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A comparison of working memory profiles in HIV-infected and HIV-exposed uninfected children

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Abstract

Conventional psychometric measures, such as the IQ score, have significant limitations in addressing the assessment needs of linguistically and culturally diverse communities. In response, working memory assessment has been identified as a promising alternative to these constraints. It is a better predictor of scholastic success than IQ, and is essential in the acquisition of fundamental literacy and numeracy concepts in school beginners. While there is a lot of theoretical and empirical support for working memory performance in typically developing populations, less is known about its functioning in the context of atypical development; particularly in children who are infected with, or exposed to HIV in utero. This study compared the working memory (AWMA) and general neuropsychological functioning (NEPSY-II) of 273 South African school beginners (6-8 years). The sample consisted of both HIV-infected (n = 95), and HIV-exposed (n = 86) children, as well as an uninfected, unexposed typically developing control group (n = 92). Significant differences were found between the three groups on measures of working memory and general neurocognitive functioning, where the processing component of working memory appeared to be particularly impaired in the two HIV-affected atypical groups. A within-group analysis of the relative strengths and weaknesses of each of the three groups showed that both storage and processing skills in the verbal domain appeared to be general weaknesses, while visuospatial working memory was a relative strength. The former is believed to be influenced by issues of linguistic test bias in the multilingual sample, while the latter is posited to be a consequence of this very multilingualism, which affords these children an executive functioning advantage. The two HIV-affected samples also showed significant deviations in the structure of their working memory when compared to the typically developing control group. However, within-group structural comparisons of a number of working memory models showed that the four factor model comprising separate components of the verbal and visuospatial simple and processing components of working memory was still favoured, even in conditions of atypical development. The study contributes to the growing body of working memory research by presenting the working memory profiles of HIV-infected and HIV-exposed, uninfected children. It also assists in identifying HIV-exposed, uninfected children as a vulnerable and under-researched clinical group which could benefit from further intervention, as well as foregrounding working memory as a less biased alternative in the assessment of paediatric cognitive functioning.

Keywords: working memory, HIV-infected, HIV-exposed uninfected, neurodevelopment, children.