Implicit statistical learning as a function of multiliteracy

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Decades of research have investigated the influence of bilingualism on cognition, with a focus on executive functions (EF; Peal & Lambert, 1962; Duñabeitia et al., 2014; Poarch & van Hell, 2012). However, EFs are higher-order functions that must be built upon the rudimentary ability to extract patterns from input strings and form complex structures. This ability - implicit statistical learning (ISL), is a domain-general cognitive function that enables us to use statistical properties of input to detect hidden regularities and in turn modify our behaviours in an adaptive way (Erickson & Thiessen, 2015), yet little is known about how language experiences with its varying statistical properties influence ISL. More specifically, it is less understood how multilingualism and literacy in orthographies of varying transparency might affect the learning of statistical regularities. 111 multilinguals were divided into three groups: English-Malay bilinguals, English-Malay-Arabic trilinguals and English-Malay-Chinese trilinguals. These languages differ in orthographic transparency; with Arabic and Malay being more transparent than English, and Chinese being the most opaque. We assessed ISL using a serial reaction time methodology. Subjects were presented with a binary sequence that is embedded with superficial as well as increasingly more opaque regularities that can only be extracted by detecting non-local dependencies. The results show that all subjects improved in accuracy and reaction times across seven experimental blocks, suggesting that they became increasingly sensitive to the structure of the input and were able to predict the items with greater efficiency. Interestingly, the results did not show a trilingual advantage. The analyses of most of the regularities show that the English-Malay bilinguals displayed comparable performance with the trilingual (Chinese) group, and the trilingual (Chinese) group outperformed both the bilingual and trilingual (Arabic) group. These findings suggest that knowing more languages may not necessarily confer benefits in ISL. Rather, literacy in opaque orthographies which have more complex relations amongst its units is associated with better performance in detecting statistical regularities.

Keywords: implicit statistical learning, multilingualism, multiliteracy

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