and accounted for 24% of the total, while continuous type was uncommon. Frequency of perseveration was found to be quite low and hence higher frequency rates should raise suspicion of the presence of neuropathology or brain dysfunction.

Localization studies of Perseveration:

Pick (1905) suggested that the accelerated speech of the sensory aphasia as one factor leading to perseveration and the lack of inhibition in word choice as another. On the question of localization, he noted that lesions had usually been found on the left side in right handed persons. While perseveration was often marked with lesions of the temporal lobe, he did not believe that it appeared only with these.

Milner (1964, 1971, 1982) studied patients with unilateral frontal and temporal lesions for control of intractable seizures. They were administered Wisconsin Card Sort test, visually guided stylus mazes and delayed comparison. The findings were as follows: The patients with both right and left frontal lesions were impaired on the WCST. Many patients were aware of their deficits, staring that they knew it was the color, the shape or the form, while remaining unable to alter their response strategy. Patients with right frontal lesions were significantly worse than other groups at learning to follow a stylus maze with auditor}' feedback. They repeatedly broke the rules and made the same errors often even when corrected. Right frontal patients were also significantly worse on a test delayed comparison.

Luria (1965) observed cases of frontal lobe lesions with varying etiologies, given motor tasks with and without verbal instructions. Two distinct types of motor perseveration were observed.

Luria (1966) discusses the phenomenon and the neurodynamics of perseveration. In experimental situations he observes that perseveration represents difficulties associated with inertia of a previously formed dynamic structure that continue to be manifest during the performance of intellectual operations. Luria believes that perseveration is associated with lesion of the frontal lobes, especially when there is evidence of disturbance of complex hierarchic programs of behaviour and for subordinating the further course of the processes to those preliminarily created programs.

Leisons involving the orbital frontal cortex and interior convexity have consistently resulted in increased activity levels and an abnormal tendency to repeat previous responses in a repetitive, perseverative fashion even when the context is no longer appropriate or rewarded and/or the response is punished and the individual realizes that his/her responses are incorrect. (Butter 1969. Butter et.al., 1963; Irensen and Mishkin, 1970; Jones and Mishkin, 1972; Kolf et. al., 1974; Luria, 1980; Mishkin 1964). The capacity to shift responses is attenuated. Thus, once a behavior is completed particularly if it is repeatedly performed, the pattern continues to be involuntarily executed such that the ability to change to a different pattern of activity is disrupted.

Hudson (1969) studied a woman with a bilateral frontal and temporal tumour, involving the thalamus and hypothalamus. The tasks given were motor and verbal tasks involving the auditory, visual and tactile modalities. The results were the patient perseverated on tests of proprioception and stereognosis. Perseverations were sometimes carried over from one modality to another, resulting in bizarre behaviour. Writing showed perseveration on words and consonants.

Fluent aphasics and non-fluent aphasic patients with left hemisphere damage made significantly more perseverative errors than either right hemisphere patients or controls. 78% of perseverative errors were of the delayed variety. Right hemisphere patients did not differ from controls in terms of perseveration.

The consequences upon language of thalamic haemorrhages and infarctions have recently been reviewed by Jonas (1982) and by Crosson (1984). Both authors stress the absence of deficits of language comprehension and repetition in the vast majority of cases. Speech production of patients with left thalamic lesions is characterized by paraphasia, or even jargon, perseveration, anomia and in a smaller number of cases, lack of spontaneity of speech.

Gorelick et, al. (1984) suggested deficits in lexical access (anomia, semantic paraphasia) separate from deficits in vigilance (leading to neologisms, intrusions, fluctuation performance jargon, perseverations) in patients with thalamic lesions.

Diagneault, Brawn and Whitaker (1992) who studied prefrontal functions in normal aging using Wisconsin card sorting task, reported significantly higher score rates of perseveration for 58, older subjects than 70, younger subjects.

Selection of test items:

Allison and Hurwitz (1967) used tests involving chiefly nonlinguistic activities such as searching for objects, simple drawings and simple constructions, tests of gesture and pantomime; tests of simple spoken commands; repeating and reversing the order of series; naming sighted objects, naming from memory, writing, reading, spontaneous speech. Results showed perseveration was "common" in response to simple commands, in reversing automatic series, in

naming sighted objects and in spontaneous conversation. Perseveration was "uncommon" in naming from memory, reading and writing, perseversation was more "common" in patients with the least spontaneous speech.

Albert and Sandson (1986) studied the effect of selected task, stimulus and subject variables on perseveration in aphasics. They reported that aphasics produce significantly more persevertion than normal and right hemisphere damages individuals in confrontation naming and drawing task.

Very few aphasics perseverated the position of a drawing. This type of response pattern was observed in six severely impaired aphasics, but results from these patients were not considered for analysis, since testing was not completed due to the perseveratory tendency. (Dressier 1988).

Emery and Heim-Estabrooks (1980) done a study to determine the extent to which confrontation naming performance is influenced by perseverative behaviour. Results showed all the 30 subjects demonstrated perseverative behaviour on the visual confrontation naming subtest.

In general, there are different tasks to elicit perseveration in brain damaged patients or normals. Helmick and Berg (1976) had listed out nine tasks which can be used to elicit perseveration which are as follows:

1. Design construction.
2. Naming and reversing a series.
3. Naming and describing the function of sighted objects.
4. Answering questions.
5. Defining words.
6. Describing a picture.

7. Writing sentences and a letter.
8. Drawing designs from memory.
9. Drawing Geometric Shapes and Writing Names Following Verbal Instructions.

As the present study is focused on verbal perseveration. only the speech tasks were taken and the motoric tasks were eliminated.

A review of literature indicated that no one set of items had been used consistently to measure perseveration in the brain injured or normals. The tasks used in this study, therefore, were a compilation of those tasks used in previous studies on which most subjects had manifested perseverative responses.

Need for the study:

The foregoing review of literature reveals that the perseveration as the phenomenon has been extensively studied in clinical population. There exists little literature on normal healthy geriatrics particularly in native speakers of Indian languages. Study of perseveratory characteristics in the above group, apart from revealing age related changes, would help a SLP to screen/evaluate geriatric population for their speech and language deficits, if any.

Objectives of the study:

i. The main objective of the present study was to look for perseveratory utterance, if any, in normal healthy geriatrics who are native speakers of Tamil, a south Indian language.
ii. The study also aimed to check for
    a. Type of perseveration, if any, in the above population and
    b. The potential tasks that elicit perseveration.
iii. Parallely', performance of the subject with reference to age and sex has also been analysed.

METHODOLOGY

The primary objective of the present study was to investigate the perseverative characteristics in the speech of geriatric adults. Parallely the study also aimed to check for the type of perseverations in normal, healthy geriatrics and in relation to the task. The secondary objectives were to look for age related language changes, if any.

A. Subjects:

In order to investigate the above is above issues, geriatric adults (both males and females) from the state of Chennai, Southern India were selected for the study. The details are shown in Table 1.

Subject Details

Table 1

Group	Age range	Males	Females	Total
I	60-64.11	**3**	**3**	**6**
II	65-69.11	**3**	**3**	**6**
III	70-74.11	**3**	**3**	**6**
IV	75-79.11	3>	**3**	**6**
	Total	**12**	**12**	**24**

The following criteria were used for selecting the subjects:

1. Age above 60 yrs.
2. Native speakers of Tamil.
3. Minimum of 10 year of formal education.

4. Should have normal or corrected vision and hearing.
5. No history of alcohol or drug abuse.
6. No history of dysfluency in younger age.
7. No significance of CVA, head injury, degenerative disease and/or psychological or psychiatric problem as reported.

B. Material:

Investigations on individuals with brain damage have substantiated the use of varieties of tasks that are known to elicit perseveration. After a review of literature the following tasks were chosen for the present study.

1. Picture Naming. (PN)
2. Describing the Function of the picture. (DF)
3. Description of Picture. (DP)
4. Defining Words. (DW)
5. Answering Questions. (AQ)

C. Selection of items:

About 25 items were selected for each of the 5 tasks chosen for the study. The items were selected keeping the widely adopted tests such as PPVT, WAIS and BKT as a reference.

D. Pilot study:

The test developed for the study was initially administered on three, Tamil speakers aged 50+ years old. A final list of stimulus items for each task was made for the purpose of testing.

Table 2

SLNo.	Tasks	No. of Stimuli
1	Picture Naming	10
2	Describing the Function	10
3	Description of Pictures	4
4	Defining Words	10
5	Answering Questions	5

Emery and Helm-Estabrooks (1989), Albert and Sandson (1986), Helmick & Berg (1976) and Ramage et al. (1999) convincingly state that the tasks listed in Table 2 are most sensitive in eliciting perseveration. Hence items for these tasks were chosen as detailed below. Details of the test are given in Appendix I.

1. ***Picture Naming (PN):***

This task was adopted from PPVT. It consists of ten pictures. Subjects were asked to name the pictures, which were presented one at a time.

2. Describing the Function (DF):

Same pictures, which were used for the above naming task, were also used for this task. It consists of ten pictures. The subjects were instructed to describe the function of the pictures. The pictures were presented one at a time.

3. Description of Picture (DP):

Four pictures from Binet Kamath Test were taken and subjects were asked to describe the pictures.

4. Defining Words (DW)*:*

Ten words from Weschler Adult Intelligence Scale were taken and the subject was asked to define the words.

5. Answering Question (AQ)*:*

The subjects were asked to read a paragraph from a magazine and were asked five questions based on the paragraph.

E. **Test environment:**

The subjects were tested in a quiet room. They were seated comfortably and there were no distractors. It was ensured that they had corrected vision/hearing, wherever in required.

F. Procedure:

The subjects were tested on the above-mentioned tasks. The responses for each task were audiorecorded. The responses were analysed for the presence or absence of perseveration. If it is absent a score of zero is given and if perseveration is present, a score of 1 is given for each perseveratory utterance. Hence, depending upon the total number of perseverations the scores were tabulated on the score sheet. The testing was done in one sitting. The average time taken for testing was 20-30 minutes. Each subject was tested individually.

G. Analysis of speech sample:

The audiorecorded responses were transcribed using broad phonetic transcriptions. The sample was analysed for the type and frequency of perseverations. Any incidental observations on the linguistic variations in the responses, which could be typically seen in geriatric population, have also been

analysed and described. Three SLP's including the investigator were involved in the analysis.

The data was computed for the frequency of perseveration for each subject on each task as a ratio (total number of perseverations/total number of utterances). By using ratio data, it is possible to determine the severity of perseveration and make comparisons among subjects who differed in their number of responses. The ratio data was converted to percentage for each task by the following formula:

1. **Picture Naming**

$$PN\ \% = \frac{\text{Total number of perseveration}}{\text{Total number of utterances}} \times 100$$

2. **Describing the Function**

$$DF\% = \frac{\text{Total number of perseveration}}{\text{Total number of utterances}} \times 100$$

3. **Description of Picture**

$$DP\% = \frac{\text{Total number of perseveration}}{\text{Total number of utterances}} \times 100$$

4. **Defining Words**

$$DW\% = \frac{\text{Total number of perseveration}}{\text{Total number of utterances}} \times 100$$

5. **Answering Question**

$$AQ\% = \frac{\text{Total number of perseveration}}{\text{Total number of utterances}} \times 100$$

The scores were also subjected to statistical analysis such as one way ANOVA, T-test, Paired-samples correlation. The results are discussed in the following chapter.

RESULTS AND DISCUSSION

The aim of the study was to investigate the nature of persevaration in the speech of geriatrics who are native speakers of Tamil (language spoken in Chennai, Southern India) the study also looked at the type of preservation and the potential tasks to elicit the same. Parallely age related changes if any, in the perseveratory features of geriatrics was also analysed.

In order to investigate the above issues geriatric adults males & females age ranging from 60 - 80 years were considered for the study. They were tested on the following tasks that were selected for the study.

1. Picture Naming (PN)
2. Describing the Functions of the picture (DF)
3. Description of Pictures (DP)
4. Defining Words (DW)
5. Answering Questions (AQ)

The responses of the subjects were audio recorded. It was given to three judges including the investigator, for analysis of perseveration. The judges were briefed about the various types of perseveration they were required to identified the number and type of perseveratory utterances, if any, for each task. The total number and type of preseverations identified were tabulated. The scores were subjected to statistical analyses of perseveration.

Table - 3

Mean of perseverations w.r.t task Vs. **type judge**

		PN	DF	DP	DW	AQ
J1	**C**	0.25	1.08	0.71	1.33	0.96
	R	-	4.17	4.17	4.17	4.17
	S	-	-	-	-	-
J2	C	0.25	0.88	0.54	1.04	0.71
	R	-	8.33	-	4.17	4.17
	S	-	-	-	-	-
J3	C	0.25	0.88	0.58	0.80	0.67
	R	-	4.17	-	-	-
	S	-	-	-		-

(A) Table 3 describes the mean of perseveratory scores on various tasks along with its type as identified by the three judges. Form the above table; it can be observed that there is a total absence of stuck-in-set type of perseveration across all the tasks whereas recurrent types of perseverations were seen on all the tasks except for Picture Naming. The continuous type of perseveration however was seen across all the tasks but the frequency was more on Defining Words (DW). A comparison of perseveratory utterances across the tasks further revealed that Picture Naming (PN) tasks elicits least perseveration where as Defining Words (DW) elicited the most. Although, Description of Picture (DP), Description of Function (DF) and Answering Questions (AQ) elicited perseverating utterances, they were not as high as Defining Word (DW).

The results of the present study on normal subjects are in contrast to those that have studied perseveration in individuals with brain damage. Allison and Hurwitz (1967), Emery and Helm-Estabrooks (1980), Albert and Sandson (1986) have reported that aphasics produce significantly more, perseveration than normals and individuals with right hemisphere damage on naming, visual confrontation and also an drawing tasks. While in the present study . Defining Words and Answering Questions elicited more perseveratory utterances in normals. Helmick & Berg (1976). on the other hand, report that the tasks that elicited the fewest number of preseverative responses were Defining Words (DW) and Answering Questions (AQ), where as reversing series, writing sentences and drawing designs from memory elicited more perseveration responses.

A comparison of the studies for the type of perseveration also reveals a striking difference from the existing literature.

Literature with respect to the type of perseveration in normals, although is scanty does reveal (Ramage et. al, 1999) that recurrent type of perseveration is the one most commonly seen in normals; on all tasks. In the preset study, the continuous perseveration was the predominant type. Ramage et. al, (1999) also found that the generative naming and verbal definition tasks elicited relatively low rates of preservation. The results of the present study are not in support of Ramage's study.

Table - 4

Mean Percentage of perseveration for task Vs. type Vs. group.

Groups		I	II	III	IV
	C	1.1%	0	2.8%	6.1%
PN	R	0	0	0	0
	S	0	0	0	0
	C	2.3%	3.2%	4%	1.9%
DF	R	0	0	0.2%	0.5%
	S	0	0	0	0
	C	6.1%	2.2%	1.8%	2.6%
DP	R	0	0.1%	0	0
	S	0	0	0	0
	C	3.3%	1.4%	6.4%	1.6%
DW	R	0	0.2%	0	0
	S	0	0	0	0
	C	0.7%	1.9%	2.7%	3.5%
AQ	R	0.1%	0.1%	0	0
	S	0	0	0	0

(B) To study the age related changes; if any, on the type and frequency of perseveration and also w.r.t. tasks, a ratio of perseveration utteranes for each subject was computed [e.g.: Number of perseverations / total number of utterances]. The obtained ratio was converted to percent scores. The mean of percent scores, so derived for all the judges has been shown in Table-4.

Table 4 indicates the percentage of perseveration w.r.t task Vs type Vs group. The percentage of mean of perseveratory utterance across groups again suggests absence of stuck-in-set type of perseveration. There were occasional recurrent type of perseveration on Description of Picture (DP), Defining Words (DW) and Answering Questions (AQ) particularly in Group II (65-69.11) but for Description of Function (DF) there was a gradual increase in percentage from Group III to Group IV. Continuous type of perseverations were seen on all the tasks under study with a gradual increase in the percentage from Group I through

Group IV on Picture Naming (PN) and Answering Question (AQ). No particular pattern was evident on Describing the Function (DF), Description of Picture (DP) and Defining Words (DW) though persevarations were seen in all the groups.

Table-4 clearly indicates that with increasing age, particularly for Description of Function (DF) recurrent type of perseveration sets in. Parallely a slow but gradual increase in percentage was seen on Picture Naming (PN) and Answering Question (AQ). The results indicate that there is a tendency for changes in frequencies of perseverations with increase in age. However, the limited sample of the present study would not permit for a more general conclusion.

Analysis of mean perseveratory utterances in general is suggestive of the fact of that perseverations emerge with aging and that the frequency of perseveration increases with increase in age. Also the type of perseverations seen in normal geriatrics is in contrast to those with individuals with brain injury. These findings are in support of the primary objective of the study, which aimed at looking for the existence of perseveration in geriatrics in relation to the type and task.

(C) ONEWAY ANOVA:

In order to check the differences that existed between the groups are real w.r.t task v/s type, one way ANOVA was carried out. ANOVA did not reveal any significant difference across groups for most of the tasks and types. However there was a significant difference for continuous type of perseveratory utterances in the Defining Words task. These findings on ANOVA partially supports the earlier findings on mean score analysis.

The results on ANOVA were further subjected to Duncan's post-hoc analysis as shown in table 5

Table - 5
Duncan's post -hoc test for continuous type of perseveration on Defining Word task

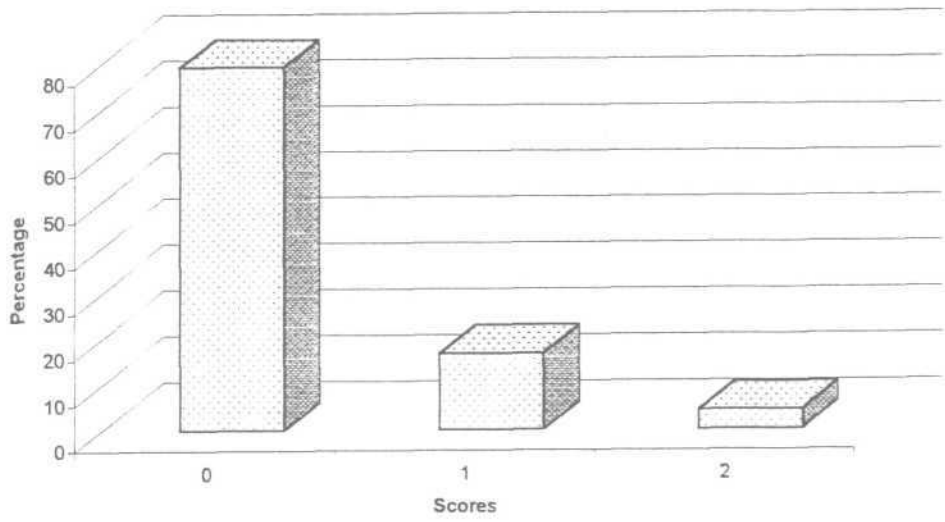
GROUP	N	SUBSET FOR ALPHA=0.05		
		1	2	3
65-69.11 Yrs	6	0.1667		
75-79.11 Yrs	6	0.3333	0.3333	
60-64.11 Yrs	6		1.0000	1.0000
70-74.11 Yrs	6			1.6667
SIG		0.642	0.074	0.074

Uses harmonic mean sample size =6.0000

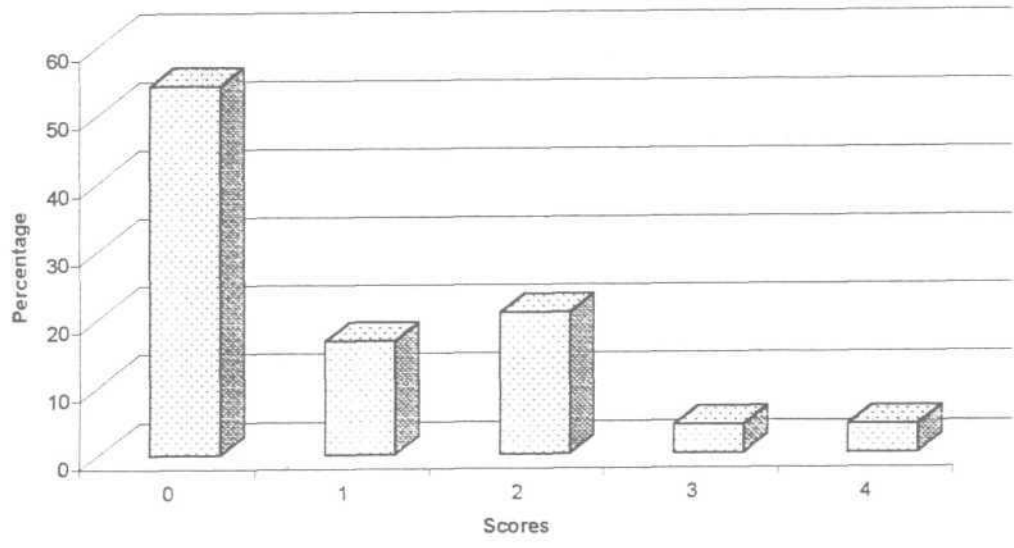
Table-5 shows a significant difference among all the groups for continuous type of perseveration. The significant difference seen on this particular task across all the age groups under study highlights the importance of the nature of this task to elicit perseverations in normal healthy geriatric adults. The results suggest that Defining Word task would be an important component to be incorporated in tests for geriatric.

D. **Frequency analysis:** The data was further subjected to frequency analysis. The graphs depicts the percentage of subjects (y-axis) who perseve on the respective tasks as shown in the figures.

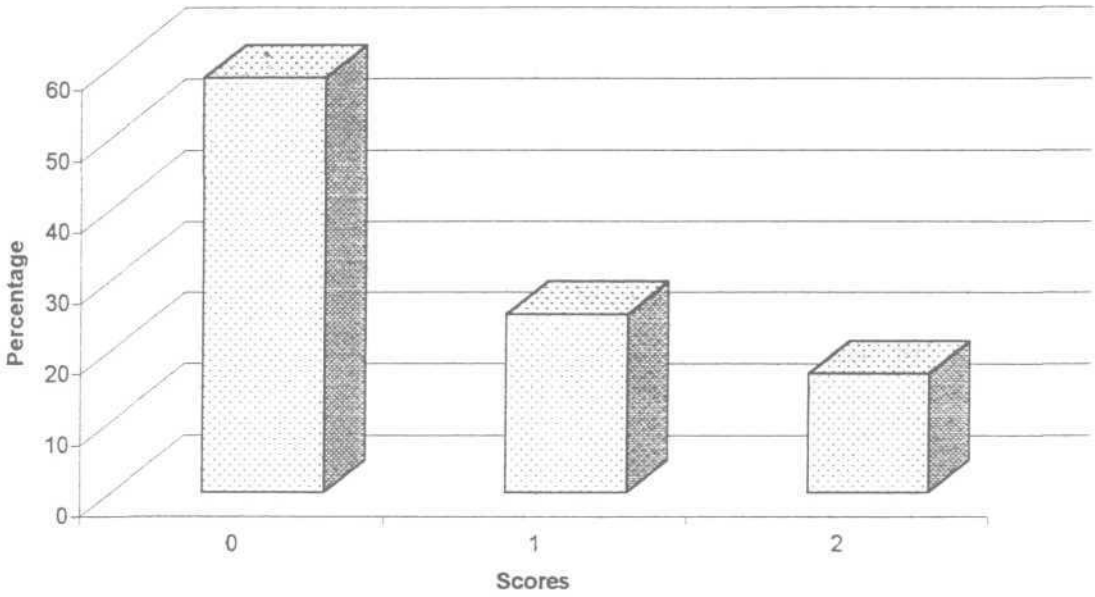
PN


80
70
60
50
40
30
20
10
0
Percentage
0
1
2
Scores

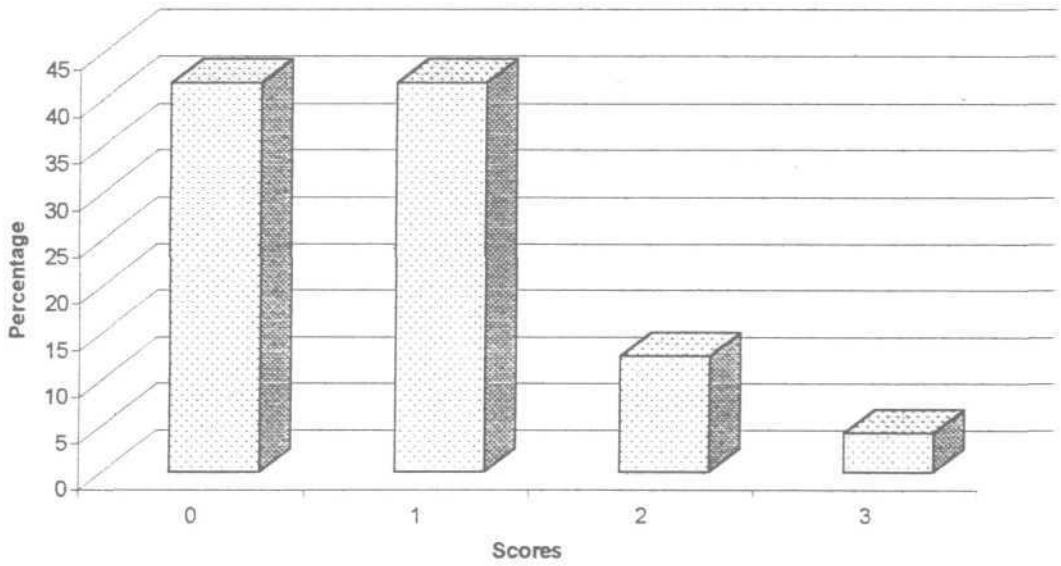
DF

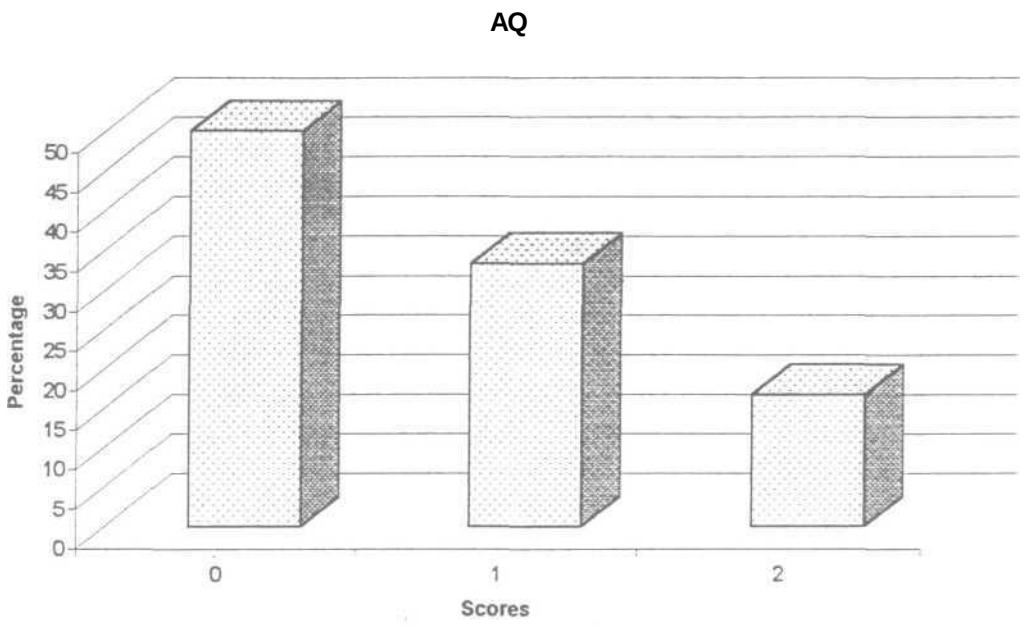

60
50
40
30
20
10
0
Percentage
0
1
2
3
4
Scores

DP


60
50
40
30
20
10
0
Percentage
0
1
2
Scores

DW


45
40
35
30
25
20
15
10
5
0
Percentage
0
1
2
3
Scores



The figures clearly indicate that while the frequency of perseverations for majority of subjects was either 0,1 or 2 on PN, DP & AQ for DF & DW there were instances where the subjects evidenced even three or four perseveratory utterances. The frequency analysis again supports the previous results that revealed that the above tasks would be important components of perseveration test for geriatrics.

(E) T-test was done to compare the mean of the males and females. There was a significant difference between males and females at 0.05 level on Describing the Function task for recurrent type of perseveration. And also there was a significant difference on Description of Picture and Defining Words at 0.0001 levels for continuous type of perseveration. The above findings co-relates one of the objectives of the study which was to look for sex difference in the perseveration phenomenon.

(F) Inter-judge reliability was tested using paired- sample correlation. There was a high correlation among all the three judges except for the judgement of recurrent type of perseveration on the task of Describing the Function

(G) Qualitative analysis of perseveratory features:

In addition to the statistical analysis of the data, the responses of the speech sample were qualitatively analysed. The results are interesting from theoretical perspective.

(i) (a) The subjects of the study occasionally borrowed words from other languages , most often from English and appeared to show synonyms substitution, ... However for the present study, synonyms substitutions from language was not considered as a perseveratory utterances. Ex. ca: vi —key
(It would be interesting to find whether such bilingual influences would be typically different from the true perseveration).

(b) Reports of perseverations on individuals with brain damage have been consistent in their finding regarding the occurrence of perseveration on allmost all the components of language. i.e. at phonological semantic and syntactic level. (Buckingham, Whitaker and Whitaker, 1975).

It was interesting to note from the present study that the subjects who perseverated invariably had instances of perseveration on almost all the above component.

Ex-1: Adigam vendam Adigam vendam (syntactical)

Ex-2: Pa pandu (phonological)

Ex-3: ubayogittal bayanpadduthudal (semantic)

This leads one to speculate whether the perseveratory features are similar in both individuals with brain damage and geriatrics. Would the difference be more in terms of frequency and type only but manifest similarity in their features?

(ii) Studies on the localisation of perseveration have reached a consensus regarding the lesion and the type of perseveration. (Pick, 1905; Milner 1964, 1971,1982; Luria, 1965,1966;Hudson, 1969;Gorelick et al. (1984))
The studies report that continuous types of perseverations are most common in thalamic lesions.

The present study on geriatrics has revealed that continuous type of perseveration is predominantly seen with increase in age. Does this observation lead us to state that degenerative phenomenon in geriatrics begins at the subcortical level which is phylogenetically .older substrate of human brain? Do we draw a parallel between the other symptoms seen in aged such as tremor laxity, slow pace etc that are associated with degenerative changes in subcortical area? Further studies to investigate this, would throw light on the parallelism between speech and motor behavior.

Analysis of the results, in general, revealed the following:

(1) Perseveration is a phenomenon of the geriatrics.
(2) The frequency of perseveration increases with age.
(3) There is a sex difference in the perseveratory characteristics.
(4) The Continuous type of perseveration seen in majority of geriatrics while the recurrent type sets in with increase in age.
(5) There is a total absence of stuck-in-set perseveration in the geriatric population.

(6) Tasks such as Defining Words (DW), Answering Questions (AQ), and Describing the Function (DF) elicited most perseveration where as Description of Picture (DP) and Picture Naming (PN) elicited the least.

(7) The ANOVA results revealed that for continuous type of perseveration, the task of Defining Words (DW) showed a significant difference from various other tasks. This emphasizes the importance of incorporating this task in the speech test for geriatrics.

(8) The subjective analysis of the results revealed the following :

(a) The geriatrics manifested similar features as individuals with brain damage by evidencing perseveration on phonological and syntactical and semantic aspect of language.

(b)The bilingual geriatrics appeared to borrow synomynous words from second language. This needs to be taken in-to consideration while defining perseveration.

(c) The continuous type of perseveration that is largely seen in geriatrics leads to speculate whether degeneration begins in subcortical area as studies on individuals with brain damage have conformed that continuous type is always associated with thalamic lesion. (Hudson, 1969).

SUMMARY AND CONCLUSIONS

The present study was aimed to investigate the nature of perseveration in geriatric Tamil speakers, by type and in relation to task. The study also aimed to look for age related changes, if any. In order to investigate the above issues geriatric adults (both males and females) age ranging from 60 yrs to 80 yrs were selected. They were divided into 4 groups -five tasks were chosen to elicit perseveration, as recommended by Helmick and Berg (1976). They were as follows:

(1) Picture Naming (PN).

(2) Describing the Functions of the picture (DF).

(3) Description of Pictures (DP).

(4) Defining Words (DW).

(5) Answering Questions (AQ).

The responses of the subjects were audio recorded. Three judges, including the investigator analysed the data for perseveration. The data obtained on 24 geriatrics was analysed by employing various statistical techniques such as mean and standard deviation, one way ANOVA, paired samples correlations and also the percentage of perseveration.

The findings of the study were:

(1) Perseveration is a phenomenon of the geriatrics.

(2) The frequency of perseveration increases with age.

(3) There is a sex difference in the perseveratory characteristics.

(4) The Continuous type of perseveration seen in majority of geriatrics while the recurrent type sets in with increase in age.

(5) There is a total absence of stuck-in-set perseveration in the geriatric population.

(6) Tasks such as Defining Words (DW), Answering Questions (AQ), and Describing the Function (DF) elicited most perseveration where as Description of Picture (DP) and Picture Naming (PN) elicited the least.

(7) The ANOVA results revealed that for continuous type of perseveration, the task of Defining Words (DW) showed a significant difference from various other tasks. This emphasizes the importance of incorporating this task in the speech test for geriatrics.

(8) The subjective analysis of the results revealed the following :

(a) The geriatrics manifested similar features as individuals with brain damage by evidencing perseveration on phonological and syntactical and semantic aspect of language.

(b) The bilingual geriatrics appeared to borrow words from second language. This needs to be undertaken in to consideration while defining perseveration.

(c) The continuous type of perseveration that is largely seen in geriatrics leads to speculate whether degeneration begins in subcortical area as studies on individuals with brain damage have confirmed that continuous type is always associated with thalamic lesion.(Hudson, 1969).

Implications of the study:

1. The present study helps in developing tasks for screening geriatric population.
2. Performance of normal, healthy geriatrics reported in this study would be helpful to screen for subtleties of changes in speech behaviour, specifically perseveration.

Limitation of the study:

1. The study employed only five verbal tasks and motoric tasks such as drawing, copying was not included.
2. Vedio recording of the performance would have given additional information on perseveratory characteristics.

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Appendix - 1

Picture Naming (PN) & Describing the Fuction Task (DF)

1. மேனை

mə:dzai

2. கத்தி

katti

3. குதிரை

kudirai

4. பந்து

pandu

5. மணி

mani

6. மின்விசிறி

~~fanna~~ minvirisi

7. இலை

ilai

8. ஏணி

ɛ:ni

9. பாம்பு

pa:mbu

10. சுப்பிருதல்

sa:pidudal

Defining Words (DW)

1. குளிர்காலம்

   kulirga:lam

2. சிற்றுண்டி

   sitrunḍi

3. அதிகம்

   adigam

4. வாக்கியம்

   Va:kjam

5. முடித்தல்

   muditta l

6. உபயோகித்தல்

   ubajohitta l

7. தடங்கல்

   tadaŋgal

8. சரணாலயம்

   Sarana:lajam

9. பொருத்தமின்மை

   Po ruttaminmai

10. சீற்றம்

    Si:ṭram

Answering Questions (AQ)

1. ஜெயராமன் எந்த கலையைப் பயின்றார் ?

dzajara:man enda kalajai pajinra:r ?

2. ஜெயராமன் வயசு எத்தனை ?

dzajara:man vajasu ettanai?

3. அவருக்கு ஆர்வம் எவ்வாறு ஏற்பட்டது ?

avarukku a:rvam evva:ru e:rpattadu ?

4. அவருடைய ஆசான் யார் ?

avarudaja a:sa:n ja:r ?

5. மராட்டியர் என்ன கட்டளையிட்டனர் ?

mara:ttijar enna kattalaijittanar ?