Differences in pitch range despite a shared prosodic typology

Research has established a clear link between the physiological constraints of the vocal tract (e.g., related to age and sex) and pitch span realisation [1, 2]. Yet pitch range variation is found when comparing samples from similar populations but from different linguistic backgrounds. It has been argued that these differences are due to language specific, intrinsic effects [3, 4]. Some studies have shown that bilingual speakers display different pitch ranges within their two languages [5, 6] and language dominance has been proposed as explanatory factor for this divergence [7, 6]. However, other studies on typologically distant language pairs (e.g., Basque and Spanish or English and Cantonese) have failed to find significant differences in pitch range, possibly suggesting that there is little intra-speaker variation across languages and that bilinguals do not necessarily differ in their use of pitch range [8, 5].

This presentation investigates intra-speaker variation of pitch range in a Drehu-French bilingual population from New Caledonia. Drehu (Oceanic) and French (Indo-European) are the two languages spoken in Lifou, a small island in the Pacific counting no more than 10.000 inhabitants [9]. Arguably, the term "bilingual speaker" covers a heterogeneous group of individuals who may exhibit different linguistic practices within their communities [10]. It is therefore of crucial interest to take into account linguistic variables but also to investigate social factors that could be influential.

From a prosodic typological perspective [11] Drehu and French can be considered as languages with strong macro-rhythm, suggesting that they could exhibit similar pitch ranges. Taking an autosegmental metrical approach [12], the current analysis tests these speakers' pitch ranges using experimental studies carried out during fieldwork in Lifou. Language dominance was determined by participant response to the BLP questionnaire which also provides information about the attitudes of speakers towards their languages [13]. Speech materials were designed to allow for a comparison of prosodic constituents with similar information structures. Experiment I examines the pitch range of four adult speakers, mostly dominant in Drehu. Experiment II investigates the speech of ten teenage speakers (six female), with varying degrees of dominance. In both experiments, content was manually transcribed, and force aligned in WebMAUS, using language-independent G2P conversion [14]. Tones and target tokens were manually labelled in Praat [15]. A hierarchical database was constructed using the EMU Speech Database Management System. Intonational labels and acoustic measurements were queried using the emuR package in R [16, 17]. Linear mixed-effects models were used to investigate differences of pitch range in semitones across groups.

Results indicate that adult and teenage speakers differ significantly in their pitch ranges ($p < .0001$), with Drehu showing more extreme pitch movements and an overall higher pitch range than French. While the score for linguistic dominance differs, the questionnaire reveals that participants share similar language attitudes. Speakers consider Drehu as their *mother tongue,* identify as *Kanak*, and show little affiliation with a (European) Francophone identity. Ongoing work seeks to determine whether pitch range variation is used as a marker that carries social meaning that is specific to this community of practice [18]. In the case of Lifou, *sense of belonging to an ethnic community* represents an important factor that could influence pitch range variation. Since variability in pitch range has been reported in various contexts, it is conceivable that the investigation of language attitudes may be a useful approach to identify factors influencing linguistic choices. Currently, the identification and quantification of this relationship are examined. In conclusion, it is proposed that variation in pitch range is a complex phenomenon, which is context-dependent, and likely to be influenced by both, cognitive and social factors. Finally, this study shows that speakers of two prosodically similar languages can differ in their use of pitch range.
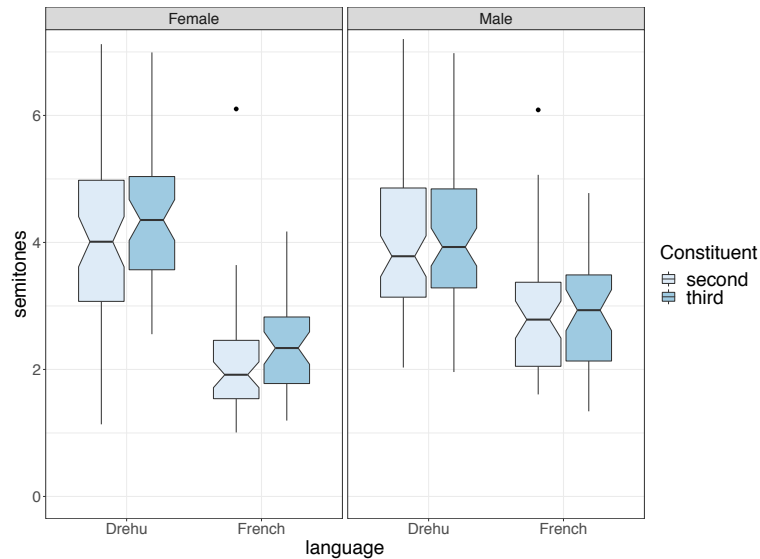
Figure 1: *Box plots show the differences in pitch range in semitones for female and male teenage speakers in Drehu and Lifou French. Two constituents were chosen for comparison: the second and third prosodic constituents of a declarative utterance.*

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