The impact of code-switching on intonation in German-Italian heritage bilingualism

Until recently, suprasegmental aspects, such as intonation have received far less attention than the segmental level in research on code-switching in bilingual speech. The segmental level is mostly considered to be affected by code-switching (e.g., Olson 2015 for vowel duration), while the few studies on suprasegmental aspects render mixed results. For instance, Aly (2017) found in Basque-Spanish bilinguals that phonetic aspects of intonation, such as peak alignment is mostly guided by the dominant (or matrix) language of a sentence, suggesting no effect of code-switching on intonation. Similarly, Piccinini & Garellek (2014) showed in a qualitative analysis of their experimental stimuli that bilinguals maintain the categories of the matrix language for the most prominent syllable of an utterance (i.e., nuclear pitch accent) as well as for the boundary tone, that is, the right edge of the utterance. In contrast to the phonological level of intonation, they found an effect of code-switching on the peak realization of the accented syllable, indicating an effect on the phonetic level of intonation. However, there is no study which provides a systematic description of the phonetic and phonological implementation of intonation under code-switching.

In this study, we want to fill this gap by focusing on the impact of code-switching on the suprasegmental level in the context of heritage bilingualism. More precisely, we focus on intonation in Italian information-seeking polar questions (PolQs) in which German nouns are inserted. In this context, Italian is acquired as heritage language (i.e., from birth through the family), whereas German is the language of the society and either acquired simultaneously from birth or sequentially. Italian and German is a promising language combination in the context of heritage bilingualism because the they differ with respect to intonational patterns, such as nuclear pitch accents and boundary tones. Both the nuclear pitch accent and the boundary tone build the nuclear contour of an utterance. The nuclear contour of Italian PolQs is mostly marked by a falling pitch accent, followed by a final fall in the Southern regional varieties (H+L* L%) or a final rise (H+L* LH%, Krieger & Geiss, 2024). In German, PolQs exhibit a low pitch in combination with a high-rise (L* H-^H%, Braun et al, 2019).

In our study, we aim to investigate (i) to what extent code-switching affects the phonological and phonetic implementations of the intonational contours of Italian PolQs in heritage bilingualism and (ii) whether linguistic factors (position and the cognate status of the code-switch) as well as extra-linguistic factors (e.g., proficiency, early language use, attitudes towards code-switching) mediate the use of German intonational patterns. For this purpose, we conducted an online elicited production task in which the participants produced PolQs. They completed the unilingual mode (Italian), before they repeated the game in the code-switch mode. In the latter, they were asked to use German only for the noun:

(1) La **Apfel** è vicino al   fiore?
    the apple is next   to-the flower
    'Is the apple next to the flower?'

(2) Marta ha la **Limousine**?
    Marta has the limousine
    'Does Marta have the limousine?'

In each mode, participants produced 48 PolQs, which were manipulated with respect to the position of the code-switch (non-final (1) vs. final (2)) and cognate status (non-cognate (1) vs. cognate (2)). Participants' proficiency was measured by means of the placement test of the DIALANG (Alderson, 2005). Additionally, they completed a background questionnaire in which we asked for language use and code-switching habits. For the prosodic analyses if the data, nuclear contours were annotated in PRAAT (Boersma & Weenink, 2015) following the guidelines of ToBIt for Italian (Gili Fivela et al., 2015). So far, 18 (out of 30 intended) HSs took part in the study and four have been transcribed with respect to their intonational properties.

Preliminary results are summarized in Figure 1 and 2, revealing a significant effect of language mode. Participants used the Italian nuclear contours H+L* LH% (β = -0.383, *SE* = 0.117, *z* = -

3.265, p < 0.01) and H+L* L% (β = -1.147 SE = 0.498, z = -2.306 p < 0.05) more often in the unilingual mode than in the code-switch mode. The typical German contour (L* LH%) was produced significantly more often in the code-switch mode (β = 1.077 SE = 0.306, z = 3.522 p < 0.001). These results indicate that code-switching triggers the use of the intonational pattern from the embedded (German) into the matrix language (Italian). A closer analysis of the results in the code-switch mode indicates that this difference between the two modes is driven by the position of the code-switch. Specifically, if the code-switch occurs in utterance final position it is more likely that participants produced the typical German contour. In these utterances, the nuclear pitch accents fell on the code-switch. Additionally, we found that a cognate status within the final position affected the intonational contour. If the code-switch contained a cognate participants produced the utterance more likely in an Italian manner (matrix language), as shown by higher frequency of H+L* LH% in cognates compared to non-cognates (see Figure 2).

In the talk, we will present the results of a larger number of participant as well as further details about the impact of code-switching on the phonetic/phonological implementation of intonation as well as the effect of extralinguistic factors.
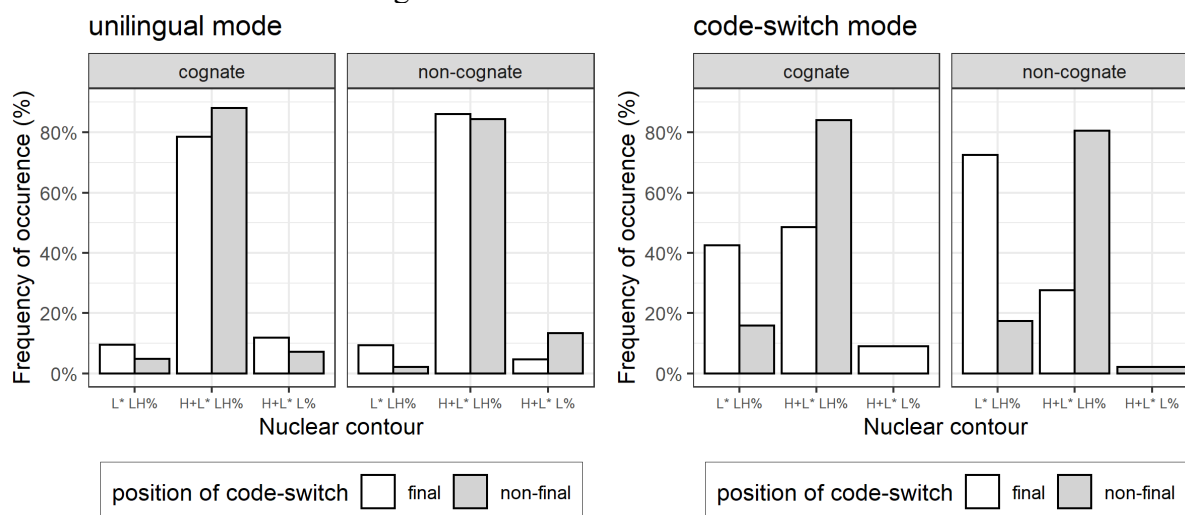

Figure 1: Percentage frequency of nuclear contours across the position of code-switch and cognate-status in the unilingual mode.

Figure 2: Percentage frequency of nuclear contours across the position of code-switch and cognate-status in the code-switch mode.

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