



Editorial

Cite this article: Calabria, M., Gallo, F., & Kiran, S. (2024). Introduction: Clinical aspects of bilingualism research in adults. *Bilingualism: Language and Cognition*, 27, 215–216. <https://doi.org/10.1017/S136672892400004X>

Received: 23 January 2024
Accepted: 23 January 2024
First published online: 23 February 2024

Corresponding author:
Marco Calabria;
Email: mc Calabria@uoc.edu

¹Faculty of Health Sciences, Universitat Oberta de Catalunya, Barcelona, Spain; ²Centre for Cognition and Decision Making, Institute for Cognitive Neuroscience, Higher School of Economics, Moscow, Russian Federation; ³PoLaR Lab, AcqVA Aurora Centre, UiT-The Arctic University of Norway, Tromsø, Norway and ⁴Director, Center for Brain Recovery, Boston University, Boston, USA

Bilingualism is an exponentially increasing trend in today's world population due to mass immigration and globalization. In addition, the rising incidence of dementia and strokes in adults suggests that there is an increased urgency to understand the interaction between bilingualism and neurological/neurodegenerative disorders and to provide clinical services for these populations. This special issue in BLC comprises six contributions that specifically delve into the characteristics, manifestations, mechanisms of language, and cognitive function in bilingual adults with clinical issues. These six papers span a wide range of topics from understanding behavioral aspects of cognitive control, to interventions for individuals with bilingual aphasia, and to evaluations of cognitive reserve in bilingual neurodegenerative disorders. All of them present emerging yet innovative research that provides a fresh perspective to some of the paramount and persistent questions in bilingual language processing research, including whether cross-language generalization can be facilitated through language intervention, and whether extensive bilingual language experience sustains a cognitive reserve benefit, to name a few.

The first series of three papers focuses on speech production in bilingual patients with aphasia or neurodegenerative diseases, including lexical retrieval processes, cross-language interference, and treatment in bilinguals with different language pairs.

The study conducted by Calabria (2024) investigated the distinct impacts of neurodegenerative disorders on cross-language interference and facilitation. This was achieved by assessing the performance of Catalan–Spanish bilinguals with varying neurodegenerative disorders in a bilingual Stroop task. Specifically, the study examined potential differences between two types of neurodegenerative disorders known to predominantly affect cortical brain areas – Mild Cognitive Impairment (MCI) and Alzheimer's disease (AD) – and Parkinson's disease (PD), which is recognized for its impact on subcortical areas (basal ganglia) crucially involved in language control. The findings revealed that AD and MCI patients, but not PD patients, exhibited a more pronounced interference effect compared to healthy controls. However, both patient groups demonstrated a similar facilitation effect as observed in healthy controls. Contrary to the initial hypothesis, interference suppression was impaired in neurodegenerative conditions affecting more cortical regions (MCI and AD), while it remained unimpaired in subcortical conditions such as PD. These results carry implications for neural models of bilingualism and shed light on cognitive mechanisms related to interference suppression, including attentional control and conflict resolution.

Gray et al. (2024) investigated the outcomes of naming therapy in a Russian–English bilingual patient with post-stroke aphasia, employing a novel and theoretically grounded training approach called BABSANT (Bilingual Abstract Semantic Associative Network Training). The underlying hypothesis of the naming training suggests an interaction between language dominance and language control, two factors influencing cross-language generalization effects in bilingual aphasia rehabilitation. The results indicated that training abstract words in the non-dominant language (English) facilitated both within- and cross-language generalization, while no significant training effect was observed when treating the dominant language (Russian). Since the patient exhibited preserved cognitive control abilities (inhibitory control and switching), the authors interpreted the findings as spreading activation within the lexico-semantic system. These results underscore the importance of considering non-linguistic factors in the rehabilitation of bilingual individuals with aphasia and also contribute to the theoretical debate on the relationship between linguistic and non-linguistic control in speech production.

In a similar vein, Scimeca et al. (2024) delved into the impact of crucial parameters in Semantic Feature-Based Treatments (SFTs) on treatment outcomes for bilingual patients with aphasia. The study specifically targeted naming improvement in Spanish–English bilinguals, examining various factors at the intervention, individual, and stimulus levels. First and foremost, the study results affirmed the effectiveness of SFTs in enhancing naming abilities for both treated and untreated items. Notably, the observed improvements were attributed to intervention-level factors, with larger effects when the dominant language was the focus of

intervention, along with some instances of cross-language generalization. At the individual level, the baseline naming performance emerged as a significant predictor of therapy outcomes. On the stimulus level, certain linguistic variables of the lexicon (e.g., frequency) and phonology were identified as significant predictors of naming progress over time. The multi-level approach employed in this study provides crucial insights into key considerations when treating bilingual individuals, optimizing the benefits of naming therapy. Additionally, these findings hold relevance for cognitive models of lexical retrieval and the predictions that can be derived from them in patients grappling with naming deficits.

The second series of three papers focuses on the cognitive and neural effect of bilingualism in patients with neurodegenerative diseases, such as MCI and the spectrum of Frontotemporal dementia (FTD).

Voits et al. (2024) investigated the impact of bilingual language experience using structural brain data on neurocognitive outcomes in Catalan–Spanish bilinguals. In contrast to earlier studies, the authors observed that bilingualism did not influence the age of onset of Mild Cognitive Impairment (MCI) symptoms and diagnosis. Furthermore, the bilingual experience did not emerge as a significant predictor of cognition, specifically memory performance. However, the study revealed a non-linear effect of bilingual language experience on hippocampal volume. Notably, individuals with mid-range levels of bilingual engagement exhibited the highest hippocampal volumes, while those with a more balanced language use demonstrated smaller volumes. This U-shaped pattern is interpreted in terms of neuroplastic efficiency, suggesting that hippocampal volume returns to a certain baseline in the brain after a certain level of bilingual language engagement, because extensive bilingual language processing leads to an automatization of cognitive control processes. These findings offer a fresh perspective on research by emphasizing the non-linear effects of the bilingual experience on brain areas related to disease. Additionally, the study underscores the importance of considering the bilingual continuum rather than relying on the traditional comparison between bilinguals and monolinguals.

In another paper, de Leon et al. (2024) revealed that bilingualism did not correlate with a delay in the age of disease onset among Frontotemporal Dementia (FTD) patients in a large retrospective analysis of monolingual and bilingual PPA individuals. Drawing on prior research on cognitive reserve in individuals with neurodegenerative diseases, the authors predicted that bilingual patients with behavioral variant FTD would exhibit delayed symptom onset compared to monolinguals. Additionally, they hypothesized that bilingualism would not emerge as a significant predictor of the age of onset for the language variants of FTD (nonfluent/agrammatic or semantic variant primary progressive aphasia). While the follow-up results were nuanced, the potential explanations for this lack of effect stem from the unique characteristics of the sample, diverging from clinical populations examined in previous studies. The higher educational levels of their patients and the sociocultural influences of their U.S.-based sample may have modulated the impact of bilingualism, contrasting with other bilinguals studied in countries like India. These findings underscore the intricate nature of the effects of bilingual experience within the framework of cognitive reserve and emphasize the role of the specific neurodegenerative disease in determining associated benefits.

Finally, the paper by Gallo and Abutalebi (2024) provides a comprehensive overview of the protective role of bilingualism in the aging process, offering a novel perspective to situate the effects of bilingualism within the context of cognitive reserve. Following a thorough review of existing literature, the authors emphasize the impact of methodological variability across studies in explaining the inconsistencies observed in results either favoring or opposing bilingualism as a protective factor against cognitive decline. Furthermore, they underscore the need for a more precise theoretical framework to elucidate the underlying mechanisms associated with the positive effects of bilingualism on cognition. This involves a shift from the traditional focus on inhibition to a new perspective centered around the attentional control system. Additionally, the authors delve into the interplay between bilingualism and other sociodemographic factors (such as education), emphasizing their impact in enhancing protection against cognitive decline. Finally, in the key section of their contribution, they discuss conceptual reasons and experimental evidence supporting the claim that bilingualism not only acts as ONE lifestyle factor contributing to cognitive reserve accrual, but it also presents UNIQUE characteristics among all reserve contributors.

In conclusion, this series of articles constitutes a significant contribution to the field of bilingualism, addressing both language and cognition in a variety of clinical populations. Because the topics of bilingual language processing, cognitive control, and cognitive reserve are emerging topics in bilingual neurological populations, the papers in this special issue provide important contributions in this regard. The exploration of bilingual individuals with brain damage is especially crucial given the expected demographic changes we are likely to encounter in the future. Beyond the evident clinical relevance of these contributions, the findings across all papers in this special issue bear substantial theoretical implications for the neural and cognitive models of bilingualism. The inclusion of research with patients is deemed essential, complementing studies with healthy individuals and providing a necessary perspective to unravel the nature of the relationship between bilingualism, language, and cognition. Ultimately, these papers will pave the way for future work in the field of clinical aspects of bilingualism research in adults.

References

- Calabria, M. (2024). Cross-language interference in bilinguals with neurodegenerative disorders. *Bilingualism: Language and Cognition*, 1–12.
- de Leon, J., Grasso, S. M., Allen, I. E., Escueta, D. P., Vega, Y., Eshghavi, M., Watson, C., Dronkers, N., Gorno-Tempini, M. L., & Henry, M. L. (2024). Examining the relation between bilingualism and age of symptom onset in frontotemporal dementia. *Bilingualism: Language and Cognition*, 1–13.
- Gallo, F., & Abutalebi, J. (2024). The unique role of bilingualism among cognitive reserve-enhancing factors. *Bilingualism: Language and Cognition*, 1–8.
- Gray, T., Palevich, J., & Sandberg, C. (2024). Bilingual Abstract Semantic Associative Network Training (BAbsANT): A Russian–English case study. *Bilingualism: Language and Cognition*, 1–17.
- Scimeca, M., Peñaloza, C., & Kiran, S. (2024). Multilevel factors predict treatment response following semantic feature-based intervention in bilingual aphasia. *Bilingualism: Language and Cognition*, 1–17.
- Voits, T., Rothman, J., Calabria, M., Robson, H., Aguirre, N., Cattaneo, G., Costumero, V., Hernández, M., Puig, M. J., Marín-Marín, L., Suades, A., Costa, A., & Pliatsikas, C. (2024). Hippocampal adaptations in Mild Cognitive Impairment patients are modulated by bilingual language experiences. *Bilingualism: Language and Cognition*, 1–11.