
Cognitive benefits of acquiring more than one language

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Abstract

Most studies show that bilinguals do not differ from monolinguals only in language competence. The simultaneous activity of two languages requires activation of a cognitive control mechanism for keeping the languages separate so that performance in one language can be achieved without intrusions from the other language which is not currently in use. An important cognitive mechanism that has been consistently linked to cognitive control is working memory. Working memory includes structures and processes associated with the storage and processing of information over short periods of time. It is considered to be one of basic executive functions involved in language planning and processing (Baddeley, 1986). Studies done so far have shown a positive impact of bilingualism on working memory in children (Bialystok et al., 2008; Morales et al., 2013).

The aim of this study was to determine whether attendance in immersion programs of second language acquisition has a similar effect on working memory in order to shed light on whether second language learners show the same cognitive enhancement as bilinguals. Recent studies done on this topic are controversial. Some studies came out with data that monolinguals in an immersion program performed significantly better than their monolingual peers on different tasks assessing attentional and executive skills (Nicolay & Poncelet, 2013). Other studies, however, showed benefits in cognitive control only for bilinguals, but not for second-language learners (Poarch & Van Hell, 2012).

A total of 63 children mean aged 7 years 11 months (SD=7 months) were included in the sample, 22 in the monolingual group, 17 in the bilingual group and 24 in the group of second-language learners (L2 group). All children in the bilingual group were simultaneous bilinguals, while the L2 group consisted of children who had been included in an immersion program of second language acquisition for one year within a regular elementary school. All participants met the following inclusion criteria: intellectual abilities between the 25th and the 90th percentile on the Raven's Colored Progressive Matrices, normal hearing, normal or corrected vision, and no history of neurological disorders, behavioral problems, or any other psychopathological issues. Two nonverbal working memory tasks were individually administered to all children – the counting recall task and the backward digit span task. Both tasks require simultaneous processing and storing of information, with the number of items to be remembered increasing progressively over successive blocks containing four trials each. In order to proceed to the next block participants must correctly recall three out of four trials.

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The data was analyzed using a multivariate analysis of covariance, with group membership as the independent variable, two working memory tasks as dependent variables and age and intelligence as covariates. Significant group differences emerged on both the counting recall and the backward digit span tasks ($F(2,58)=3.796$, $p=.028$ and $F(2,58)=3.222$, $p=.047$, respectively). Contrast analyses revealed that the bilingual group outperformed the other two on both tasks, while the L2 group did not significantly differ from the monolingual group. Furthermore, the results showed a significant positive contribution of intelligence on performance on the counting recall task ($F(1,58)=6.624$, $p=.013$).

The results presented in the current study add to the growing body of evidence demonstrating the benefits of bilingualism on working memory task performance. However, attendance in the immersion program of second language acquisition did not prove to have beneficial effect on performance on working memory tasks. Bearing in mind that our sample had only been exposed to the immersion program for one year, it is possible that this period of exposure was too short to produce significant effects. Further studies are needed in order to better assess how intensively and for how long the children in second language acquisition programs need to be immersed for significant effects on working memory to emerge.

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