Cognitive predictors of early second-language acquisition in children attending Dutch immersion school programs

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INTRODUCTION

Nicolay and Poncelet (2013) showed that some phonological processing abilities (nonword repetition and speech perception, but not phonological awareness) appeared to underlie second-language (L2) vocabulary acquisition in the context of an early **English** (L2) immersion school program, at least during the first steps of acquisition. Similarly, among the assessed attentional/executive skills in the study of these authors, auditory selective attention and flexibility, but not response inhibition, appeared to be involved during the first steps of L2 vocabulary acquisition in such an immersion school context.

To the best of our knowledge, no information is available to determine to what extent these different cognitive abilities might also been implicated in the acquisition of L2 vocabulary in the specific context of early **Dutch** language immersion school programs.

AIM OF THE STUDY

- to determine to what extent phonological abilities (STM, phonological awareness, speech perception) and executive/attentional skills (auditory selective attention, flexibility and inhibition) underlie Dutch vocabulary development in children involved in early L2 immersion school programs
- to precise the type of STM processing (STM for item or for order) (see Majerus & Boukebza, 2012) involved in vocabulary development of these children

METHOD

PARTICIPANTS

- 39 French-speaking children attending the third year of kindergarten (K3) in immersion schools at the beginning of the study
- Mean age : 63 months (57-68)
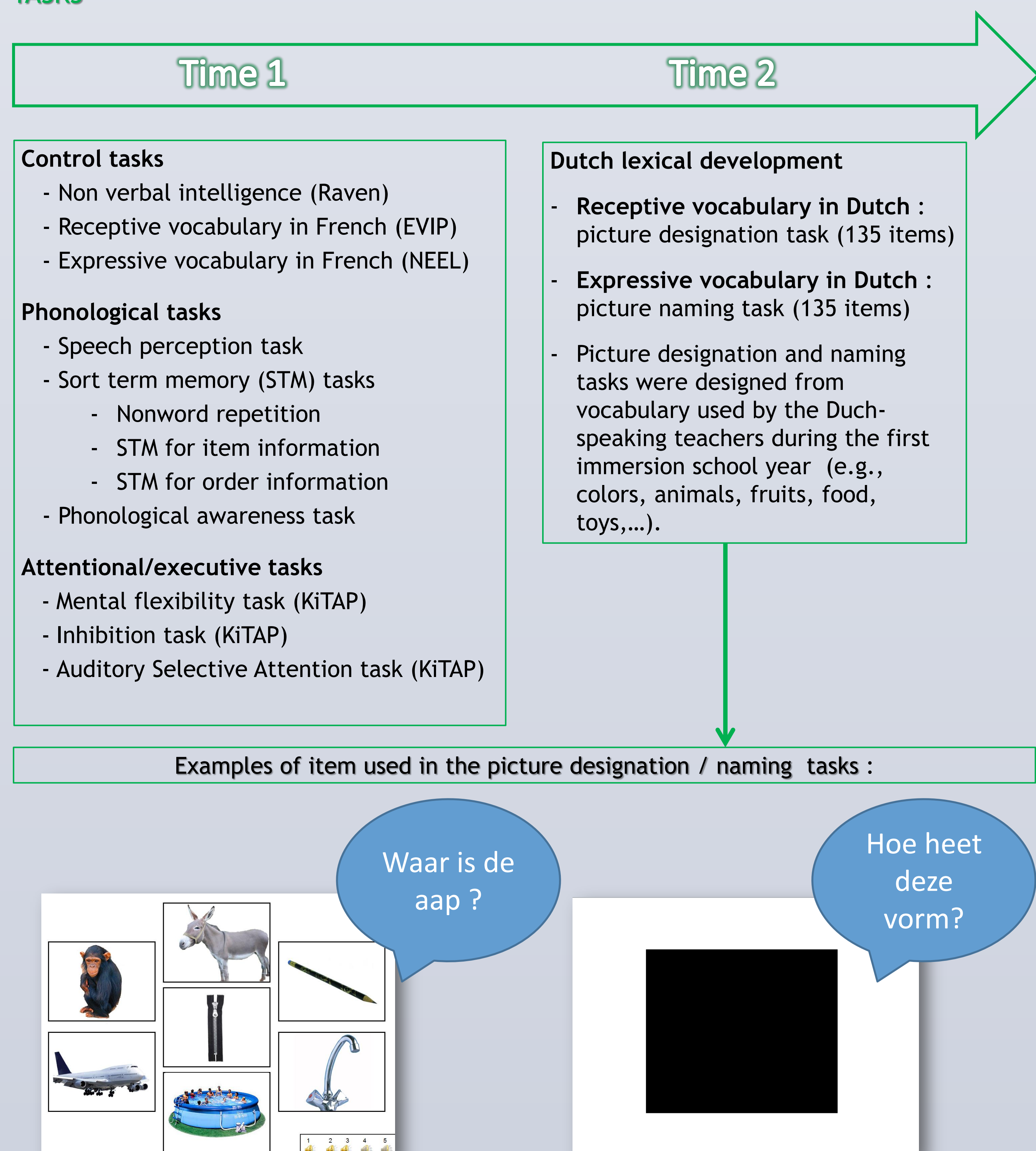- Immersion type : 75 % Dutch – 25% French

PROCEDURE

Longitudinal design :

Time 1 (beginning of K3) :
- measures of phonological and attentional/executive abilities;
- control measures of non verbal intelligence and vocabulary knowledge in French

Time 2 (end of K3) :
- measures of lexical acquisition in Dutch after 8 months in immersion classes

TASKS

Time 1 ➞ Time 2

Control tasks
- Non verbal intelligence (Raven)
- Receptive vocabulary in French (EVIP)
- Expressive vocabulary in French (NEEL)

Phonological tasks
- Speech perception task
- Sort term memory (STM) tasks
  - Nonword repetition
  - STM for item information
  - STM for order information
- Phonological awareness task

Attentional/executive tasks
- Mental flexibility task (KiTAP)
- Inhibition task (KiTAP)
- Auditory Selective Attention task (KiTAP)

Dutch lexical development
- **Receptive vocabulary in Dutch :** picture designation task (135 items)
- **Expressive vocabulary in Dutch :** picture naming task (135 items)
- Picture designation and naming tasks were designed from vocabulary used by the Duch-speaking teachers during the first immersion school year (e.g., colors, animals, fruits, food, toys,…).

Examples of item used in the picture designation / naming tasks :

Waar is de aap ?

Hoe heet deze vorm?

RESULTS

Correlations between the different variables assessed at $\underline{T1}$ and Dutch vocabulary development at $\underline{T2}$ (only significant correlations are shown)

T1 ↓	Dutch expressive voc (T2)	Dutch receptive voc (T2)
Age	.32*	
Non verbal intelligence		.35*
French expressive vocabulary	.32*	
Nonword repetition	.33*	
Serial Order STM	.55***	.34*
Auditory Selective Attention (CR)	.39*	
Mental Flexibility (errors)	-.44**	-.47**

(*p<.05, ** p<.01, *** p<.001)

Hierarchical regression analyses predicting Dutch vocabulary development using phonological abilities and attentional/executive skills as predictors (only independent predictors are shown)

	Dutch expressive voc Δ R^2	Dutch receptive voc Δ R^2
Age	.104*	
Non verbal intelligence		.120*
Serial Order STM	.089*	
Auditory Selective Attention	.107*	
Mental Flexibility (errors)		.092*

(*p<.05)

DISCUSSION

This study shows that, among the phonological and executive-attentional abilities assessed, STM for serial order and auditory selective attention appears to be independent predictors of Dutch expressive vocabulary acquisition while mental flexibility abilities seems to be involved in Dutch receptive vocabulary acquisition, at least during the first steps of vocabulary develoment in a context of immersion school programs.

Furthermore, age and non verbal intelligence appears also to be involved in Dutch vocabulary acquisition in this context.

In conclusion, these results suggest that the cognitive predictors may be only partially similar for English and Dutch vocabulary acquisition in the context of linguistic immersion school programs.

REFERENCES

Majerus, S., & Boukebza, C. (2012). Short-term memory for serial order supports vocabulary development: New evidence from a novel word learning paradigm. *Journal of Experimental Child Psychology, 116,* 811-828.

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