An exploratory study of synchronic text-to-tune alignment in Drehu

Catalina Torres
The University of Melbourne, ARC Centre of Excellence for the Dynamics of Language

This study investigates how tonal targets align to segmental landmarks or regions in Drehu, a language from the Southern Melanesian linkage, spoken in New Caledonia. A rate manipulation paradigm, commonly used for this type of study, was implemented to investigate how fundamental frequency minima and maxima align to points in segmental structure. Preliminary results show that the phrase initial L tone is aligned to an *anchorage region* situated towards the beginning of the content word, whereas a H tone mostly aligns to the last full syllable of the same content word. These observations support the hypothesis of Drehu being an edge prominent language.

Research on tonal alignment has shown that language specific phonological characteristics come into play in determining how the speech stream is organized (Ladd et al., 2009). The *segmental anchoring hypothesis*, refers to how tonal targets, realized as fundamental frequency movements, unfold in time while being coordinated with the segmental string and predicts that an accent is aligned or *anchored* to a segmentally defined position (Arvaniti et al., 1998). However, studies on Peninsular Spanish (Prieto and Torreira, 2007) and French have shown that tones are not necessarily anchored to one specific segment and can be linked to an *anchorage* region (Welby and Lœvenbruck, 2006). Cross-linguistic studies including language families other than Indo-European are underrepresented and of special interest for our understanding of prosodic typology.

First descriptions of Drehu claim there is word initial stress, that is fixed, and shows no weight sensitivity (Lenormand, 1954; Tryon, 1968). The language has a 14 vowels system, with a contrastive length distinction, and a syllabic structure that allows for V, CV, VC, CVC, VV, CVV, VVC, CVVC combinations (Moyse-Faurie, 1983). A recent study investigating prosody in Drehu suggests prominence is marked on a phrasal level (Torres et al., 2018). This study made use of a word insertion paradigm (Jun and Fletcher, 2014) and found a strong preference for LH rising patterns, that were realized throughout target tokens or at the right edge of the constituent. Further, there was an effect of informational focus, which showed that the right edge of words was consistently marked through modifications of F0 and duration. This partially stands in contradiction with the initially reported word initial stress pattern.

The aim of this study is to further investigate tonal properties that help define the lowest tonally marked constituent in Drehu. Therefore, a more naturalistic experimental procedure was chosen in which token words were embedded in meaningful sentences. Twelve speakers (6 females) were recorded performing a controlled reading task. A total of 26 utterances containing target tokens with 2 to 4 syllables, always preceded by at least one monosyllabic function word (generally an article), were read aloud at a self-selected normal and fast speech rate (N=624). The position of the target token was manipulated in order to elicit tokens in different phrase internal positions (see examples 1 and 2). Sound files were manually transcribed, and force aligned in WebMAUS (Reichel 2012). Phoneme alignment was manually corrected, and labelling carried out in Praat (Boersma and Weenink, 2009). A hierarchical data base was constructed using the EMU Speech Database Management System and acoustic measurements were queried using the emuR package in R (Winkelmann et al., 2007; Team, 2014). Results show that the phrase initial L tone is aligned to an anchorage region which is situated between the content and the function word preceding it. Additionally, the H tone generally aligns to the last full syllable of the content word. This study confirms previous observations of a constituent initial L tone demarcating the left edge and a H tone to the right edge of constituents, see Figure 1. Results support the edge-prominence hypothesis which is why the accentual phrase is suggested as lowest tonally marked constituent in Drehu.

Data from an under-described language like Drehu contributes to the understanding of typological variation found in the intonational phonology of the languages of the world. This study also provides evidence for a phrasal prominence marking in the language which hadn't been reported before. Future research will examine contrastive focus in order to further investigate the interface between information structure and prosody.

Examples:

(1) Ame **[la maamu]**, tre, hna sile hnei itre qatr.

PRS.1 ART bogeyman PRS.2 PST invent A PL old

'The bogeyman was invented by the old'

(2) Ame [la satana] **[me la maamu]**, tre, hna sile hnei itre qatr.

PRS.1 ART devil and ART bogeyman PRS.2 PST invent A PL old

'The devil and the bogeyman were invented by the old'

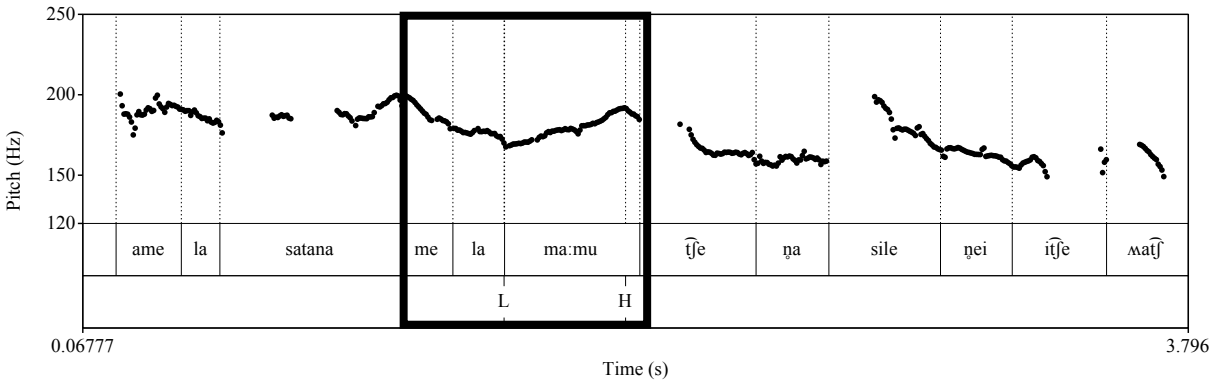

Figure 1: *Fundamental frequency curve containing token word 'maamu' (bogeyman) preceded by two monosyllabic function words. Target token shows LH pattern.*

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