

# **LANGUAGE IN INDIA**

**Strength for Today and Bright Hope for Tomorrow**

**Volume 12 : 9 September 2012**

**ISSN 1930-2940**

**Managing Editor: M. S. Thirumalai, Ph.D.**

**Editors: B. Mallikarjun, Ph.D.**

**Sam Mohanlal, Ph.D.**

**B. A. Sharada, Ph.D.**

**A. R. Fatihi, Ph.D.**

**Lakhan Gusain, Ph.D.**

**Jennifer Marie Bayer, Ph.D.**

**S. M. Ravichandran, Ph.D.**

**G. Baskaran, Ph.D.**

**L. Ramamoorthy, Ph.D.**

**Assistant Managing Editor: Swarna Thirumalai, M.A.**

## **Agraphia and Anomia in Bilingual Individual with Left Temporal Lobe Lesion – A Case Report**

**Swapna Sebastian, Ph.D., Shyamala Chengappa, Ph.D.,  
Sunil Kumar R, M.Sc. (SLP), Achamma Ballraj, MS., DLO**

---

### **Abstract**

The present study reveals the case report of a 39 year old man with intracerebral hemorrhage in the left temporal lobe. He is a bilingual anomic aphasic patient with Malayalam as mother tongue and English as second language. There was a discrepancy in the scores between the tasks of automatic writing vs word retrieval writing in Malayalam and English. Lexical interference (borrowing of entire word from Malayalam) was found while writing English words in the subtest of written word retrieval of function words (grammatical words). Deficits in writing in the two different languages, i.e., English and Malayalam were definitely different. The scores for the subtest of written word retrieval of function words (grammatical words) was better for English language whereas the scores were better in Malayalam for other writing tasks associated

Language in India [www.languageinindia.com](http://www.languageinindia.com)

12 : 9 September 2012

Swapna Sebastian, Ph.D., Shyamala Chengappa, Ph.D., Sunil Kumar R, M.Sc. (SLP), and Achamma Ballraj, MS., DLO

706

Agraphia and Anomia in Bilingual Individual with Left Temporal Lobe Lesion – A Case Report

with semantics. This difference in scores raises the question whether deficits can differ between syntax and semantics in different languages. Comparison need to be done in future research studies regarding the performance on oral production across languages so that a better understanding will be available whether the difference in the script is accountable to the difference in the scores or the language as such.

**Key words:** bilingual aphasia, lexical agraphia, anomia

## **Introduction**

Agraphia, loss of ability to write and spell while writing, is seen as one of the major disturbances along with other comprehension, naming deficits in patients with stroke and aphasia. Although these disturbances are seen in all types of aphasic individuals, the severity of these deficits varies with types of aphasia and lesion sites. These deficits again vary from language to language in individuals with bilingual aphasia depending upon several factors like age of acquisition, manner of acquisition and proficiency levels of both languages.

The previous research on typical bilingual individuals and individuals with bilingual aphasia has highlighted the importance of these factors on individuals' speaking and comprehension levels (Paradis, Goldblum & Abidi, 1982). Kirshner and Webb in 1982 have studied reading and writing deficits in three Wernicke's aphasics following acute left hemisphere strokes. All the three subjects exhibited greater impairment in reading than in auditory comprehension. Two subjects showed significant agraphia as well as alexia who were later diagnosed as pure alexia and agraphia. These authors have also reported that the lesion in left inferior parietal region, especially the angular gyrus and subjacent white matter is the cause for alexia and agraphia in two subjects.

Many theories have been put forward to explain the process of writing in typical individuals. Kaplan, Gallagher and Glosser (1998) have reported that writing and reading process involve same central linguistics cognitive components. Apart from those components, writing involves specific other components in production of letters. For example, writing to dictation

Language in India [www.languageinindia.com](http://www.languageinindia.com)

12 : 9 September 2012

Swapna Sebastian, Ph.D., Shyamala Chengappa, Ph.D., Sunil Kumar R, M.Sc. (SLP)., and  
Achamma Ballraj, MS., DLO

Agraphia and Anomia in Bilingual Individual with Left Temporal Lobe Lesion – A Case Report

task involves activation of phonological lexicon, semantic lexicon and orthographic lexicon. However, in spontaneous writing, the concepts can activate semantic lexicon and orthographic lexicon.

It has also been proposed that there are at least two stages involved in the act of writing in a normal person: a linguistic stage and a motor-expressive-praxic stage. The linguistic stage involves the encoding of auditory and visual information into syntactical-lexical units (the symbols for letters and written words) which is mediated through the angular gyrus. The motor stage is the final step in which the linguistic impulses are translated into graphemic motor impulses mediated presumably by Exner's writing area in conjunction with the inferior parietal lobule (Joseph, 2000). Exner's Writing Area is located within a small area located adjacent to Broca's expressive speech area which controls the movement of the hand and fine finger movements.

There are different subtypes of agraphia reported depending on the type of error and the area of brain damage. Lexical agraphia, similar to surface alexia, reflects a dysfunction of the lexical spelling system and is characterized by better spelling of regular words than non-words and irregular words (Beauvois & Derouesne, 1981). These patients produce regularization spelling errors that tend to preserve the phonological form of the target word (Kaplan et al, 1998).

The deficits exhibited by bilingual aphasics can be differential or parallel in different languages. Understanding of the brain function comes from studying the deficits experienced by brain damaged individuals. Analysis of the type and pattern of error in the writing skills of bilingual aphasics can throw insight into the understanding of the organization of different languages in the brain.

### **Case Description**

A 39 -year-old right-handed graduate with intracerebral hemorrhage due to hypertension in the left temporal lobe was evaluated. He is a bilingual individual with Malayalam as mother

Language in India [www.languageinindia.com](http://www.languageinindia.com)

12 : 9 September 2012

Swapna Sebastian, Ph.D., Shyamala Chengappa, Ph.D., Sunil Kumar R, M.Sc. (SLP)., and  
Achamma Ballraj, MS., DLO

708

Agraphia and Anomia in Bilingual Individual with Left Temporal Lobe Lesion – A Case Report

tongue and English as second language. There was no previous medical history of hypertension. Initial speech and language analysis revealed fluent speech but was characterized by word finding difficulty. His CT scan revealed moderate sized hyperdense lesion with surrounding hypodense zone in the left temporal lobe suggestive of haematoma. No abnormality was found in tests of other cognitive functions, such as praxis, left-right orientation, calculation, finger naming, and spatial attention. Other parts of the neurological examination, including examination of the cranial nerves, motor and sensory functions, and reflexes, were unremarkable. Hearing was normal. Malayalam version of Western Aphasia Battery (Phillip J.E 1992) was administered. On WAB he scored 8 in the subtest of fluency, 8 in the subtest of comprehension, 8 in the subtest of repetition and 5 in the subtest of naming which classified the patient as anomic aphasia. Detailed analysis of his writing skills was done using Writing test for Malayalam - English Bilingual Aphasics (Ranjini & Sebastian, 2012). The scores of the writing assessment are given in Table 1.

**Table 1. Subjects' scores in Writing Test for Malayalam – English Bilingual Aphasics.**

	<b>Malayalam</b>	<b>English</b>
<b>Automatic writing</b>	10/10	10/10
<b>Copy writing</b>	10/10	10/10
<b>writing to dictation</b>		
<b>sound spelling</b>		
irregular words	0/10	0/10
regular words	5/10	0/10
non-words	0/10	0/10
<b>Sight spelling</b>		
irregular words	0/10	0/10
regular words	3/10	3/10
non-words	0/10	1/10
<b>Written Picture naming</b>	4/10	4/10

Language in India [www.languageinindia.com](http://www.languageinindia.com)

12 : 9 September 2012

Swapna Sebastian, Ph.D., Shyamala Chengappa, Ph.D., Sunil Kumar R, M.Sc. (SLP)., and Achamma Ballraj, MS., DLO

709

Agaphia and Anomia in Bilingual Individual with Left Temporal Lobe Lesion – A Case Report

<b>Written word retrieval of function words (grammatical words)</b>	1/10	4/10
---	------	------

## Discussion

The present study has discussed the writing errors in a 39 year old man with intracerebral hemorrhage in the left temporal lobe. He is a bilingual anomic aphasic patient with Malayalam as mother tongue and English as second language.

On the writing test for Malayalam- English Bilingual Aphasics, he had scored maximum scores for the subtest of automatic writing and copy writing for both the languages (10/10), whereas on the tasks where word retrieval is needed for writing the scores were poorer for both the languages. Automatic writing and copy writing are preserved even after a neurological insult whereas tasks involving word retrieval for writing are affected in this patient as shown in the discrepancy in the scores between the task of automatic writing vs word retrieval writing. This may be accounted by the fact that automatic writing and copy writing depends on implicit memory whereas tasks involving word retrieval for writing depends on explicit memory. There can be a possibility of an intact implicit memory despite a severely impaired explicit memory.

Lexical interference (borrowing of entire word from Malayalam) was found while writing English words (eg. *aval* for *she*) in the subtest of written word retrieval of function words (grammatical words). On writing to dictation, he did not attempt to write the irregular words and non-words in English, however, in Malayalam, the irregular word writings were characterized by lexical agraphic errors (phonological spelling - eg. *channanam* for *chandanam*, *malsaram* for *mathsaram*). Even though Malayalam is a phonological language, certain words are borrowed from Sanskrit are irregular where there is no phoneme – grapheme correspondence (eg. Channanam was written as chandanam). Other writing errors noticed in Malayalam were transposition of graphemes within a word (parava was written as pavara) and deletion of diacritic markers (kuppi as kapi; mu tha la was written as ma thala; tha: mara was written as thamara; kaduva was written as kadava)

Language in India [www.languageinindia.com](http://www.languageinindia.com)

12 : 9 September 2012

Swapna Sebastian, Ph.D., Shyamala Chengappa, Ph.D., Sunil Kumar R, M.Sc. (SLP)., and Achamma Ballraj, MS., DLO

710

Agaphia and Anomia in Bilingual Individual with Left Temporal Lobe Lesion – A Case Report

Literature review shows that there are two major viewpoints regarding the deficits in different languages exhibited by a bilingual. One view point is that deficits are similar across languages in a bilingual while the second view point is that orthography plays an important role and deficits differ across scripts. Case reports are available on studies done on Indian bilinguals which are supportive of the later view point. (Chengappa, Bhat & Padakannaya, 2004; Karanth, 1981; Ratnavalli et al 2000).

In this patient, lexical type of errors with deletion of diacritic markers were found in the writing of Malayalam whereas phonological spelling errors were not seen in the English language. English orthography is the alphabetic spelling system which has got a relationship between speech sounds and the corresponding written words.

The Malayalam script is a Brahmic script used commonly to write the Malayalam language—which is the principal language of the Indian state of Kerala (Lewis 2009). It is a semi syllabic script i.e it is partially “alphabetic” and partially syllable-based. The basic characters in Malayalam script consists of vowels which can exist as independent vowel letters or dependent vowel signs and consonant letters. An independent vowel letter is used as the first letter of a word that begins with a vowel. A consonant letter does not represent a pure consonant, but a consonant + a short vowel /a/ by default. For example, ക is the first consonant letter of the Malayalam alphabet, which represents /ka/, not a simple /k/. A vowel sign is a diacritic attached to a consonant letter to indicate that the consonant is followed by a vowel other than /a/. If the following vowel is /a/, no vowel sign is needed. The phoneme /a/ that follows a consonant by default is called an inherent vowel whose phonetic value is unrounded [ɐ], or [ə] as an allophone. To denote a pure consonant sound not followed by a vowel, a special diacritic virama is used to cancel the inherent vowel.

The following are examples where a consonant letter is used with or without a diacritic.

കിki = കka + ി vowel sign i

കുku = കka + ു vowel sign u

Language in India [www.languageinindia.com](http://www.languageinindia.com)

12 : 9 September 2012

Swapna Sebastian, Ph.D., Shyamala Chengappa, Ph.D., Sunil Kumar R, M.Sc. (SLP)., and Achamma Ballraj, MS., DLO

Agaphia and Anomia in Bilingual Individual with Left Temporal Lobe Lesion – A Case Report

കൈ kai = ക ka + ഐ vowel sign ai

ക് k = ക ka + ്virama

ക ka = consonant letter ക ka itself, with no vowel sign (retrieved from [www.wikipedia.com](http://www.wikipedia.com) on 10.7.2012).

Deficits in writing in the two different languages, i.e., English and Malayalam were definitely different. Comparison need to be done regarding the performance on oral production across languages so that a better understanding will be available whether the difference in the script is accountable to the difference in the scores or the language as such.

The scores for the subtest of written word retrieval of function words (grammatical words) was better for English language whereas the scores were better for Malayalam for other writing tasks associated with semantics. This difference in scores raises the question whether deficits can differ between syntax and semantics in different languages.

The writing errors shown by the patient, i.e., phonological spelling for irregular words and deletion of diacritic markers suggest that anomia in this patient may not be the result of significant loss of semantic knowledge but may be due to disconnection between semantic knowledge and access to phonological word forms.

## Conclusion

The present study has focused on the writing errors in a bilingual anomic aphasia with intracerebral hemorrhage in the left temporal lobe whose mother tongue is Malayalam and English was learned as second language. Deficits in writing in the two different languages i.e English and Malayalam are were definitely different. Comparison need to be done regarding the performance on oral production across languages so that a better understanding will be available whether the difference in the script is accountable to the difference in the scores or the language as such.

Language in India [www.languageinindia.com](http://www.languageinindia.com)

12 : 9 September 2012

Swapna Sebastian, Ph.D., Shyamala Chengappa, Ph.D., Sunil Kumar R, M.Sc. (SLP)., and Achamma Ballraj, MS., DLO

Agaphia and Anomia in Bilingual Individual with Left Temporal Lobe Lesion – A Case Report

---

---

## References

1. Beauvois, M. F., & Derouesne, J. (1981). Lexical or orthographic agraphia. *Brain*, 104, 21-49.
2. Chengappa ,S., Bhat, S., Padakannaya, P. ( 2004). Reading and Writing Skills in Multilingual /multiliterate aphasics: Two case studies: *Reading and writing: An Interdisciplinary Journal*.17:121-135.
3. Joseph. R. (2000). *Agraphia. Neuropsychiatry, Neuropsychology, Clinical Neuroscience*. Academic Press, New York.
4. Kaplan, E., Gallagher, R. E., & Glosser, G. (1998). Aphasia-Related Disorders. In Sarno, M. T. (1998) Eds. *Acquired Aphasia*. 3rd Edn. Academic Press. San Diego.
5. Karanth,P. (1981). Pure alexia in a Kannada- English bilingual. *Cortex*, 18,187-198.
6. Kirshner, H. S. & Webb, W. G. (1982). Alexia and agraphia in Wernicke's aphasia. *Journal of Neurology, Neurosurgery and psychiatry*. 45, 719 – 724.
7. Lewis, M. Paul (2009). "Malayalam". *Ethnologue: Languages of the World* (16th ed.). SIL International. Retrieved 2009-10-31.
8. Malayalam alphabet . Wikipedia, the free encyclopedia. Wikimedia Foundation, Inc.2 May 2012.Web.9 July 2012.[http://en.wikipedia.org/wiki/Malayalam\\_alphabet](http://en.wikipedia.org/wiki/Malayalam_alphabet)
9. Philip. J .E, Karanth. P. (1992). Test of Aphasia in Malayalam. Unpublished dissertation submitted to University of Mysore.
10. Ratnavalli, E., Murthy G.G., Nagaraja, D., Veerandrakumar,K., Jayaram, M. & Jayakumar, P.N. (2000). Alexia in Indian bilinguals. *Journal of Neurolinguistics*, 13, 37-46.



Swapna Sebastian, Ph.D.  
Associate Professor  
Audio Vestibular Unit, Department of ENT  
Christian Medical College  
Vellore- 632004, Tamil Nadu, India  
[swapna\\_santhosh@yahoo.co.in](mailto:swapna_santhosh@yahoo.co.in)

Shyamala K Chengappa, Ph.D.  
Professor & Head  
Department of Speech Language Pathology  
All India Institute of Speech and Hearing  
Manasagangothri, Mysore 570 006  
Karnataka, India  
[shyamalake@yahoo.com](mailto:shyamalake@yahoo.com)

Sunil Kumar. R. M.Sc. (SLP)  
Junior Research Fellow  
Department of Speech Language Pathology  
All India Institute of Speech and Hearing  
Manasagangothri, Mysore 570 006  
Karnataka, India  
[rsunilkumar86@gmail.com](mailto:rsunilkumar86@gmail.com)

Achamma Ballraj, MS., DLO  
Professor and Head  
Department of ENT  
Christian Medical College  
Vellore 632004, Tamilnadu  
India  
[abalraj@cmcvellore.ac.in](mailto:abalraj@cmcvellore.ac.in)

Language in India [www.languageinindia.com](http://www.languageinindia.com)

12 : 9 September 2012

Swapna Sebastian, Ph.D., Shyamala Chengappa, Ph.D., Sunil Kumar R, M.Sc. (SLP)., and  
Achamma Ballraj, MS., DLO

714

Agaphia and Anomia in Bilingual Individual with Left Temporal Lobe Lesion – A Case Report