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Aphasia in multilingual individuals: The importance of bedside premorbid language proficiency assessment

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Dear Editor,

With increased rates of "globalization", the proportion of individuals who speak more than one language is rapidly expanding, with a projected number of 47 million US citizens speaking at least two languages by 2030 [1]. As a result, language impairment in multilingual persons is likely to become a frequent clinical challenge. Multilingual brains do not merely function as multiple, simultaneous monolingual brains coexisting in one individual [2,3]. Multilingual patients with acquired speech problems may present clinical nuances that underscore the relationship between anatomical lesions and subtypes of language deficits, both in the first as well as in their second languages. Importantly, a careful history of the premorbid use of each language may be particularly relevant to understand the nature and extent of the acquired language deficits in these subjects. The importance of a comprehensive bedside language assessment is illustrated through the case of a French–English bilingual person who, after an ischemic stroke, became aphasic in English (his second, albeit most frequently used language) while remaining fairly competent in his first language. We describe his language deficits and anatomical distribution of lesion, and discuss their relevance in the context of the diagnosis of aphasia and language recovery after brain injury.

A 68-year-old bilingual male (native language—L1: French, second language—L2: English), right-handed as determined by the Edinburg handedness questionnaire [4], presented to the Emergency Department of our institution 24 h after noticing word-finding difficulties. His wife reported frequent intrusions of French words while speaking in English. She also reported phonological paraphasias, such as saying "*gland*" for the English word 'glove'. This pattern was not present when speaking in French. When writing in English, he reported feeling as if he was "writing in a foreign language". French and English comprehensions were reported to be unaffected. He denied motor, sensory, or visual symptoms. The Language Experience and Proficiency Questionnaire were used for language proficiency evaluation [5]. The patient was born in Algeria and raised in France. He lived in a French-speaking country during the first 24 years of his life. He started to learn English in his mid-late twenties and he estimates becoming fluent in English at around age 30. He has been living in the US for the past 44 years, and reports using English 80% of his time in written communication, and 75% for oral communication. His current use of French is mostly restricted to interacting with family. English is the language he employs with friends and work-related communications, as well as to access information and mass media. The patient rated his French proficiency as 10/10 in speaking, understanding spoken language, and reading; for English, he reported a proficiency of 9/10 for speaking and 10/10 for understanding spoken language and reading. Everyday use and proficiency in each language were further confirmed by the patient's spouse. He was alert and oriented to time, place, person, and self. His recent and remote memories were intact. Cranial nerve examination was unremarkable. He had full strength and intact sensation on all extremities. Deep-tendon reflexes were normal and symmetric on all extremities. He had no clinical sign of cerebellar dysfunction. Standardized language testing was completed using the Western Aphasia Battery™ – Revised (WAB-R) [6], in both English and French; with assessments occurring within thirty minutes of each other and instructions provided using the corresponding language for both English and French. Language impairment was greater in written language abilities across both languages. Agraphia was greater in English (5/10) than in French (8/10) and primarily presented as a reduced ability to write sentences, with the transcription of isolated letters and simple words across both languages largely preserved. The patient independently attempted to correct transcription errors 100% of the time in French (vs. 80% in English). The ability to successfully correct transcription errors within five seconds once identified was also less successful in English (40%) than in French (100%). Other language deficits were observed in the patient's ability to perform word repetition tasks. These deficits were only observed in English. Deficits in repetition were characterized by periodic interjections of French words for English words with attempts at self-correct errors 100% of the time. MRI demonstrated multiple areas of restricted diffusion in the left temporal and parietal regions, incompletely encompassing the inferior parietal lobule, supra-marginal gyrus, angular gyrus, superior temporal gyrus and middle temporal gyrus. The lesion partially involved the cytoarchitectonic Brodmann Areas 7, 19, 22, 39, 40, 41 and 42 (Fig. 1).

We illustrate the importance of assessing pre-morbid socio-demographic and language proficiency in a bilingual subject with post-stroke aphasia. Without this measure, this person could have been erroneously interpreted as being less proficient in his second language, when in fact he was aphasic almost exclusively in his second language. This clinical scenario also demonstrates differential mechanisms supporting naming deficits in bilingual individuals. In English and in French, several words designating the same object share phonological commonalities, suggesting that they may be encoded phonologically at the same level. Few examples of such paired-words include chair—*chaise*, shoe—*chaussure*, glove—*gant*, table—*table*, bowl—*bol*. In the present case study, for instance, the patient used '*gland*' (which is phonologically close to *gant*, the French translation of glove) instead of glove. This partial phonological–semantic overlap may also help explain the patient's ability to identify up to 80% of transcription errors in English versus 100% in French, as commonalities of phonemes in both languages may have contributed to word retrieval. In fact, the phonological overlap between languages may be detrimental, as it may incur in "phonological competition". This is partly supported by the present case

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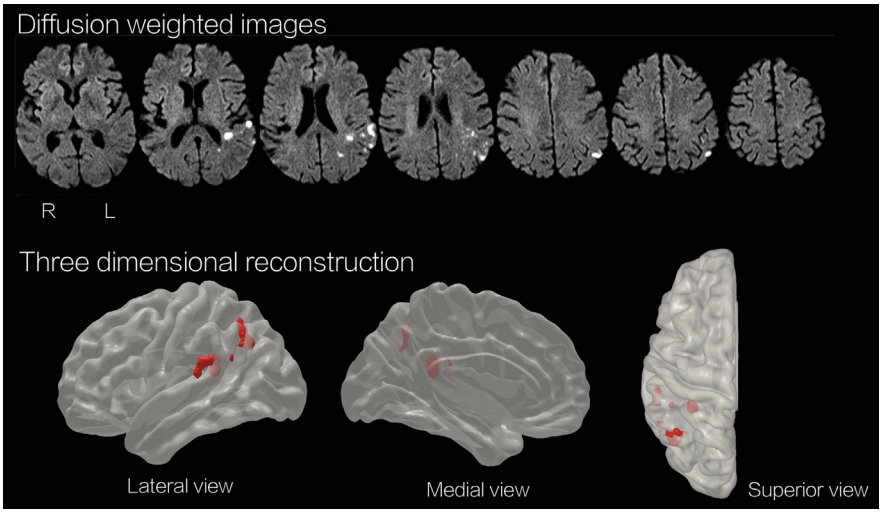

Fig. 1. The anatomical location of the acute ischemic lesions in this patient is demonstrated by the Magnetic Resonance Images obtained two days after the onset of symptoms. The ischemic lesions correspond to the areas of restricted diffusion (hyperintense) on diffusion-weighted images (upper panel), which are shown in a tridimensional brain diagram as colored in red (lower panel). R = right hemisphere, L = left hemisphere.

given the frequent interjection of French words into English. This effect was not observed for L2 into L1, suggesting that the integrity of brain circuits feeding maternal language abilities may be more spared than late-acquired L2 networks and supporting recent results of aphasia in bilingual speakers [7]. We suggest that history of premorbid use of each language should be assessed in a structured manner in stroke units in order to permit the full assessment of speech disabilities and help detect dissociative patterns of language impairment.

Conflict of interest

The authors declare that there are no conflicts of interest.

Disclosure

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References

[1] Pearce JM. A note on aphasia in bilingual patients: Pitres' and Ribot's laws. Eur Neurol 2005;54:127–31.
[2] Grosjean F. Neurolinguists, beware! The bilingual is not two monolinguals in one person. Brain Lang 1989;36:3–15.
[3] Fabbro F. The bilingual brain: bilingual aphasia. Brain Lang 2001;79:201–10.
[4] Oldfield RC. The assessment and analysis of handedness: the Edinburgh inventory. Neuropsychologia 1971;9:97–113.
[5] Marian V, Blumenfeld HK, Kaushanskaya M. The Language Experience and Proficiency Questionnaire (LEAP-Q): assessing language profiles in bilinguals and multilinguals. J Speech Lang Hear Res 2007;50:940–67.
[6] Kertesz A. The Western Aphasia Battery — Revised. New York: Grune & Stratton; 2007.
[7] Hope TM, Parker J, Grogan A, Crinion J, Rae J, Ruffle L, et al. Comparing language outcomes in monolingual and bilingual stroke patients. Brain 2015;138(Pt 4):1070–83.

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