Lexical Retrieval in Bilinguals with Traumatic Brain Injury: A Neurocognitive Synthesis of Age of Acquisition, Pre-Injury Language Dominance, and Cross-Linguistic Access Patterns

Mina Shirafkan[1*], **Mohammad Hadi Mahmoodi**[2]

1. PhD Candidate in Teaching English as a Foreign Language (TEFL), Bu-Ali Sina University, Hamedan, Iran
2. Bu-Ali Sina University, Hamedan, Iran

Abstract

While models neglect age of acquisition (AoA), pre-injury dominance, and executive control interactions, lexical retrieval deficits are prevalent in bilingual traumatic brain injury (TBI). Switching and inhibition are disrupted by frontoparietal damage. In order to model reorganization and direct bilingual rehabilitation, this synthesis brings together behavioral, ERP, and fMRI data from 46 studies (2010–2024) concerning Persian-English, Spanish-English, and Mandarin-English bilinguals. We examined peer-reviewed papers on adult bilingual TBI with lexical measures published in neuroscience and bilingualism journals between 2004 and 2023 using narrative synthesis. Sources: more than fifty studies (e.g., Dash et al., 2022; Ansaldo, 2014) organized by modality, lesion site, dominance, and AoA. Non-TBI and non-bilingual people without AoA or dominance are excluded; they are incorporated through models of adaptation, BIA+, and inhibitory control (Green, 1998; Dijkstra & Van Heuven, 2002; Kiran et al., 2013). Predictors were matrix aligned to questions about deficits, effects, and profiles. Prolonged latencies, disruptions, and distortions are asymmetric deficits associated with bilingual TBI; these deficits are worse in the dominant L2 for late acquirers with IFG/STG lesions (DeLuca et al., 2019; Grasemann et al., 2021). Bilateral access remains intact by early bilinguals; dominance reversals emerge through plasticity (Barbancho et al., 2015). Theta desynchronization, N400/P600 delays, as well as code-blending from ACC/DLPFC/caudate hypoactivation, are all consequences of control deficits (Dash et al., 2022; Hula et al., 2020) —frontal clustering of lesions (Ryan et al., 2016). Dominance and AoA dynamically modify TBI lexical access, increasing late L2-dominant vulnerabilities through control damage while enhancing early bilingual resilience. Apply language history to customize rehabilitation, and use ERP/fMRI to track results. This fosters experience-dependent models that go beyond monolingual perspectives.

Keywords: Age of acquisition, Bilingualism, Lexical access, Neuroplasticity, Traumatic brain injury

Email: M.shirafkan@ltr.basu.ac

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