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# Manifestation of Surface Agraphia in an Alphasyllabary: Evidence from Kannada-English Biliterates with Acquired Brain Damage

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## Introduction

Surface agraphia (also known as *lexical agraphia*) is characterized by selective inability to write irregular words with preserved writing of regular words. According to the dual-route architecture of reading, surface agraphia results from damage to the lexical semantic route of spelling leading to reliance on phoneme-grapheme route for spelling. Words are, therefore, spelled by their pronunciation and the underlying deficit is characterized by regularization of irregular words.
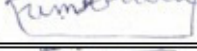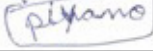
While surface agraphia is frequently reported in individuals with brain damage who read/ write irregular orthographies like English, its manifestation in individuals who read/write more regular orthographies (e.g., Kannada) has been a matter of debate lately. Observations from bilingual/biscriptal individuals with brain damage, hence, provide valuable insights on how subtle neurological lesions express linguistically across orthographies.
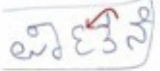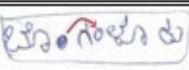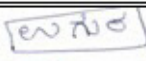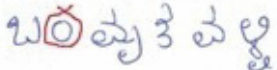
## Method

**Case Report**. We present three Kannada-English biliterate individuals with acquired reading and writing disturbances following brain damage. GN, a 50-year-old man, experienced an episode of stroke involving the left cortical-subcortical network involving thalamus, basal ganglia. U, a 31-year-old lady experienced stroke in the left MCA territory and C, another young lady, aged 25 years incurred brain damage after surgical procedure in the left fronto-parietal lobes. Language assessment revealed naming disturbances in all three participants. On further examination of reading and writing skills with a detailed cross-linguistic (Kannada-English) test battery which included word lists matched for phoneme, syllable, character-lengths, familiarity, & imageability, all three participants exhibited alexia with agraphia in both the languages. While, GN and U showed relatively severe writing than reading disturbances, C exhibited equally impaired reading and writing deficits. While all three participants spelled non-words and regular words relatively well, they spelled irregular words as regular, thus exhibiting surface agraphia. Interestingly, while all three participants exhibited surface agraphia in English, C showed regularization errors in Kannada words involving 'anusvaara' and 'arka' markers – the only points of irregularity in Kannada script. Figure 1 shows the way these markers were either misplaced, dropped, or inserted in wrong positions by the participant C.

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| Writing to Dictation (English) | |
|---|---|
| Response | Target |
| *(handwritten: Ruf)* | **Rough** |
| *(handwritten: Gee)* | **Ghee** |
| *(handwritten: wall)* | **Wall** |
| *(handwritten: umbrala)* | **Umbrella** |
| *(handwritten: pияno)* | **Piano** |

| Writing to Dictation (Kannada) | |
|---|---|
| Response | Target |
| *(handwritten Kannada)* | ಪ್ರಾರ್ಥನೆ /praːrtʰanɛ/ |
| *(handwritten Kannada)* | ಪರ್ವತ /parvaʈa/ |
| *(handwritten Kannada)* /bogamɭʊːrʊ/ | ಬೆಂಗಳೂರು /bɛŋgaɭʊːrʊ/ |
| *(handwritten Kannada)* /ʊgʊra/ | ಉಂಗುರ /ʊŋgʊra/ |
| *(handwritten Kannada)* /baɱɱrʊʈavaɭɭɪ/ | ಬಮೃತವಳ್ಳಿ /baɱrʊʈavaɭɭɪ/ (Kannada Non-Word) |

## Conclusion

The inconsistent presentation of surface agraphia observed in our participants does point towards orthography mediation of underlying spelling deficits. Indian orthographies are generally highly transparent in nature, yet individual scripts like Kannada may vary in the grapheme-to-phoneme correspondence leading to a few irregularities in spelling. Hence, surface alexia/agraphia is far less reported in users of Indian orthographies compared to those using opaque alphabetic orthographies like English (Karanth, 2003). The case of C reported here, thus documents the rare occurrence of acquired surface agraphia in alphasyllabary, a highly transparent orthography used in Kannada.

## Reference

Karanth, P. (2003). *Cross-Linguistic Study of Acquired Reading Disorders: Implications for Reading Models, Disorders, Acquisition, and Teaching*. New York: Kluwer Academic/ Plenum Publishers.