Simultaneous Versus Sequential Second Language Acquisition: Empirically Testing Timing Effects

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Introduction

Bilinguals may acquire their languages in tandem (**simultaneously**) or one after the other (**sequentially;** Kohnert, 2010). The difference in **timing of acquisition** has consequences for their outcomes in both languages.

Prior studies have found better receptive language performance in simultaneous learners (Gross et al., 2014; Roesch & Chondrogianni, 2016) but compare simultaneous and sequential learners at a point where their language acquisition has **already occurred**. Patterns of acquisition are intertwined with a vast number of sociocultural factors, making it difficult to pinpoint the consequences of sequential vs simultaneous acquisition on language outcomes.

Although sequential and simultaneous second language acquisition cannot be randomly assigned in nature, experimental manipulations that mirror these environments are possible. The current study investigates the effect of timing (simultaneous vs. sequential) on one aspect of language acquisition - vocabulary learning.

Research Question

Does simultaneous or sequential L2 acquisition yield better vocabulary learning?

Participants

Adults ages 18-40 years with normal hearing who resided in the US were recruited through Prolific.

Exclusionary Criteria:

- Participants who reported intermediate or high proficiency in a language besides English, operationalized as self-reported speaking proficiency of 3 or higher on Language Experience and Proficiency Questionnaire (LEAP-Q)

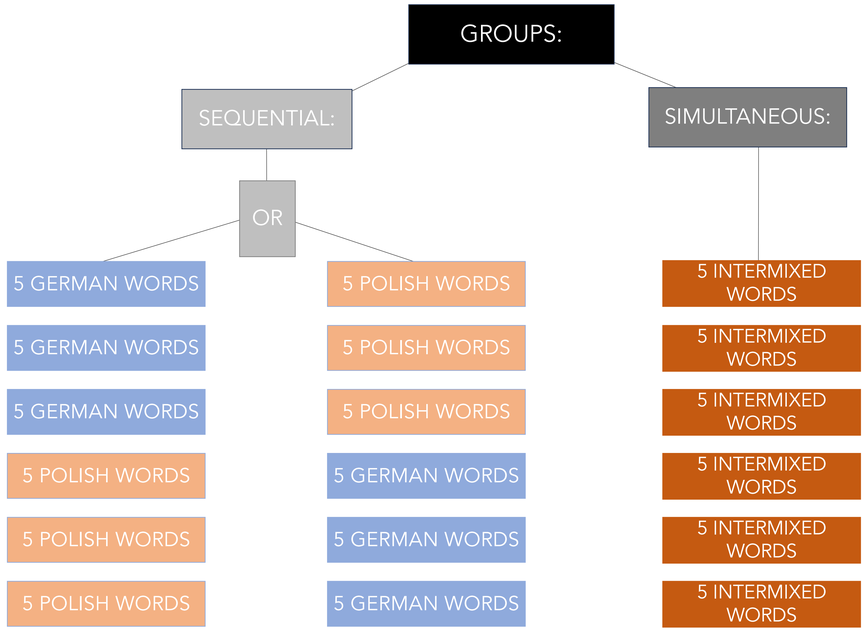
	Sequential (N = 46)	Simultaneous (N = 48)	P-value
	Mean (SD)	Mean (SD)	
Gender (Count)	20F, 24M, 2NB	20F, 26M, 1NB, 1NR	0.818
Age, years	31.9 (5.41)	31.5 (5.52) 1 NR	0.724
Total years of education	14.7 (2.57)	14.5 (2.53)	0.772
LexTALE score [1]	89.1 (10.5)	90.1 (9.59)	0.613
Nonverbal IQ, proportion items correct [2]	0.676 (0.160)	0.670 (0.176)	0.876
Self-rated English-speaking proficiency	9.67 (0.598)	9.85 (0.412)	0.094

[1] The Lexical Test for Advanced Learners of English (LexTALE) assesses medium-highly proficient L2 English speakers on vocabulary knowledge and has been use with L1 English speakers previously

[2] Derived from the Matrices subtest of the Kaufman Brief Intelligence Test, Second Edition

Experimental Design

- **Between-subjects** study conducted online.
- Participants were randomly assigned to either the sequential or the simultaneous condition.



Procedure

- The word-learning task consisted of 6 training blocks; each block first trained, then tested 5 new words.
- **Training:** Participants were auditorily presented with the word three times and shown its English translation on the screen.
- **Testing:** Participants heard the Polish or German word and chose between 4 multiple-choice options of its English translation equivalent.

"przypadek"

SAMPLE POLISH TRAINING SCREEN:

coincidence

"przypadek"

SAMPLE POLISH TESTING SCREEN:

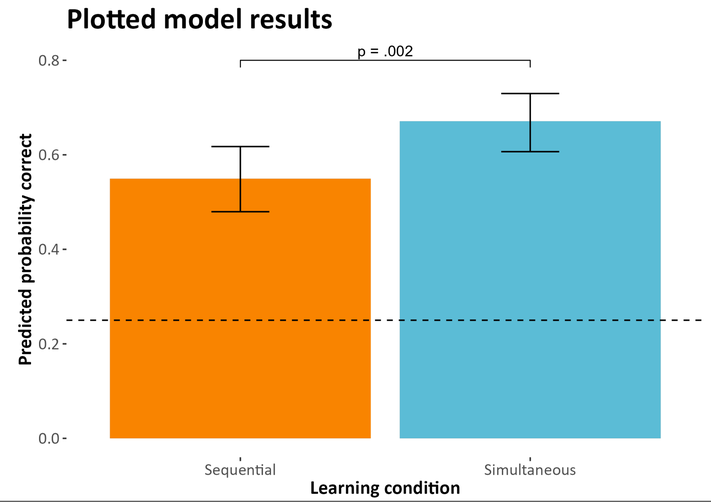
a) embarrassment
b) coincidence
c) custom
d) prospect

Stimuli

Participants were taught a total of 30 non-cognates in Polish and German (produced by native speakers).
Scan the QR code for the full list of stimuli:

Analyses & Results

- Analyzed item-level data via logistic regression in R with the LME4 package, accounting for subject- and item-level random effects
  - glmer syntax: accuracy (0 or 1) ~ condition (sequential or simultaneous) + years of education (continuous) + self-rated English-speaking proficiency (continuous) + LexTALE (continuous) + nonverbal IQ (continuous) + (1 I subject) + (1 +conditionII item)
- Significant effects of condition & nonverbal IQ (higher IQ associated with better learning)



Summary & Discussion

Our findings indicate that **simultaneous** exposure to novel words in Polish and German yielded better learning than **sequential** exposure. This is the first **experimental evidence** on advantages associated with simultaneous exposure and confirms prior quasi-experimental studies (Gross et al., 2014; Roesch & Chondrogianni, 2016).

Interleaving languages, as in simultaneous exposure, may optimize receptive vocabulary outcomes. However, we acknowledge the long road between basic science and practical applications of this finding. Future research will investigate the best timing sequence for language exposure for different aspects of second language acquisition (vocabulary vs. morphosyntax), in both children and adults..

Limitations:

- Unlike children who learn both languages from the ground up, participants in the present study had an **already established L1**.
- The participants in the present study experienced **massed word learning**, which contrasts with natural language learning. This may have caused cognitive overload, especially in the sequential condition.

Future Directions:

- Investigating the effect of rest on is critical as cognitive exhaustion may hinder task performance. Rest may be especially beneficial for the sequential condition (Zhang, 2013).
- By modifying stimuli to include earlier-acquired words, children could be tested using a similar procedure.
- Exploring implications and educational applications for bilingual children who acquire their two languages simultaneously vs. sequentially.

Acknowledgements

We thank our participants and members of the Language Acquisition and Bilingualism Lab for making this research possible. This project was supported by the Hilldale Undergraduate Award (SS) and Oros Bascom Professorship (MK).