The effect of one year of second-language immersion school program on cognitive development

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The ability to master different languages has been positively linked to advantages in measures assessing attentional or/and executive skills (Adesope, Lavin, Thompson & Ungerleider, 2010). These positive effects have been observed in different types of populations : elderly, adults and children. An increased number of studies have investigated these aspects in early and/or simultaneous bilinguals but very few have tried to assess children learning in a second language immersion school program. While some of these studies found no advantages after 6 month of immersion (Carlson & Meltzoff, 2008), others observed an advantage after 8, 20 months (Kalashnikova & Mattock, 2014) and 3 years (Nicolay & Poncelet, 2013 ; 2015) of immersion in comparison to monolinguals. In this last study, immerged children (English) outperformed monolinguals in selective attention, divided attention and flexibility. We used the same tasks to assess children enrolled in a Dutch immersion school for one year.

THIS STUDY

The purpose of the present study was to determine if children enrolled in a Dutch immersion program for one year outperform monolinguals in tasks assessing different executive functions (EF).

METHODS

Immersion group

- 40 French-speaking children
- Grade 1 (6 years old)
- Attend Dutch immersion classes since kindergarten (K3)

Control group

- 37 French-speaking children
- Grade 1 (6 years old)
- Attend monolinguals classes

Two groups matched on:

- age
- sociocultural level
- sport practice
- processing speed
- nonverbal reasoning
- verbal intelligence

Material

Experimental tasks :

- Selective auditory attention
- Divided attention
- Flexibility – verbal modality (V) & non verbal (NV)
- Inhibition – NV & V (+ semantic traits)
- Working memory

RESULTS

The results showed no significant group differences in any of the executive and attentional measures applied .

Table 1. **Comparison between the two groups on attentional and executive tasks**

Tasks	Monolinguals	Immerged	T Student
Selective attention			
- CR	15,9 (2,5)	16,2 (3,2)	-0,37 *(ns)*
- TR	884,3 (2,5)	899,9 (3,2)	-0,43 *(ns)*
Divided attention			
- CR	32,1 (4,3)	31,3 (5,8)	0,72 *(ns)*
- TR	798,0 (104,9)	849,7(130,9)	-1,9 *(ns)*
Inhibition (V)			
- NCM	0,9 (1,2)	0,9 (1,2)	0,07 *(ns)*
- TR	72,7 (14,1)	71,6 (15,7)	0,64 *(ns)*
Inhibition (NV)			
- CR	34,4 (5,5)	35,0 (3,9)	-0,56 *(ns)*
- TR	522,8 (130,3)	541,5 (129,4)	-0,69 *(ns)*
Flexibility (V)			
- NCM	1,8 (1,7)	2,5 (2,2)	-1,48 *(ns)*
- TR	93,5 (38,7)	99,8 (28,7)	-0,81 *(ns)*
Flexibility (NV)			
- CR	39,2 (6,0)	39,8 (5,3)	-0,42 *(ns)*
- TR	1272,2 (283,8)	1364,3 (276,6)	-1,44 *(ns)*
Working memory			
- CR *(empan)*	5,8(1,3) *(3)*	5,5(0,0) *(3)*	1,06 *(ns)*

CR = correct response ; NCM = non corrected mistakes; TR = time response ; ns = non significative

CONCLUSION

After one year of school immersion in Dutch, no cognitive advantage seems to be observed for the immerged children. We hypothesised that the level of mastery of Dutch is not yet sufficient after one year of linguistic immersion in order to develop enhanced control attention skills.

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