Code-Switched Words Recognition by Cantonese-English Bilinguals

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Introduction

- This study is part of a larger study which investigates code-switching of Cantonese-English bilinguals under different interactional contexts.
- Here we examine, the lexical processing of code-switched words in a group of highly-proficient Cantonese-English bilinguals dominant in their L1 Cantonese.
- The current study asks **two** research questions:
  (1) Is there a **switch cost** for highly-proficient bilinguals who are dominant in L1 in processing code-switched sentences?
  (2) Are switch costs modulated by **the phonological structures** of the code-switched words and the sentential context?

Methods

Participants

- 29 Cantonese-English homeland bilinguals (17 female)
- Age: 17-26 (*M* = 20.7, *SD* = 1.70)
- Undergraduate students enrolled in local universities in Hong Kong
- L1 Cantonese (from birth) and L2 English (*M* =3.52, *SD* = 1.4) in school
- Early sequential bilinguals, highly-proficient in both languages, dominant in L1 Cantonese

Experiment: Word Recognition Task

Based on Li (1996), this study adopted a cued shadowing paradigm to examine the factors that modulate bilinguals' lexical processing of code-switched speech.

- Participants heard a series of Cantonese sentences in which an English word was embedded.
- **Female** speaker: Matrix **Cantonese sentence**
  Male speaker: Embedded **English word**
- Participants were asked to repeat the word spoken by the male as quickly and as accurately as possible.

- Measurements:
  (1) **Response latencies** (ms): a measure of switch cost
  (2) **Accuracy** (hit or miss)**:** scored manually based on the collected voice recordings
- 3 independent variables:
  (1) **Syllable structure**
  [**C**onsonant **C**lusters (CC) vs. *Simple **C**onsonant-**V**owel (CV)]
  (2) **Code-switched version** [**C**ode-**S**witched (CS) vs. ***Borrowers** (B)]
  (3) **Sentential context** [**L**ong (L) vs. ^**S**hort (S)]

Predictions

(1) **Accuracy**: high and consistent (>90%)
(2) **Response latencies**:
- Overlapping phonological structures (marked by * above) in both languages and semantically-neutral sentential context (^) should induce *greater* lexical interference effect, thus *longer* in reaction time.
- Code-switched experimental trials should have a switch cost, thus *longer* reaction time than non-switched control trials.

Example Stimuli

Consonant Clusters x	keoi ge **flight** jinci
Code-Switched form x	3SG POSS flight delay
Short context	'His/her flight is delayed.'
Consonant Clusters x	keoi ge **faɪ** jinci
Borrower x	3SG POSS flight delay
Short context	'His/her flight is delayed.'
Consonant Clusters x	keoi daap baan jinci ge **flight**
Code-Switched form x	3SG board CL delay POSS flight
Long context	'He/she boarded a delayed flight.'
Consonant Clusters x	keoi daap baan jinci ge **faɪ**
Borrower x	3SG board CL delay POSS flight
Long context	'He/she boarded a delayed flight.'

Abbreviations: 3SG: 3 person singular; CL: classifier; POSS: possessive marker

Results

Mixed-Effects Logistic Regression modelling with **accuracy,** and Linear Mixed-Effects Regression modelling with **response latencies**

- Accuracy rates were **higher** in control (**non-switched**) than experimental (**code-switched**) trials (β = -3.74, SE = 1.37, *z* = -2.74, *p* < 0.01) but no significant difference was found between the two for reaction time.
  → language switching effect only on accuracy
- For the three IVs:
  - Participants responded **faster** to target words with CV than CC structures.
  - Participants responded **faster** to target words in Code-switched (CS) than Borrower (B) forms.
  - Participants responded **faster** to target words in Long (L) than Short (S) context.

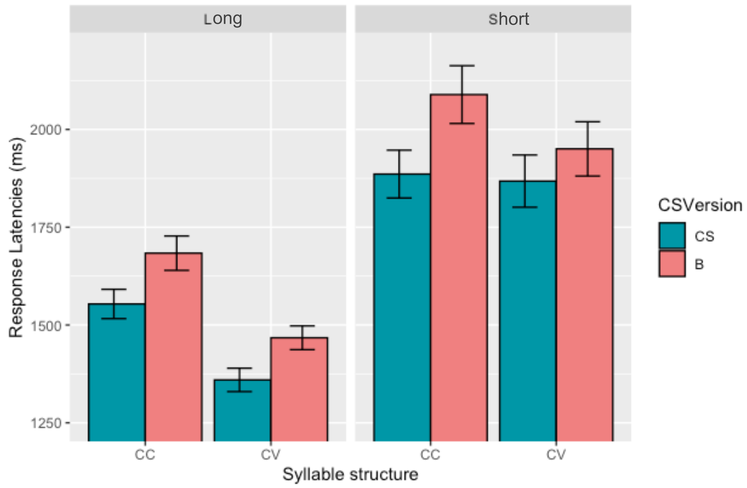

Fig 1. Response latencies as a function of the three IVs

Discussion

Summary of results

Table 1. Findings of the experiment

DVs	IVs	Findings
Accuracy		• High accuracy rate (0.95, Range = 0.7-1, *SD* = 0.22)
Response latencies	Syllable Structure	• CC > CV
	Code-Switched version	• Borrower > Code-switched form
	Context	• Short > Long
	Type of trials	• Non-significant difference between code-switched vs. non-switched trials

Research Question 1: Is there a switch cost for highly-proficient bilinguals who are dominant in L1 in processing code-switched sentences?

- Accuracy was higher in non-switched than code-switched trials, but the difference in response latencies was not significant.
- Is switch cost eliminated in highly-proficient bilinguals? Or does language proficiency play a greater role in modulating switch cost than language dominance?

Research Question 2: How is switch cost modulated by the phonological structures of the code-switched words and the sentential context?

- Sentential context can modulate cross-language lexical interference effect into the target language, even if it was is in the non-target language.
- For cross-language interference of overlapping phonological structures, the results were mixed: longer reaction time to CS target words in borrower form (overlapping structure), but shorter reaction time to CV structure (overlapping representation).
- Is language dominance a key factor in modulating cross-language interaction? Or, unlike segmental overlap, similarity in syllable structure may not have a significant effect on lexical interference?

Conclusions

- This study successfully replicated the results of Li's (1996) study in confirming that syllable structure, code-switched version, and sentential context can modulate the lexical interference effect in bilingual processing.

- Results suggest that switch cost is eliminated in highly-proficient bilinguals. This supports the claim that unlike language-switching [2], code-switching in natural contexts is not cognitively costly [1].

- **Next steps:**
  - Conduct the same experiment in heritage and immersed bilinguals, highly-proficient bilinguals who differ from the homeland bilinguals in language dominance and experience.
  - Examine whether identity plays a role in modulating bilingual lexical processing.

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