

Working Memory and Language Learning: A Longitudinal Study of Trilingual Children

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1. Background

Working memory (WM) – the ability to store and manipulate information in the course of ongoing cognitive activities - has been suggested to play a key role in supporting learning in many different domains. This study presents the findings of a 4-wave, latent variable longitudinal study, exploring variations and the development of two working memory components - verbal short-term storage (STM) and the central executive - and their contributions to native and foreign language learning in a population of multilingual children.

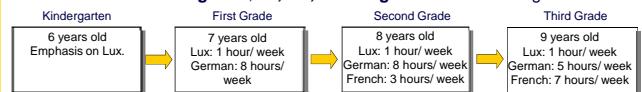
2. Method

Summary

Central executive, verbal short-term storage, and native and foreign language acquisition were investigated longitudinally in a population of children growing up in Luxembourg (EU) - a country in which Luxembourgish is mainly used in social interactions, and German and French are instructed in schools.

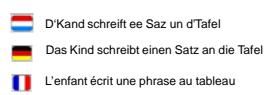
Participants

103 Luxembourgish speakers with both parents speaking Luxembourgish. Children were assessed in kindergarten, 1st, 2nd, and 3rd grade of Luxembourgish schools.



'Secondary bilinguals' - languages are learnt and socialised in the school situation

Language genealogy



Tasks

	K	1 st	2 nd	3 rd		K	1 st	2 nd	3 rd	
Central executive	Counting recall	X	X	X	-	Vocabulary	Expressive Lux	X	X	-
	Backw. digit recall	X	X	X	-		Expressive German	X	X	-
Short-term storage	Digit recall	X	X	X	-		Expressive French	X	X	X
	Nonword repetition	X	X	X	-		Receptive French	-	-	X

Analyses

Confirmatory Factor Analyses (CFA) to explore the underlying task structure - WM in kindergarten, 1st, and 2nd grade and language in 2nd grade.

Structural Regression (SR) models to explore the contribution of WM in kindergarten to language learning two (2nd grade) and three years (3rd grade) later.

6. Conclusion

The findings reinforce previous evidence indicating that verbal STM is one of the main contributors to language development by supporting the formation of stable phonological representations of new words in long-term memory. Importantly, the study showed that the early acquisition of an unfamiliar foreign language might draw on different underlying mechanisms than new word learning in a familiar second language. Whereas German might have been learned via a process of bootstrapping onto the secure knowledge base already established for the native language, French might not benefit in the same way from existing lexical knowledge as the phonological structure of French words is very different from words in Luxembourgish. French foreign language learning might therefore rely more heavily on basic cognitive processes such as verbal STM. The data supports the view that verbal STM is causally related to new word learning in French. Interestingly, French vocabulary was significantly predicted by only one of the verbal STM measures - nonwords repetition - suggesting that nonword repetition taps some specific skill that is not directly involved in conventional STM task. This finding has important practical implications as it highlights the potential utility of nonword repetition as a screening tool for detecting children at risk for future foreign language learning difficulties.

