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Bilingual Persons with Mild Dementia - Spectrum of Cognitive Linguistic Functions

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Abstract

Cognitive linguistics (CL) refers to the school of linguistics that understands language creation, learning, and usage as best explained by reference to human cognition in general. With increase in age human cognition improves, which can be measured through tasks based on cognitive-linguistics. The tasks include attention and concentration, orientation, memory, organization etc. But these skills reduce their efficiency with advanced age. That is, younger population perform better as compared to older. And a disorder of elderly called dementia is a debilitating condition causing progressive deterioration in cognition, personality and communication skills. If healthy elderly perform less efficient in cognitive linguistic skills, then disordered population will perform still. Hence there is an immediate need to study the cognitive-linguistic performance in healthy elderly as compared to dementia.

The aim of the present study is to qualify the cognitive-linguistic performance in persons with dementia as compared to healthy elderly. Considered for the study were 20 (10 monolingual and 10 bilingual) healthy elderly and age matched persons with dementia. Monolingual persons had Kannada as their mother tongue/ first language and bilinguals had English as their second language. Cognitive linguistic Assessment Protocol (CLAP) (Kamath, 2001, Rajasudhakar, 2005) was administered for both the groups. The performance of healthy elderly as against to dementia is been discussed along with the performance of monolinguals versus bilinguals.

Key words: dementia, bilingualism, language, cognition.

Introduction

Communication is a manifestation of cognition. The linguistic representations for objects are part of long-term lexical memory and must be retrieved and brought to consciousness. Thus, the simple act of object naming requires perception, access to long term memory, association, recognition, lexical retrieval, decision-making, motor planning, and self-monitoring.

The cognitive- linguistic skills may be affected in people with closed head injury, cerebrovascular accidents and in cerebral neuropathogenesis. These deficits emerge as dynamic and pervasive, ranging from subtle to severe. Treatment of cognitive-linguistic deficits is a dynamic process that begins with assessment of patient's information processing skills, their ability for quantifying specific deficits and observation and recording of response behaviours (Ross-Swain, 1992).

Neurogenic communication disorders in adults encompass a variety of specific abnormalities all caused by nervous system pathology. These disorders include Aphasia, Right hemisphere damage, traumatic brain injury, dementia, dysarthria etc. Neurogenic communication disorders are an important consequence of nervous system abnormality. Their features, severity and outcome reflect the location, magnitude and nature of the abnormality. Aim of the present study is to primarily focus on Dementia and its effect.

Dementia

Dementia is the progressive decline in cognitive function due to damage or disease in the body beyond what might be expected from normal aging. Dementia is a non-specific illness syndrome (set of symptoms) in which affected areas of cognition may be memory, attention, language, and problem solving. According to American Psychiatric Association (2000), the clinical feature necessary for diagnosis of dementia are multiple deficits manifested by memory impairment and one or more of the cognitive disturbances such as aphasia, apraxia, agnosia or disturbance in executive functioning. Higher mental functions are affected first in the process. However in the later stages of the condition, affected persons may be disoriented in time (not knowing what day of the week, day of the month, or even what year it is), in place (not knowing where they are), and in person (not knowing who they are or others around them).

The early stage of dementia lasts from two to four years. The symptoms found during this stage include difficulty in handling finances, memory problems, concentration problems, difficulty with complex tasks, forgetting the location of objects and decreased awareness of recent events (Bayles, 1991). The first obvious symptom of dementia is a problem with episodic memory. Working memory also affected early in the progression of the disease, and is manifested by decreased efficiency of encoding and retrieval of information. Individuals have difficulty sustaining attention (Perry, Watson & Hodges, 2000; Backman, Small and Fratiglioni, 2001) and span memory is modestly attenuated in some individuals though not all.

Communicative Impairments in Dementia

Of growing interest to speech language pathologists and neuropsychologists is the communicative impairment present in individuals with dementia. A consensus exists that persons with mild to moderate dementia show relatively preserved phonologic, syntactic and lexical knowledge while semantic and pragmatic knowledge are markedly impaired (Appell, Kertesz & Fisman, 1982; Bayles, 1982; Emery & Emery, 1983; Murdoch, Chenery, Wilks & Boyle, 1987).

Communication abilities in bilingual demented patients and the pattern of language decline for first language(L1) and second language(L2) L1 and L2 in dementia are issues rarely mentioned in the dementia literature. It is a well known fact that, in persons with dementia, the ability to maintain fluency in more than one language decreases. It is well known, however, the ability to maintain fluency in more than one language decreases with aging (Hyltenstam & Obler, 1989). With advancing age, people may tend to retreat to a single language, regardless of a life-long history of bilingualism. Moreover, older bilinguals may experience increased difficulties handling two languages due to the effects of cross-language interference. These effects in aging bilingual persons can be further exacerbated in those who develop dementia

Behavioral Characteristics of Dementia

The behavioral and cognitive slowing that characterizes normal aging is exaggerated in dementia. Birren and Botwinick (1951) reported an early attempt to document slowing in dementia, in which they showed patients with senile psychosis to be slower in writing than age-matched healthy older persons. Miller (1974) investigated the nature of response slowing in persons with dementia. .He showed that the persons with dementia were slower in simple tasks which required participants to move the small objects. The studies which have employed standardized "intelligence test" agree that dementia patients show lower mean IQ scores than groups of age matched control subjects (review by Miller, 1977).

Selective attention within the visual modality has been studied with digit (Lewis & Kupke, 1977) or letter (Talland & Schwad, 1964) cancellation tasks. Using digit cancellation task, Allender and Kasniak (1985) found moderately demented patients to be impaired relative to age and education matched healthy control subjects.

Eslinger and Benton (1983) investigated spatial and nonspatial visual perceptual abilities in a group of 40 older dementia patients (mixed etiology) and an age-matched healthy control subjects. The dementia patients as a group were significantly impaired on both of these tasks.

Stoarandt, Botwinick, Danziger, Berg, and Hughes (1984) found mild Alzheimer's dementia patients to make significantly more errors than age-matched healthy control subjects on a geometric design copy task. Further it was found that as the disease progressed there were greater number of errors in copying the geometric design.

Beatty et al., in the year 1994 administered a standard neuropsychological tests and individualized measures of patients' skilled behaviours. For patients who remained skilled at games, performance was compared with that of normal controls in direct competition. For the patient-trombonist, raters compared premorbid and postmorbid recordings of his play.

Findings indicate that a broad range of complex cognitive abilities may be preserved in patients with dementia of the Alzheimer type who cannot perform simpler actions.

Ballard, Patel, Oyebode, and Wilcock (1996) assessed 124 patients with different types of dementia with a standardized battery which included the Geriatric Mental State Schedule, the History and Aetiology Schedule, the Secondary Dementia Schedule and the CAMCOG. There were no significant differences in the cognitive abilities between these groups.

Laurin et al., (2001) explored the association between physical activity and the risk of cognitive impairment and dementia. Compared with no exercise, physical activity was associated with lower risks of cognitive impairment, Alzheimer disease, and dementia of any type. Significant trends for increased protection with greater physical activity were observed. High levels of physical activity were associated with reduced risks of cognitive impairment.

Aim of This Study

Present study aimed at assessing cognitive skills in monolingual and bilingual persons with dementia. The study was also interested in looking for performance in bilinguals versus monolinguals.

Method

Sample:
There were 80 participants: 20 persons with diagnosis of mild dementia (10 monolinguals and 10 bilinguals) and 60 healthy elderly (30 monolinguals and 30 bilinguals). The dementia group comprised of persons suffering with mild cognitive impairment as measured by the Mini-Mental Status Examination (MMSE: Folstein et al., 1975**).**

A diagnosis of probable dementia was made according to DSM IV criteria. Each patient attended a geriatric clinic at National Institute of Mental Health and Neurosciences (NIMHANS) where they underwent thorough medical screening in order to rule out any other treatable pathology that could explain their impairment. This included neuropsychological assessment, laboratory blood testing and Computerized Tomography (CT) scanning of the head. In addition, the following criteria were fulfilled for the participants from dementia group.

- The age range of the participants should be between 65-85 years.
- All participants should have a minimum of 12years of formal education.
- All of them should have Kannada as their first language (L1).
- English as their second language (L2) was required criteria for bilinguals.
- All the clinical population must be diagnosed by neurologists/ psychiatrists/ neurosurgeon or geriatric specialist.
- At least 12yrs of formal education.
- Vision and hearing acuity corrected to normal / near normal limits.
- A Score of "1" (mild) should be obtained from Clinical dementia rating scale (Hughes, Berg, Danziger, Coben, & Martin, 1982).

- A score of "3" and above was to be obtained in International Second Language Proficiency Rating Scales by Wylie (2006) to categorize the participants as monolinguals vs. bilinguals.

Healthy elderly participants were not suffering from any neurological or psychological illness likely to impair performance and were not complaining of memory or other cognitive difficulties. A score of 25 and above in MMSE and in "0" Clinical dementia rating was required for healthy elderly group.

Table 1 shows the demographic and neurological details of patient participants. Table 2 shows the mean age, years of education, and handedness of all the participants, and duration of illness for persons with dementia. There were no significant differences in the distribution of males and females ($p > 0.05$). Also the participants in the dementia group exhibited similar cognitive decline despite having different types of dementia.

Table 1. Demographic and neurological details of patient participants.

Sl no.	**Age/sex**	**CDR score**	**Monolingual/ bilingual**	**Diagnosis of dementia**	**Neuroimaging result**
1	67/f	1	M	Mild AD	Bilateral medial temporal atrophy
2	72/f	1	M	Mild AD	Diffuse central atrophy
3	69/f	1	M	Mild Frontotemporal	Left fronto-temporal atrophy
4	68/m	1	M	Mild Frontotemporal	Bilateral fronto-temporal lobe atrophy
5	86/f	1	M	Mild AD	Bilateral medial temporal atrophy
6	68/m	1	M	Mild AD	Diffuse brain atrophy
7	66/m	1	M	Mild AD	Bilateral sub-cortical infarcts
8	71/m	1	M	Mild vascular	Multiple cerebral infarcts
9	69/m	1	M	Mild frontotemporal	Left fronto-temporal atrophy
10	75/m	1	M	Mild AD	Bilateral medial temporal atrophy
11	67/f	1	B	Mild AD	Bilateral medial temporal atrophy
12	72/f	1	B	Mild AD	Diffuse central atrophy
13	69/	1	B	Mild	Left fronto-

	f			Frontotemporal	temporal atrophy
14	68/ m	1	B	Mild Frontotemporal	Bilateral fronto-temporal lobe atrophy
15	86/ f	1	B	Mild AD	Bilateral medial temporal atrophy
16	68/ m	1	B	Mild AD	Diffuse brain atrophy
17	66/ m	1	B	Mild AD	Bilateral sub-cortical infarcts
18	71/ m	1	B	Mild vascular	Multiple cerebral infarcts
19	69/ m	1	B	Mild frontotemporal	Left fronto-temporal atrophy
20	75/ m	1	B	Mild AD	Bilateral medial temporal atrophy

(CDR= Clinical dementia rating, m= male, f = female, AD = Alzheimer's dementia, M = monolingual, B = bilingual).

Table 2. Age, years of education, and handedness of all the participants, and duration of illness for persons with dementia

	Healthy elderly N= 60 M	SD	Participants with dementia N= 20 M	SD
Age	72.6yrs	6.39792	70.8yrs	6.97296
Years of education	12.8yrs	1.68655	11.9	2.46982
Duration of illness (in months)	--		7.7months	1.82878
Handedness	right		right	

Material:

Included in the study are two test protocols for assessing cognitive linguistic skills in elderly population. These tests include Addenbrooke's Cognitive Examination Revised (ACE-R, Krishnan & Lokesh, 2010) and Cognitive linguistic assessment protocol (CLAP, Kamath, 2001 & Rajasudhakar, 2005). Clinical Dementia Rating scale (Hughes et al., 1985) was used to measure the cognitive status of the participants.

Description of CLAP

CLAP is a test which assesses the cognitive and linguistic abilities in young and elderly. It was developed at All India Institute of Speech and Hearing, Manasagangothri, Mysore, as a part fulfilment of master's degree by Kamath in 2001 which was further modified by

Rajasudhakar in 2005. He developed the normative data for young and elder adults. It is the unpublished master dissertation submitted to University of Mysore. This test consists of domains such as attention, perception & discrimination, memory, problem solving and organization.

Procedure:

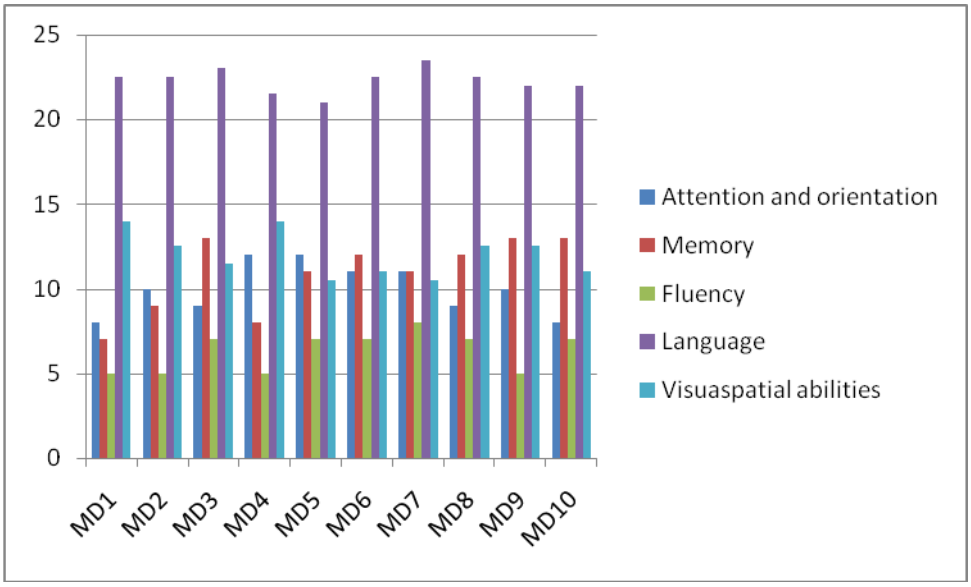
Four groups were considered for the study. Two clinical groups consisting of persons with dementia (10 monolingual and 10 bilingual) focused on mild stage and were recruited from National Institute of Mental Health and Neuroscience, Bangalore, India and Nightingales Medical trust, Bangalore, India. These clinical groups were compared with two groups of 60 healthy elderly (30 monolingual and 30 bilingual) matched for gender, age and education. All patients were subjected to a clinical and radiological (CT or MRI or SPECT). Patients were classified into demented and non-demented groups, according to DSM-IV criteria (APA, 1994).

A non-invasive method was used for the study. All the participants were interviewed and the general history was taken. The participants were made to sit in front of the examiner. Interview was basically questioning and answers type. General history included the demographic details of the participants, education history, language history, medical history & present health status and any other associated problems. Participants were expected to answer how much they are able to. Since the testing would take nearly one and half to two hours, all the participants were provided breaks in between the data collection considering their age. For the clinical group frequent breaks were provided as they were unable to co-operate for long duration. Followed by the general history, a written consent was taken from all the participants regarding the willingness for the participation in the study. Language proficiency was measured using International Second Language Proficiency Rating Scales by Wylie (2006). Based on the scale participants were categorized into monolingual and bilingual i e., a score of 3 and above shows vocational to native like proficiency for speaking, reading, listening and writing. Hence a cut off score of 3 and above (in both Kannada and English) in all the four categories was used for considering the participants as bilinguals.

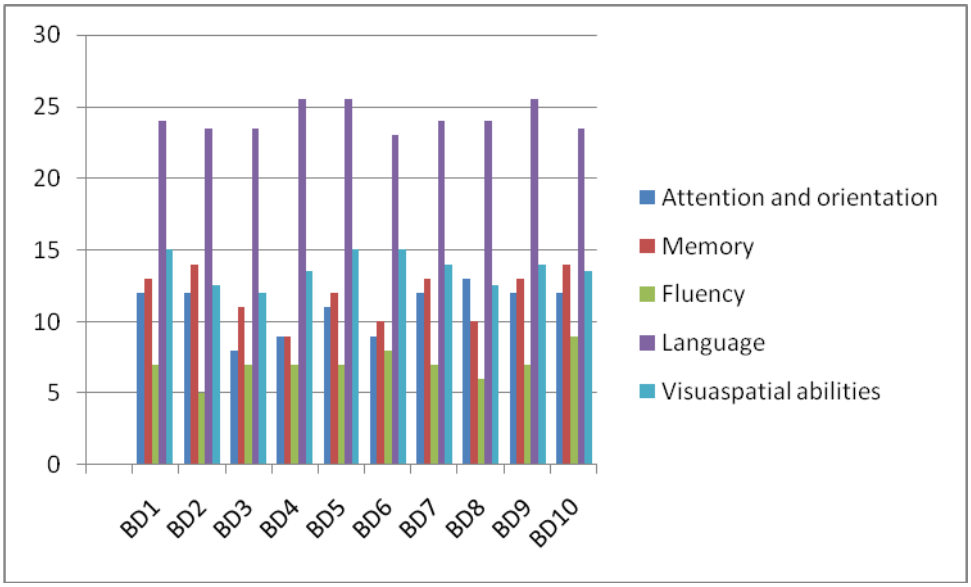
The clinical groups and healthy elderly groups were studied for CLAP.

Results and Discussion

The results of ACE-R for both monolingual and bilingual group of dementia are depicted in graph 1 and graph 2. As it is seen from both the graphs the scores in all the domains of ACE-R were almost similar for individuals within the group (monolingual and bilingual). That is they exhibited similar cognitive decline and hence they were grouped together.



Graph1. : Mean scores of ACE-R for monolingual persons with Dementia



Graph 2: Mean scores of ACE-R for bilingual persons with Dementia

As seen from Table 3, two way MANOVA was administered to see the main effect of group, category and interaction between the two, in APDVAT (Attention, Perception and Discrimination for Visual and Auditory in Total), MEST (and Semantic memory total), PST (Total for Problem solving), ORT (Total for organization) and CLAPT (Cognitive linguistic assessment protocol total). Main effect of group is significant in all five parameters or dependent variables at $p<0.01$. The effect of category is significant in all dependent variables except PST at 5% level. There was significant interaction between group and category in PST, ORT and CLAPT at $p< 0.05$.

Table 3: Two way MANOVA of group, category and interaction between group and category

	Parameters	F(1,76)	Sig.

Group	APDVAT	327.414	.000
	MEST	88.302	.000
	PST	1004.116	.000
	ORT	589.812	.000
	CLAPT	1020.908	.000
Category	APDVAT	11.210	.001
	MEST	5.987	.017
	PST	1.489	.226
	ORT	45.606	.000
	CLAPT	29.927	.000
Group * Category	APDVAT	.171	.680
	MEST	.071	.790
	PST	57.717	.790
	ORT	6.659	.012
	CLAPT	13.728	.000

(APDVAT = Attention, Perception and Discrimination for Visual and Auditory in Total, MEST = Episodic and Semantic memory total, PST = Total for Problem solving, ORT = Total for organization, CLAPT = Cognitive linguistic assessment protocol total)

Patients with mild dementia were compared with healthy elderly to examine which linguistic function deteriorates first in dementia. Although the actual difference in the mean scores were typically small, many of the differences between mild dementia group and healthy elderly reached statistical significance. Particularly items measuring abstract naming, fluency, understanding of complex structures and verbal amnesia and conceptual processes were impaired in mild dementia. Thus the diffuse language impairment associated with dementia could not be found in healthy aging. CLAP consisted of items of several language dimensions such as attention, perception & discrimination, memory, problem solving and organization and these check for diffuse language disturbances in dementia.

Table 4: Result of ANOVA for monolingual vs. bilingual healthy elderly

	Parameters	F(1,58)	Sig.
Category	APDVAT	15.976	.000
	MEST	4.515	.038
	PST	70.554	.000
	ORT	13.689	.000
	CLAPT	2.624	.111

(APDVAT = Attention, Perception and Discrimination for Visual and Auditory in Total, MEST = Episodic and Semantic memory total, PST = Total for Problem solving, ORT = Total for organization, CLAPT = Cognitive linguistic assessment protocol total)

One way ANOVA was performed to find out the effect of category (monolingual vs bilingual) in normal for APDVAT, MEST, PST, ORT and CLAPT. As seen from table 4 the effect of category was significant for all the dependent variables. There was significant difference for the parameters, APDVAT, MEST, PST, and ORT but except for CLAPT at $p<0.001$ level.

Table 5: Result of ANOVA for monolingual vs bilingual persons with dementia

	Parameters	F(1,58)	Sig.
Category	APDVAT	2.098	.165
	MEST	2.951	.103
	PST	20.188	.000
	ORT	234.747	.000
	CLAPT	71.138	.000

(APDVAT = Attention, Perception and Discrimination for Visual and Auditory in Total, MEST = Episodic and Semantic memory total, PST = Total for Problem solving, ORT = Total for organization, CLAPT = Cognitive linguistic assessment protocol total)

Table 5 shows the results of ANOVA administered to check for the category effect (monolingual vs. bilingual) in dementia for APDVAT, MEST, PST, ORT and CLAPT. There is significant difference between the category for PST, ORT and CLAPT at $p < 0.001$. But APDVAT and MEST did not show any category effect.

The results from CLAP reveal that overall; bilingual's performance was better compared to that of monolinguals. Linguistic memory is affected from the milder stage of dementia and it worsens as the disease progresses. The findings are in agreement with Morris (1996) and Perry, Watson, & Hodges (2000) who found that the difficulty in focused attention, forgetting the location of objects and the memory problems decreases the working memory capacity.

Organization skills decline from the early stage of the disease. Since individuals face difficulty in working memory, they perform very poor in organization tasks. The decreased sustained attention, leads to the lower performance in them. Organization skills require solving of complex tasks, hence concentration problems found in these individuals hinders their performance. This is agreement with Bayles (1991). Also the behavioral slowing and the fatigue are also common features which attribute to the poor performance.

Table 6: Result of ANOVA for monolingual persons with dementia vs monolingual healthy elderly

	Parameters	F(1,58)	Sig.
Category	APDVAT	97.935	.000
	MEST	38.506	.000
	PST	675.281	.000
	ORT	237.129	.000
	CLAPT	404.661	.000

(APDVAT = Attention, Perception and Discrimination for Visual and Auditory in Total, MEST = Episodic and Semantic memory total, PST = Total for Problem solving, ORT = Total for organization, CLAPT = Cognitive linguistic assessment protocol total)

Table 6 shows the results of ANOVA administered to see the effect of group (normal and dementia) for monolinguals for APDVAT, MEST, PST, ORT and CLAPT. There was highly significant group effect for all the parameters at $p<0.001$.

Results from CLAP indicate that patient participants were slower and inaccurate in performing attention, perception and discrimination tasks. It is very clear that they exhibit visual-perceptual deficits which can be referred to as visual agnosia in the clinical literature after the observation of clinical patients with dementia (Ernst, Dalby & Dalby, 1970). The incorrect performance in the visual subset of this domain would attribute to the visual recognition problems. Even though the clinical population was provided bigger letters and longer duration, their performance was inaccurate and incorrect. Thus the disease related changes, places these elderly at a perceptual disadvantages.

Problem solving skills were found to be better than other tasks in CLAP. This could be that tasks involved in this domain are easier compared to other domains of the test. Problem solving domain involved fluency of language as the responses for the task. Since fluency of language is preserved till moderate stage of the disease, the scores were better in this domain. However in the later stage even problem solving is equally affected like other domains of the test. A less complete or elaborate mental representation would thus be available to higher cognitive process such as problem solving skills. Beyond a certain point, a mental representation may be so degraded that it no longer activates the appropriate concept.

Table 7: Mann Whitney test results for monolingual persons with dementia vs monolingual healthy elderly

	APDVAT	MEST	PST	ORT	CLAPT
Z	-4.683	-4.589	-4.737	-4.699	-4.692
Asymp. Sig. (2-tailed)	.000	.000	.000	.000	.000

(APDVAT = Attention, Perception and Discrimination for Visual and Auditory in Total, MEST = Episodic and Semantic memory total, PST = Total for Problem solving, ORT = Total for organization, CLAPT = Cognitive linguistic assessment protocol total)

In order to cross check_ the results obtained in table 6, Mann Whitney test was administered between groups and it was found that there exist significantly high group effect for all the dependent variables at $p<0.001$. And hence the results shown in table 7 did not differ from each other.

Table 8: Result of ANOVA for monolingual persons with dementia vs monolingual healthy elderly.

	Parameters	F(1,58)	Sig.
Category	APDVAT	423.969	.000
	MEST	52.940	.000
	PST	338.486	.000
	ORT	492.796	.000

	CLAPT	929.805	.000

(APDVAT = Attention, Perception and Discrimination for Visual and Auditory in Total, MEST = Episodic and Semantic memory total, PST = Total for Problem solving, ORT = Total for organization, CLAPT = Cognitive linguistic assessment protocol total)

One way ANOVA was administered to check the effect of group for bilinguals (normal vs dementia) for APDAVT, MEST, PST, ORT and CLAPT. As seen from table 8 there was significant effect of group for all the five parameters at $p<0.001$.

Table 9: Mann Whitney test results for bilingual persons with dementia vs bilingual healthy elderly.

	APDVAT	MEST	PST	ORT	CLAPT
Z	-4.863	-4.489	-4.780	-4.738	-4.698
Asymp. Sig. (2-tailed)	.000	.000	.000	.000	.000

(APDVAT = Attention, Perception and Discrimination for Visual and Auditory in Total, MEST = Episodic and Semantic memory total, PST = Total for Problem solving, ORT = Total for organization, CLAPT = Cognitive linguistic assessment protocol total)

Although the groups could be differentiated very well, the results were reanalyzed in order to check the effect of dementia. Mann Whitney test was administered between groups and it was found that there exist significantly high group effect for all the dependent variables at $p<0.001$. As seen from table 9 the results did not differ from each other.

Overall bilinguals performed better as compared to monolinguals in both the tests and across the test domains. Results from the present study shows that bilinguals perform better in all the domains of cognitive linguistic tasks as compared to monolinguals. This might be because that bilingual have two choices to come out with the response. Aging has been associated with increased interference between two languages. Alteration or code switching between languages occurs commonly amongst bilinguals (Skiba, 1997).

Whereas monolinguals have single language in use and hence if they are unable to use a particular word for a context the answer would be nil or no other choice. But bilinguals can code switch and complete that particular task. In the present study, researchers were not interested in studying the performance in a particular language, but performance as a whole in cognitive linguistic task. So the response either from native language (L1) or the second language (L2) was taken as appropriate. Hence bilinguals performed better as compared to monolinguals. This was true for the normal group because normal aging also shows up decline in the language abilities (Craik & Bialystok, 2006).

The result differentiates the healthy elderly from the demented patients. The greatest diagnostic value is laid on tasks measuring grammatical structures, abstract phrases, fluency and verbal memory. Impairment in these language abilities can be interpreted to a great extent to be caused by intellectual and amnestic disorder.

Conclusion

Language impairment was assessed in 20 (10 monolingual and 10 bilingual) patients with mild dementia and 60 healthy elderly (30 monolingual and 30 bilingual). The investigation included the Cognitive linguistic assessment protocol (Rajasudhakar, 2005). Statistical analysis with multivariate procedures used in this study indicated that the language functions in healthy elderly could be distinguished from the changes in mild dementia. The deterioration in cognitive linguistic functions found in mild dementia can be attributed to a great extent to general intellectual impairment and to memory disorders on the basis of the task complexity. The basic language functions seemed to preserve quite intact in mild dementia. However, the actual differences in mean scores were typically small which leaves the clinical significance of the results open to further investigation.

The most interesting results in this study concern the differentiation between monolingual and bilingual dementia. Clear differences could not be found in all the parameters besides the general cognitive linguistic impairment in both.

Degenerative changes in central nervous system seem to affect especially the complex forms of language without disturbances in the symbolic aspects of language and the disorders lie primarily in the cognitive aspects of language.

Bilinguals performed better as compared to the monolinguals in both the tests and across the cognitive domains of the tests. Bilinguals had an advantage of two choices to come out with the response unlike monolinguals, who had single language choice.

The study enlightens the clinicians working with elderly in various clinical set-ups. Age associated changes in sensory processes necessitate that modifications in illumination, size of the visual stimuli, and complexity of visual presentation be considered when working with the older adult. Reduction in attention capacity with aging implies that task complexity be carefully considered in clinical interactions with older individuals.

Deficits in perception and attention in persons with dementia must be taken into account in any attempt to assess other aspects of cognition and communication. Longitudinal studies in this domain will enlighten the nature of deficits in these individuals. Since the study considered very few persons with dementia, studies with lager group of individuals will strengthen the generalization of the findings.

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References

Allender, J. & Kasniak, A. W. (1985) . Processing of emotional cues and personality change in dementia of the Alzheimer's type. Paper presented at the 31th annual meeting of the International Neuropsychological Society, San Diego, CA.

Alzheimer, A. (1906). Of a particular disease of the cerebral cortex. *Zentralblatt vur Nervenbeilkunde und. Psychiatric*, *30*, 177-179.

American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders (4th ed.)*. Washington, DC: Author.

American Psychiatric Association (2000). Diagnostic and statistical manual of mental disorders, (4th ed., text version). Washington, DC: American Psychiatric Association.

Appell, J., Kertesz, A., & Fisman, M. (1982). A study of language functioning in Alzheimer's patients. *Brain and Language, 17*, 73-91.

Backman, L., Small, B. J., & Fratiglioni, L. (2001). Stability of the preclinical episodic memory deficit in Alzheimer's disease. *Brain, 124*, 96-102.

Ballard C., Patel A., Oyebode F, & Wilcock G. (1996) Cognitive decline in patients with Alzheimer's disease, vascular dementia and senile dementia of Lewy body type. *Age and Ageing.* ; *25*(3):209-13.

Bayles, K. A. (1991). Alzheimer's disease symptoms: Prevalence and order of appearance. *Journal of Applied Gerontology, 10*, 419-430.

Bayles, K. A. (1982). Language functions in senile dementia. *Brain and Language, 16*, 265-280.

Beatty, W. W., Winn, P.,. Adams, R. L ., Allen, W.,. Wilson, D. A , Prince, J. R. ,. Olson, K. A., Dean, K., & Littleford, D. (1994).Preserved Cognitive Skills in Dementia of the Alzheimer Type. *Archives of neurology*. 51(10):1040-1046.

Birren, J. E., & Botwinick, J. (1951). The relation of writing speed to age and to the senile psychoses: Journal of Consulting Psychology Vol *15*(3) Jun 1951, 243-249.

Craik, F. I., & Bialystok, E. (2006). Cognition through the lifespan: mechanisms of change. *Trends in Cognitive Sciences, 10*, 131-138.

Emery, O.B., & Emery, P.E. (1983). Language in senile dementia of the Alzhei- mer's type. *Psychiatric Journal of the University of Ottawa, 8*, 169-178.

Ernst, B., Dalby, M. A., & Dalby, A. (1970). Aphasic disturbances in presenile dementia. *Acta Neurologica Scandinavica, Supplementum*. *43* (46), 999-1000.

Eslinger, P. J. & Benton, A. L. (1983). Visuaperceptual performances in aging and dementia: Clinical and theoritical implications. Journal of Clinical Neuropsychology, *5*, 213-220.

Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). "Mini- mental state": A practical method for grading the mental state of patients for the clinician. *Journal of Psychiatric Research, 12*, 189-198.

Hodges, J. R., Salmon, D. P., & Butters, N. (1991). The nature of the naming deficit in Alzheimer's and Huntington's disease. *Brain, 114*, 1547-1558.

Hughes, L. Berg, W. L. Danziger, L. A. Cobe (1982). A new clinical scale for the staging of dementia. *British Journal of Psychiatry.140*:566–572.

Hyltenstam, K., & Obler, L. K. (1989). *Bilinguals across the lifespan: Aspects of Acquisition, Maturity and Loss*. New York: Cambridge University Press.

Kamath, A. (2001). Cognitive- Linguistic Assessment Protocol for adults. *Unpublished Master's Dissertation,* University of Mysore, Mysore.

Laurin, D., Verreault, R ., Lindsay, J . MacPherson, K ., & Rockwood, K (2001). Physical Activity and Risk of Cognitive Impairment and Dementia in Elderly Persons. Archives of Neurology, *58:*498-504.

Lewis, R. & Kupke, T.(1977). *The Lafayette Clinic repeatable neuropsychological test battery: Its development and research applications.* Paper presented at the annual meeting of the Soutwestern Psychological Association, Hollywood, Floria.

Miller, E. (1974). Psychomotor performance in presenile dementia. *Psychological Medicine, 4*, 65-68.

Miller, E. (1977). *Abnormal aging: The psychology of senile and presenile dementia*. McGraw-Hill Co. New York.

Morris, R.G., Gick, M. L., & Craik, E. I. M. (1988). Processing resources and age differences in working memory. *Memory and Cognition*, *16*, 362-366

Murdoch, B. E., Chenery, H. J., Wilks, V., & Boyle, R. S. 1987. Language disorders in dementia of the Alzheimer type. Brain and Language, *31* (1):122-37

Perry, R., Watson, P., & Hodges, J. (2000). The nature and staging of attention dysfunction in early (minimal and mild) Alzheimer's disease: Relationship to episodic and semantic memory impairment. *Neuropsychologia, 38*, 252-271.

Rajasudhakar, S. (2005). A study of the effect of age, gender and lingualism on cognitive-linguistic performance. *Unpublished Master's Dissertation,* University of Mysore, Mysore.

Ross-Swain, D. (1992). Cognitive Linguistic Improvement Progam. Singular Publishing group. San Diego, CA.

Skiba, R. (1997). Code switching as a countenance of Language Intereference. The internet *TESL Journal*, III, 10. Available online at http://iteslj.org.

Stoarandt, M., Botwinick, J., Danziger, W. L., Berg, L., & Hughes, C.P. (1984). Psychometric differentiation of mild senile dementia of Alzheimer's type. *Archives of Neurology, 41*, 497-499.

Talland, G. A., & Schwad, R. S. (1964). Performance with multiple sets in Parkinson's disease. *Neuropsychologia, 2*, 45,-53.

Wylie, E. (2006). International Second Language Proficiency Rating Scales.

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