Abstract

The current study aims to explore the role of working memory in developmental dyslexia, in terms of deficit of working memory capacity (WMC) in developmental dyslexia, relationship of WMC and reading fluency among dyslexic children and normal children, and the gender difference of WMC. Hong Kong students of primary two and three (n=47) with and without dyslexia were tested for WMC and other literacy measures. The n-back task is used to test the WMC by varying the difficulty level (one-back and two-back) and task type (verbal and non-verbal stimuli); the accuracy, d'prime—a score which takes into account for target and non-target accuracy, and reaction time (RT) were recorded for analysis. Results showed a greater drop in accuracy and d'prime from one-back to two-back task for non-verbal task than verbal task, and a greater increase in RT from one-back to two-back task for verbal task than non-verbal task. Dyslexics showed a different pattern of RT in the verbal and non-verbal task, where controls performed with a shorter RT for verbal than non-verbal task across different difficulty levels, while dyslexic showed longer RT for verbal than non-verbal task in the two-back task. The overall WMC accuracy was correlated with reading fluency significantly different in the two groups, where dyslexics showed a stronger correlation than control children. Male participants showed a greater drop in accuracy and d'prime score than female participants when increasing level of difficulty from one-back to two back. This study showed that there is a deficit in verbal WMC in dyslexic children compared to normal children, the WMC plays a critical role in reading fluently for dyslexic children, and the higher prevalence of dyslexia in male than female may be related to gender difference in verbal WMC abilities.

Keywords: Dyslexia, Working memory, n-back task, gender difference