

# Exploration of attentional control abilities in children frequenting a Dutch-language immersive school program

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## Introduction

- **Exposure to two languages** has been proposed to positively affect the executive and attentional functioning (Bialystok et al., 2004)
- Cognitive advantages were also found for children attending **English immersion classes** (Nicolay & Poncelet, 2013; 2015)
- However, the current literature suggests that the potential benefit of bilingualism on attentional control may not be as consistent as previously thought (Ross & Melinger, 2016)

## Aims

1. **Extending the results of Nicolay and Poncelet (2013; 2015)** in a group of children attending a **Dutch-language immersive school program**
2. Examining **when and how** a cognitive advantage emerges over the course of bilingual education.

## Methods

### Participants

- 157 children attending a **Dutch immersion program (I)**
- 156 children attending a **traditional school program (NI)**

Table 1. Number of participants in each Grade and language Group (I/NI)

Grade 1 (n = 106)		Grade 2 (n = 108)		Grade 3 (n = 99)	
NI (n=53)	I (n=53)	NI (n=55)	I (n=53)	NI (n=48)	I (n=51)

- The 2 groups were matched on grade, age, sex ratio, socio-economic level, non-verbal and verbal intelligence measures.

### Tasks

Tasks from Nicolay and Poncelet (2013; 2015) were used :

- **Alerting**
  - **Selective auditory attention**
  - **Divided attention**
  - **Cognitive flexibility**
- Kitap battery  
(Zimmermann, Gondan, & Fimm: French adaptation by Leclercq, 2005).

## Results

ANOVA on the different tasks, with grade (1,2,3) and program type (I vs. NI) as a between-participants variable revealed:

- a **significant main effect of grade** for all tasks
- **no effect for type of program** (I vs. NI) and no interaction
- Bayesian ANOVA **provided evidence for the absence** of a type of program effect (I vs. NI).

Table 2. BF01 for Bayesian ANOVA on alerting, selective auditory attention, divided attention and cognitive flexibility measures

Variable	Model	BF01	error %
Alerting (RT)	<b>Group effect (I or NI)</b>	<b>6.909</b>	1.479e -5
	Grade effect (Grade 1-2-3)	2.768e -5	0.018
	Group + Grade effects	1.724e -4	5.198
	Group + Grade effects + Group * Grade effect	0.002	3.647
Selective auditory attention (RT)	<b>Group effect (I or NI)</b>	<b>7.236</b>	1.569e -5
	Grade effect (Grade 1-2-3)	1.271e -9	0.009
	Group + Grade effects	5.272e -5	1.788
	Group + Grade effects + Group * Grade effect	2.487e -5	1.676
Divided attention (RT)	<b>Group effect (I or NI)</b>	<b>5.503</b>	1.100e -5
	Grade effect (Grade 1-2-3)	9.813e -6	0.019
	Group + Grade effects	18701.659	1.655
	Group + Grade effects + Group * Grade effect	39951.928	2.687
Cognitive flexibility (RT)	<b>Group effect (I or NI)</b>	<b>1.861</b>	2.538e -6
	Grade effect (Grade 1-2-3)	6.404e -15	0.012
	Group + Grade effects	6.841e -15	1.810
	Group + Grade effects + Group * Grade effect	3.287e -14	1.855

## Discussion

- **This study did not reveal a cognitive advantage of immersive language learning (Dutch-language immersive program)** on tasks evaluating attentional control
- The results are in opposition with those observed by Nicolay & Poncelet (2013; 2015) for an English immersion program in 3rd grade
  - Influence of the **nature of L2** (Dutch/English) ? Role of **contextual factors** (total duration of exposure to and usage of L2 in a school setting? motivational ones) ?

**In conclusion, our results suggest that L2 immersion does not necessarily lead to a cognitive advantage at the level of attentional control.**

## References

- Bialystok, E., Craik, F.I.M., Klein, R., Viswanathan, M. (2004). Bilingualism, aging, and cognitive control: Evidence from the Simon task. *Psychology and Aging, 19*, 290-303.
- Nicolay, A.-C. & Poncelet, M. (2013). Cognitive advantage in children enrolled in a second-language immersion elementary school program for 3 years. *Bilingualism: Language and Cognition, 16*, 597-607.
- Nicolay, A.-N. & Poncelet, M. (2015). Cognitive benefits in children enrolled in an early bilingual immersion school : a follow-up study. *Bilingualism: Language and Cognition, 18*, 789-795
- Ross, J. & Melinger, A. (2016). Bilingual advantage, bidialectal advantage or neither? Comparing performance across three tests of executive function in middle childhood. *Developmental Science, 1*-21.