

An Investigation of Switching Cost through Lexical Decision Task



Qian Zhou; Nan Jiang, PhD

University of Maryland, Department of Second Language Acquisition

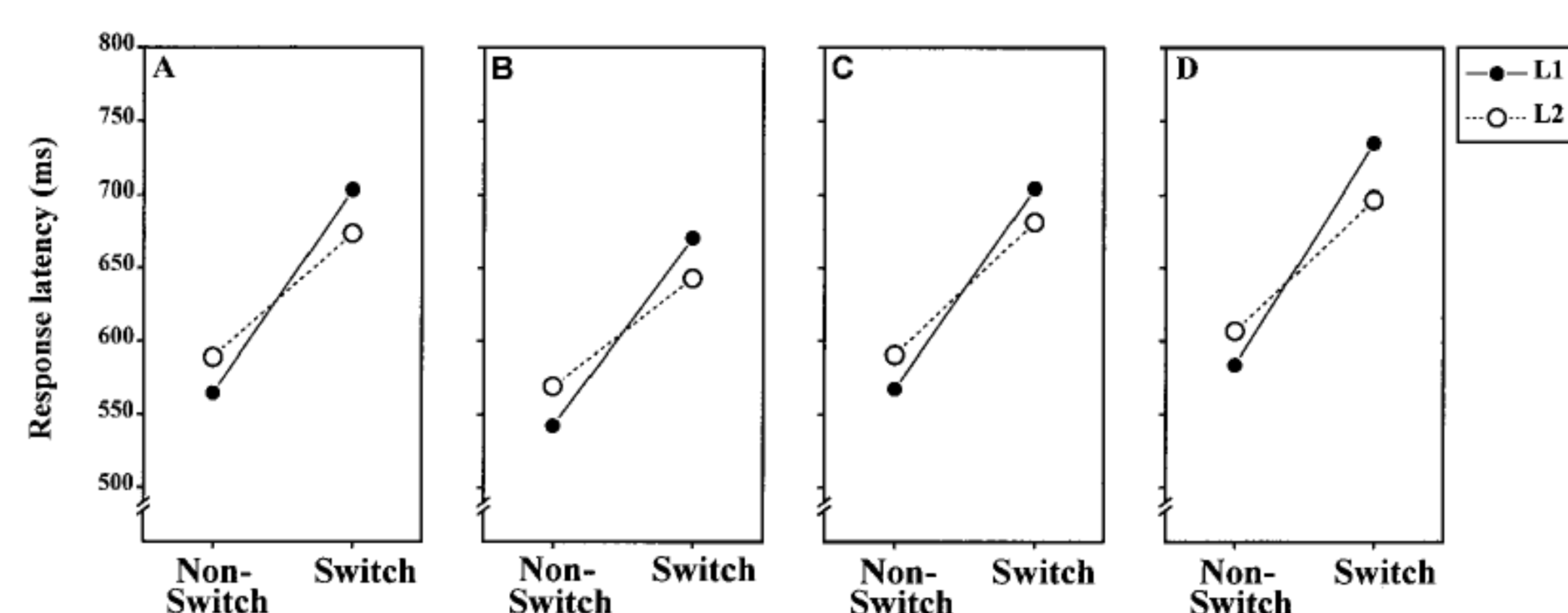
Abstract

While a “paradoxical” asymmetry in the cost of switching language has been observed from bilinguals consistently by previous studies using language production tasks in a mixed-language context, the current study set out to investigate whether the asymmetrical switching cost also applies to a word recognition task and whether reaction times (RTs) differ under monolingual and mixed conditions.

Thirty Chinese-English bilinguals completed lexical decision tasks in a Chinese monolingual condition, an English monolingual condition, and a mixed language condition -- critical stimuli in the mixed list consisted of both nonswitching and switching trials in both languages. RT analyses did not reveal a switching cost in the word recognition task. In addition, participants did not respond significantly faster in a monolingual condition than in a mixed language condition. We argue it is the orthographic distance that leads to the null switching effect.

Introduction

- Asymmetry in the cost of switching language^{1 2 3 4 5 6}: the language switching cost was larger when switching to the first language (L1) from the second language (L2) than vice versa



Meuter & Allport (1999)

- Objectives of the Current Study
 - Is there an asymmetrical switching cost in a word recognition task?
 - Do RTs differ under monolingual and mixed-language context?

Methods and Materials

- Participants: 30 highly proficient Chinese learners of English
- Lexical Decision Task
- Materials (number of items)

Context	Condition	L1 critical stimuli	L2 critical stimuli	L1 Non-Words	L2 Non-words	L1 Fillers	L2 Fillers
Mixed	Nonswitching	12	12	65	65	41	41
	Switching	12	12				
Monolingual	N/A	16	16	16	16	N/A	N/A

- Design: N-2 lexical status; N-2 language; Response Type
 - N1 – first language nonwords n2 – second language nonwords
 - F1 – filler words f2 – second language filler words
 - L1 – first language critical words l2 – second language critical words
- Nonswitching items Switching items
 - A: (n2)(n1)n1 f1 L1 (f1) B: (n2)(n1)n1 f1 L2 (f1)
 - C: (n1)(n2)n2 f1 L1 (f2) D: (n1)(n2)n2 f1 L2 (f1)
 - E: (n2)(n1)n1 f2 L2 (f1) F: (n2)(n1)n1 f2 L1 (f2)
 - G: (n1)(n2)n2 f2 L2 (f2) H: (n1)(n2)n2 f2 L1 (f2)

Results

- Language (Chinese vs. English) X Switching (Switching vs. Nonswitching):
 - No interaction effect $F_{language*switching} = .032, p = .859, \eta^2 = .001$
 - Main effect of language $F_{1,29} = 45.95, p < .001, \eta^2 = .613$
 - No main effect of switching $F_{1,29} = .026, p = .874, \eta^2 = .001$

	Nonswitching	Switching	Difference
L1	490 (48)	492 (62)	2
L2	521 (60)	521 (53)	0
Difference	31***	29***	

- Language (Chinese vs. English) X List (Monolingual vs. Mixed-language)
 - No interaction effect $F_{language*list} = .066, p = .80, \eta^2 = .002$
 - Main effect of language $F_{1,28} = 45.4, p < .001, \eta^2 = .619$
 - No main effect of List $F_{1,28} = 2.825, p = .104, \eta^2 = .092$

	Monolingual	Mixed	Difference
L1	475 (49)	491 (49)	16
L2	503 (48)	522 (61)	19
Difference	28***	31***	

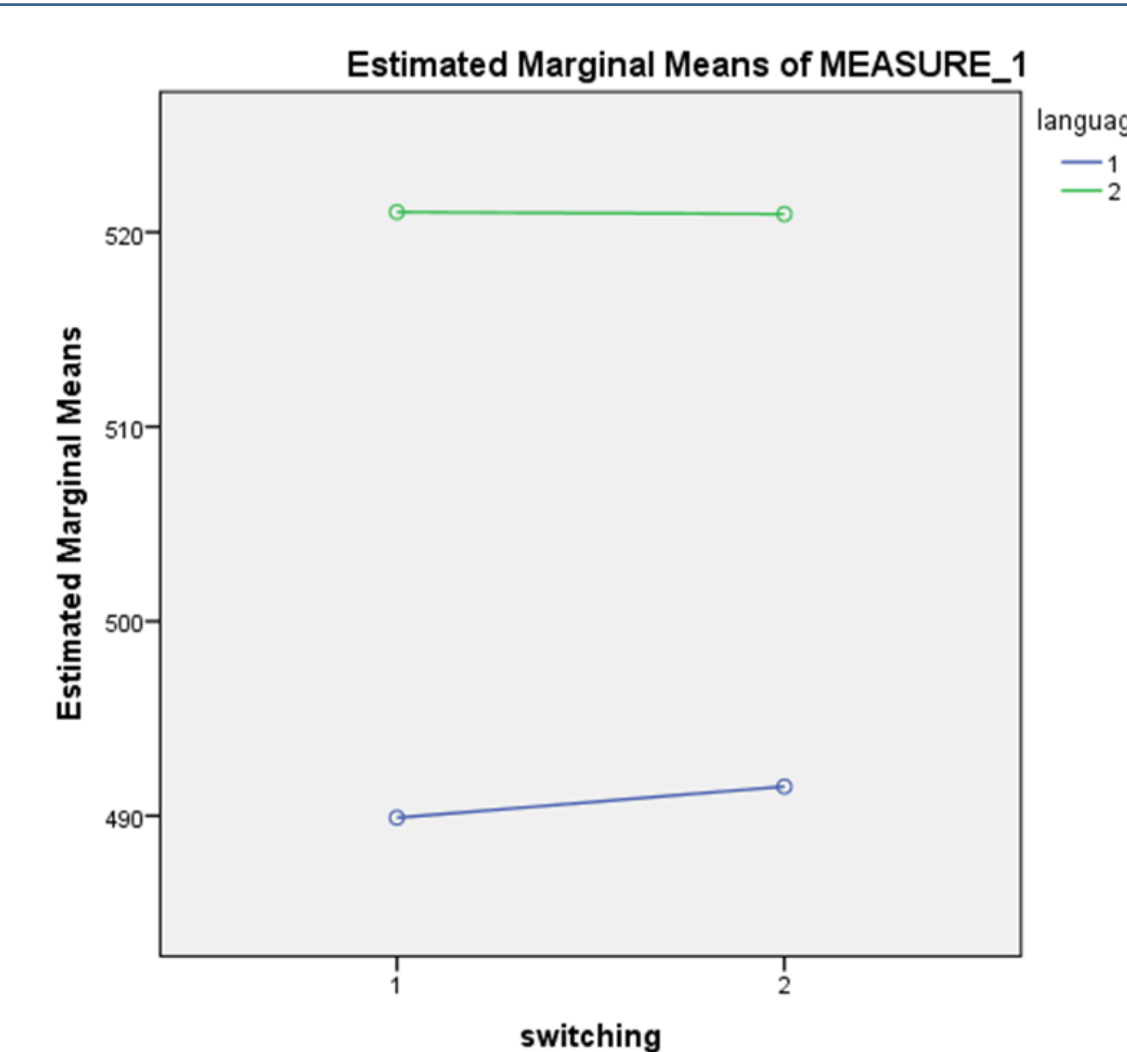


Figure 1. Language X Switching

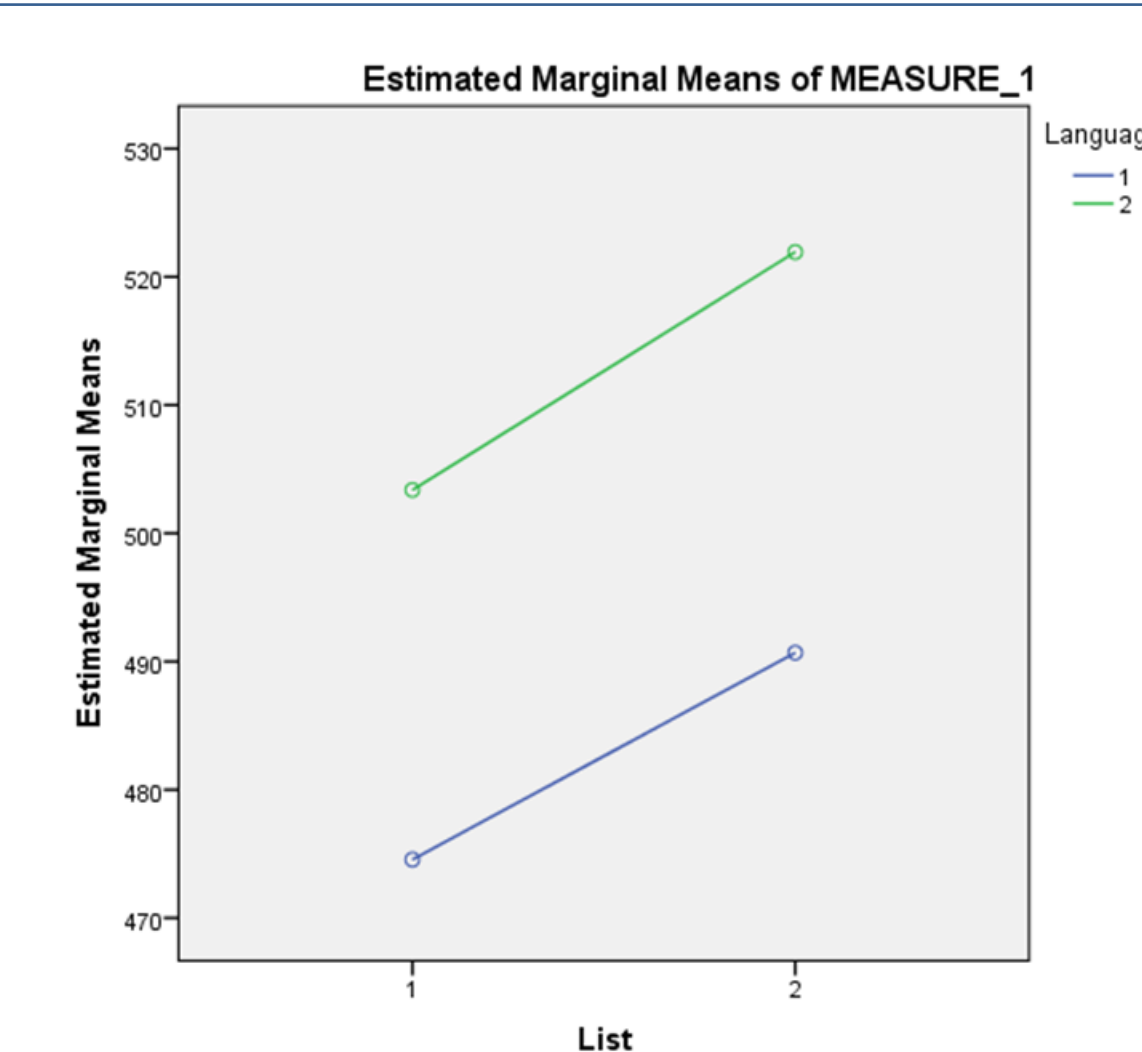


Figure 2. Language X List

Discussion

- No switching cost was not observed in word recognition task among highly proficient Chinese-English bilinguals.
- Mixed-language context did not lead to slower response latencies.
- However, switching cost was observed by previous studies using word recognition tasks.^{7 8 9}
- What leads to the discrepancies is orthographic distance – whether L1 and L2 share the same script.
- Previous research shows that script differences facilitate rapid access by providing a cue to the lexical processor that directs access to the proper lexicon.^{7 10}

Conclusions

- The organization of the bilingual lexicon is influenced by whether the two involved languages share the same script. Script difference could facilitate access to the specific lexicon and thus reduce competition between the two languages.

References

- Costa A, Miozzo M, Caramazza A. Lexical selection in bilinguals: Do words in the bilingual's two lexicons compete for selection? *Journal of Memory and Language*, 41, 365-397, 1999.
- Finkbeiner M, Almeida J, Janssen N, Caramazza A. Lexical selection in bilingual speech production does not involve language suppression. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 32(5):1075-1089, 2006.
- Guo T, Liu H, Misra M, Kroll JF. Local and global inhibition in bilingual word production: fMRI evidence from Chinese-English bilinguals. *NeuroImage*, 56, 2300-2309, 2011.
- Meuter RFI, Allport, Bilingual language switching in naming: Asymmetrical costs of language selection. *Journal of Memory and Language*, 40, 25-40, 1999.
- Misra M, Guo T, Bobb SC, Kroll JF. When bilinguals choose a single word to speak: Electrophysiological evidence for inhibition of the native language. *Journal of Memory and Language*, 67(1), 224-237, 2012.
- Philipp AM, Koch I. Inhibition in language switching: What is inhibited when switching between languages in naming tasks? *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 35(5), 1187-1195.
- Grainger J, Beauvillain C. Language blocking and lexical access in bilinguals. *Quarterly Journal of Experimental Psychology*, 39, 295-319, 1987.
- Thomas M S C, Allport A. Language switching costs in bilingual visual word recognition. *Journal of Memory and Language*, 43, 44-66, 2000.
- Chauncey K, Grainger J, Holcomb P. Code-switching effects in bilingual word recognition: a masked priming study with event-related potentials. *Brain and Language*, 105, 161-174, 2008.
- Gollan T H, Forster K I, Frost R. Translation priming with different scripts: Masked priming with cognates and noncognates in Hebrew-English bilinguals. *Journal of Experimental Psychology*, 23, 5, 1122-1139, 1997.

Contact

Qian Zhou
University of Maryland
Email: qzhou1@umd.edu

Nan Jiang
University of Maryland
Email: njiang@umd.edu