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Authors

Shen, Ye

Del Tufo, Stephanie

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Functional Connectivity Differences between Trilinguals and Bilinguals: The Role of Orthographic Depth

Ye Shen

University of Delaware, Newark, Delaware, United States

Stephanie Del Tufo

University of Delaware, Newark, Delaware, United States

Abstract

Orthographic depth, the consistency of grapheme-phoneme correspondence, influences brain activation in multilinguals' first (L1) and second language (L2). The intrinsic functional connectivity of cross-language transfer was investigated between two groups of multilinguals, those whose L2 orthography is deeper than their L1 (S-to-D group) and those whose L2 orthography is shallower than their L1 (D-to-S group). We focused on two seed regions: the Visual Word Form Area (VWFA) and the left posterior supramarginal gyrus (pSMG). Stronger connectivity was found between the left pSMG and the right precuneus in multilinguals who spoke at least three languages (trilinguals) compared to those who only spoke two languages (bilinguals). Follow-up analyses revealed that this difference was driven by stronger intrinsic connectivity in D-to-S trilinguals compared to the S-to-D trilinguals. Multilinguals' intrinsic functional connectivity is shaped by the orthographic distance between L1 and L2, as well as differences between bilingualism and trilingualism.