**Effect of withholding acoustic cues to English-Spanish codeswitching in Wh-questions**

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**Abstract**

The state of activation of each language of a bilingual person will change depending on the other part of the communication, and this change of behavior can affect both language production and language perception (Grosjean, 2013; Weinreich, 1966; Hasselmo, 1970; Baetens Beardsmore, 1986). The amount and type of mixed language used in one bilingual context can affect the language mode as the activation of each language will be altered, thus code-switching can serve as a scope to look into language mode. Code-switching is the linguistic phenomenon when more than one language is used in one utterance. A line of studies showed that there can be an additional cognitive cost for bilinguals in a code-switching context (Grainger & Beauvillain, 1987; Soares & Grosjean, 1984; Olson ,2017). Shen et al. (2020) showed that in English-Chinese code-switching tonal cues can help mitigate switch cost. The present study will be in line with Shen et al. (2020) study, examining the role of acoustic cues in auditory recognition of English-Spanish CS utterances, as the language pair under study in Shen et al. (2020) study is an intonational-tonal pair, the present study aims to fill the gap of an intonational-intonational pair (English-Spanish). The present study seeks to expand the conclusions made in Shen et al. (2020) by gathering evidences from a different type of language pair. Furthermore, the two experiments setting will provide with us more evidences of if acoustic cues help mitigate the higher cognitive cost in code-switching context by providing anticipatory information. Last but not least, the 4-version design of the stimuli can also provide us with preliminary understanding in how segmental and suprasegmental levels of acoustics work in such kind of bilingual context.

**Introduction**

Bilingual communication and language mode

The amount and type of mixed language used in one bilingual context can affect the language mode as the activation of each language will be altered, thus code-switching can serve as a scope to look into language mode.

CS communications

Code-switching (CS) is the linguistic phenomenon when more than one language is used in one utterance. In comparison to a monolingual discourse, it is reported in a line of studies that more complex processes are involved the production, recognition and comprehension of CS utterances: in Grainger and Beauvillain’s study (1987) performance costs was in their lexical decision task when bilingual participants are involved in switching languages when recognizing lexical items; Soares & Grosjean (1984) reported the bilingual speakers who can perform similar to monolinguals in monolingual context still showed a slower lexicon access in the bilingual speech; Olson’s study (2017) by using eye-tracking paradigm extended the line of production-oriented switch costs researches to auditory comprehension.

Cue to switch

Wh intonation in English and Spanish

**Present Study**

The objectives of this study are the following:

I. To investigate if native speakers of English who are late learners of Spanish are able to make use of acoustic cues to cope with a higher cost on cognitive ability when a switch of language happens in a sentence that starts in English and ends in Spanish. More specifically, we are taking a further look at both the segmental level of the acoustics and also the suprasegmental level using the resynthesized audios: the spliced audios.

II. To investigate how are native speakers of English who are learners of Spanish make use of the two formerly mentioned levels of acoustics to mitigate the difficulty in a language mixing context. More specifically, we are testing if the acoustic cues are acting as anticipatory cues to upcoming switching.Research Question 1: When perceiving Wh-questions start in English and end with code-switched items in Spanish, are English speaking learners of Spanish able to make use of acoustic cues to cope with switch cost?

Hypothesis 1: Previous studies have reported segmental properties going through alternation when produced in CS context in both matrix language and switched items (eg, VOT in Fricke, Kroll and Dussias, 2016), and there were reported suprasegmental features involved in similar phenomenon (intonation in Piccinini & Garellek’s study, 2014); Shen et al.(2020) showed that in English-Chinese code switching withholding acoustic cues can cause slower recognition of switched item. In line with Shen et al. (2020) study, we hypothesize that English speaking learners of Spanish are able to make use of acoustic cues to cope with switch cost in English-Spanish code switching Wh-questions.

Research Question 2: Are the acoustic cues (segmental and suprasegmental) helping mitigate switch cost by providing anticipatory information?

Hypothesis 2: In line with previous studies, we hypothesize that our participants will make use of both types of acoustic cues (segmental and suprasegmental) to predict upcoming code switching, which will suggest the change of language mode, in other words, anticipatory activation of the other language.

**Methodology**

Splicing

LHQ adaptation with other questionnaires

The language history data of the participants will be collected in the form of a survey, where the participants will be asked to complete an adapted questionnaire (LHQ) (Li et al., 2020), asking about their self-report language proficiency, age of acquisition of the second language, language use and language exposure, etc.

In order to investigate the two research questions, a quantitative two-task study that also includes a language proficiency test and a language history questionnaire is designed.

Two tasks gathering reaction time data will be used in the study: a visual world paradigm using auditory stimuli, during which participants listen to the stimulus (sentences) and make a choice between two pictures as soon as they hear the corresponding word in the audio. The choice and the reaction time will be collected. In the second experiment participants will listen to the stimulus (sentences) and make a choice of what language they are hearing and switch the choice as soon as they hear a change in language.

Experiment 1: Concept monitoring

Experiment 2: Switch prediction

The language history data

Language proficiency assessment will be conducted in the form of a language test, The researcher will administer the Lextale-Esp (Izura & Brysbaert, 2014) test to assess participants' Spanish proficiency.

Acoustic analysis (matrix sentence)

**Data analysis**

**Discussion**

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