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# LANGUAGE MODE VS. L2 INTERFERENCE: EVIDENCE FROM L1 POLISH

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## ABSTRACT

Only a small amount of research has been devoted to the phonetics of code-switching in the speech of bilinguals. The studies that do exist have shown conflicting results with regard to the appearance and direction of cross-language interaction, and are limited in the types of participants and phonetic parameters that have been investigated.

This paper presents both monolingual data and insertional code-switches from L1 Polish speakers that are highly proficient in English. The phonetic parameter of interest is glottalization vs. *sandhi*-linking of vowel-initial words. Linking is common in English, but rare in Polish, where glottalization is more prevalent. Results show that suggest that English style *sandhi*-linking does not interfere with boundary realization in the L1 in both monolingual and bilingual modes. Implications are discussed for models of L2 speech and the phonological status of the boundary effects under study.

**Keywords**: Phonetic code-switching, *sandhi* linking, vowel glottalization, Polish.

## 1. INTRODUCTION

In the area of L2 speech research, the manifestation of L1>L2 phonological interference is a commonly recurring theme. L2 pronunciation studies describe the degree to which learners master the phonetic norms of monolingual speech in the target language, while probes into perception investigate the degree to which learners' processing of L2 phonetics deviates from that of native speakers. Some models of L2 speech learning, most notably Flege's Speech Learning Model (SLM) [1], while accounting for L1 interference, also allow for the possibility of bidirectional interaction between L1 and L2. Speakers' production and perception of their first language has been found in many instances to be affected by their second (or even third) language.

One possible factor that is relevant for explaining L2>L1 effects is language context or language mode. Grosjean proposed an activation continuum [2], by which the communicative setting determines the degree of interaction between bilinguals' two languages. In situations in which both languages are activated, language switching and cross-language interaction are expected. These cases are described as bilingual mode. Sometimes, bilinguals find themselves in purely monolingual situations, in which one language or the other is deactivated. The notion of language mode has provided insight into the traditional "one system or two?" question that was debated in earlier work on bilingualism. It is now accepted that the answer to this question is largely dependent upon the communicative setting in which bilinguals find themselves.

The literature on language mode effects in phonology is quite limited, both in the L1-L2 pairings and in the scope of phonetic parameters that have been investigated. Available research has yet to paint a clear picture of the types of phonetic interactions that may be expected in the speech of bilinguals. In one study [3], French-English bilinguals produced identical VOT patterns in both monolingual tasks and in insertional code-switches. Another VOT study found evidence of bidirectional phonetic drift [4]. Two other studies [5],[6] sought to weed out interference from language mode effects, and found that monolingual mode induced monolingual-like VOTs, while code-switching revealed almost exclusively L1 influence on L2. More recent work [7], which considers the distinction between insertional and alternational code-switching [8], found that Spanish-English bilinguals hyper-articulated switched items, leading to longer durations and raised pitch.

The work cited above has dealt with balanced bilinguals, presumably under the intuitive notion that only 'true' bilinguals may be expected to show L2 interference in their L1. This notion has been challenged by findings in [9] of phonetic drift in the speech of L1 English learners of Korean even in the early stages of their instruction. Thus, it is clear that L2 does not need to be learned naturalistically in order for it to have an influence on the phonology of L1.

In sum, we are left with a number of research gaps with regard to the effects of L2 on L1. In particular, we know of no studies that investigate language mode effects in consecutive, as opposed to simultaneous bilinguals. This paper will therefore present L1 data from proficient Polish users of

English who are L1 dominant. Our goal is to establish whether L2>L1 interference may be observed independently of language mode effects. Our study takes up the realization of phrase-medial V#V sequences, which in English is frequently associated with modally voiced, glide-like transitions from V1 to V2 [10], and in Polish is characterized by glottalization of the word-initial vowel [11].

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## 2. VOWEL GLOTTALIZATION VS. LINKING IN POLISH AND ENGLISH

Although the realization of initial vowels in terms of glottalization or linking is usually not a contrastive phonemic property, it appears as if the phonologies of individual languages encode it in a categorical way. For example, in French vowel-initial items are systematically joined with preceding words by processes such as *enchaînement* and *liaison*. By contrast, German is characterized by *harter Einsatz*, hard attack, realized as glottalization or full glottal stops. With regard to linking at word boundaries, English and Polish appear to show a similar opposition. In Polish, word-initial syllables are characterized by phonetic prominence [12], [13] that preserves the prosodic integrity of lexical items. In the case of vowel-initial words, this prominence frequently manifests itself as glottalization. Glottalization may be therefore be said to preserve a boundary that is already present. By contrast, glottalization in English is usually interpreted as an 'inserted' boundary marker that is most likely to appear phrase-initially [14], [15].

As with any phonetic feature, contrastive or non-contrastive, vowel glottalization is subject to gradient effects of a large number of internal and external factors. Glottalization has been observed to be more likely at higher-level prosodic boundaries, in faster speech, in less frequent words, in low vowels, when followed by a vowel, and in the speech of females. Despite these effects, whether or not a language allows linking appears to be a phonological issue that represents a rich and understudied area for investigations into cross-language phonetic interaction.

## 3. THE CURRENT STUDY

### 3.1. Method

Seven L1 Polish speakers served as the experimental group for our study. The speakers were all highly proficent speakers of English (C2 level), employees at the Faculty of English at Adam Mickiewicz University in Poznan. In addition, 20 'quasi-monolingual' speakers with elementary (A2 level) proficiency in English served as controls.

The linguistic materials were comprised of 20 two-word phrases with vowel hiatus spanning the word boundary (V#V). The data set was counterbalanced for both V1 and V2 quality. Half of the V2 tokens were /e/ and half were /a/. The first vowel was either /y/ or /a/. All of the word-initial vowels were unstressed.

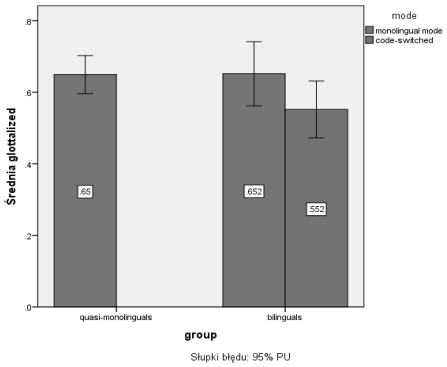
The experimental group was recorded in both monolingual Polish mode and in an insertional code switching task. In monolingual mode, the target two word sequences were contained in short phrases (2-5 words). In the code switching task, the target phrases were inserted into an English carrier phrase. There was an interval of 2-4 weeks between the recording sessions. The stimuli were presented to the participants on Power Point slides on a monitor installed in a soundproof recording booth. Speakers were instructed to try to read quickly. Vowel-initial items were coded as linked or glottalized, while duration of the target phrases was measured in order to calculate speech rate in syllables/second. Tokens which were produced more than 1 standard deviation (0.647 syllables/sec) faster or slower than the mean speech rate (6.07 syll/sec) were excluded from the analysis.

### 3.2. Results

The first set of results to be presented concerns speech rate as a function of language mode and as a function of linking vs. glottalization. Linked phrases (M=6.27, SD=.630) were produced more quickly than glottalized ones (M=5.96, SD=.629), $F[1,575]=33.2$, $p<.001$. The phrases produced in the code switching task (M=6.32, SD=.672) were produced more quickly than those in monolingual Polish mode (M=5.98, SD=.615), $F[1,575]$, $p<.001$. A binary logistic regression analysis revealed that rate was a significant predictor of glottalization, B=-.771, $p<.001$.

The rates of glottalization of vowel-initial items are summarized in Figure 1. In monolingual mode, the quasi-monolingual group produced glottalization in 64.9% of the vowel-initial tokens, while the experimental group produced glottalization in 65.2% of the cases. Meanwhile, in the code-switched items, glottalization was produced in 55.2% of the word initial vowels. Neither Group (in monolingual mode, B=.01, p=.96) nor Language Mode (in the bilingual group, B=-.42, p=.102) was a significant predictor of glottalization in the group data, although the figure suggests that the odds of linking tended to increase in the code-switching task.

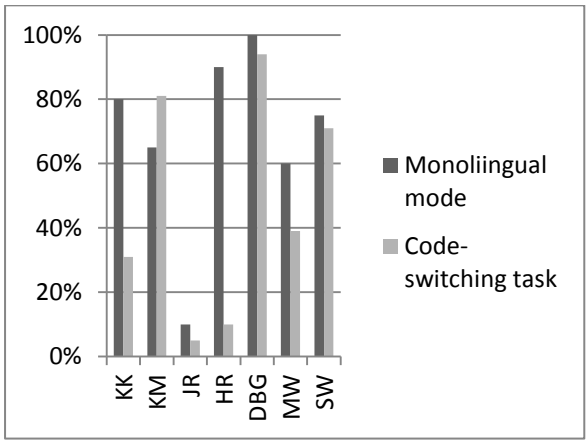
**Figure 1**: Glottalization rates across group and task




A second trimming of the data according to speech rate included only the tokens produced between 5.5 and 6.5 syllables per second. In these items, the difference in speech rate across monolingual vs. code-switched items was not significant, F[1,169]=2.34, p=.128. For these items, rate was still a significant predictor of glottalization, B=-.828, p=.035, while language mode was not, B=-.257, p=.430.

Results for each of the individuals in the experimental group are shown in Figure 2. Six out of the seven participants produced more linking and less glottalization in the code-switching task. Of these six, all but one produced the target items more quickly when code-switched. Informal analysis revealed that this speaker (HR), in addition to linking target V#V items, also produced linking at the code switch boundaries. That is, she linked the final segments of the L1 target items to the vowel-initial word in the English carrier phrase.

**Figure** 2: Individual glottalization rates by task




## 4. DISCUSSION

Our study sought to make a direct comparison of L1 Polish items produced in a monolingual Polish mode with those produced in insertional code-switches in an English context, as well as those produced by 'quasi-monolinguals'. The goal was to observe language mode effects independently from possible L2>L1 interference. The results of the study found no evidence for either of the two phenomena. The proficient users of English and the 'quasi-monolinguals' produced similar rates of linking/glottalization in the monolingual task. For the group of proficient users of English, the greater prevalence of linking in the code-switching task was mitigated by the effects of speech rate. In what follows, we will discuss possible implications of the negative results of our study.

The first question concerns speech rate in code-switched items. In the present study, code-switched items were produced more quickly. This is in contrast to the findings in [7] in which code-switched items were prosodically prominent and produced more slowly. This study differs in that the participants were not balanced bilinguals but L1 dominant users who were code-switching into their L1. Thus, it may be suggested that the target items were native and the context was foreign, and switching 'back' into one's L1 may be conducive to increases in speech rate in comparison to L2.

Next, we must consider the result that the experimental group in monolingual mode produced a similar rate of glottalization/linking to the 'quasi-monolingual' controls. In other words, there was no evidence of L2 interference on the L1 of the participants, which would be manifested as word-boundary *sandhi* linking processes. This result may be seen in terms of a comparison between two of the most influential models of L2 speech: the SLM and Best's Perceptual Assimilation Model (PAM) [16]. One important difference between these two theories is that the latter incorporates an abstract phonological level at which L1 and L2 may be separate, while SLM postulates that L1 and L2 phonetic categories exist within a 'common phonological space'. If one accepts the PAM view, then the lack of L2 interference found in this study may be interpreted as evidence of the phonological status of word-boundary integrity in Polish. That is, the prominent realization of initial syllables [12], [13] is encoded in the phonology of Polish and may be less susceptible to bidirectional drift than other phonetic parameters such as VOT.

Finally, our results must be considered in terms of other available studies on phonetic code-switching. Some VOT studies involving code-switching tasks have found little or no evidence of L2 influence on L1 [3], [5], while one such study found evidence of L1 influence [6]. A later experiment [17] showed evidence of bidirectional phonetic drift. An important difference between the

earlier studies and may be described in terms of a distinction between insertional and alternational code-switching [8]. It appears that bidirectional influence, including L2 effects on L1, is more likely in alternational code-switches, in which a greater portion of the entire utterance is switched. This type of switch is more conducive to changes in language mode than insertional code switches in which the majority of the utterance is produced in a single language. Our study is based on insertional code-switches.

To conclude, there are still numerous aspects of phonetic code-switching that remain understudied. The present research examines a new phonetic parameter for such studies, and makes an attempt to investigate L2 interference and language mode effects independently.

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