

This paper presents the findings of the first systematic investigation of vowel harmony in Ende (Pahoturi River family). The investigation incorporates both impressionistic and acoustic data, which ultimately support a vowel harmony account of Ende vowels. Interestingly, the acoustic data indicate an unexpected and complex pattern in the phonetic realization of phonological height. Specifically, on underlyingly mid vowels in harmonic contexts, the phonological feature [+high] is phonetically realized in different acoustic dimensions depending on the backness of the vowel.

Ende is proposed to exhibit iterative, progressive, height-based vowel harmony ([2]). The Ende vowel inventory consists of two front vowels (/e, i/), three central vowels (/ɪ, ə, a/) and two back vowels (/o, u/). Thus, mid vowels /e/, /ə/, and /o/ are said to raise to their high counterparts, [i], [ɪ], and [u], when the nearest preceding vowel is [+high], as illustrated by the alternation in the realization of *de* (inanimate accusative marker) below.

- (1) masar        ine        kube=**de**        ŋəmo        naŋasan  
 grandfather water bucket=ACC 1.SG.POSS make.REC.1|3SG.A.SGP  
 ‘Grandfather made a water container for me.’ (T. Warama, 2017: 37 RE\_EE001)
- (2) ede obo        tudi=**di**        dəeja        koŋba=a        dətʃpenən  
 so 3.SG.POSS fishing.gear=ACC COP.PST.SG fish=NOM break.REM.3SGA>3SGP  
 ‘That fish broke her fishing line.’ (T. Dobola, 2016: 7)

To test the validity of the proposal, peripheral mid vowels /e/ and /o/ in nominal enclitics were examined. 409 clitic vowel tokens preceded by high, mid, and low vowels from the Ende corpus were narrowly transcribed by the researcher in categorical terms as either mid ([e, o]) or high ([i, u]) based on auditory impression ([1]). The F1 and F2 values were extracted at the midpoint using a Praat script, providing a gradient, acoustic metric of vowel tokens. The data was then analyzed separately by sex according to the height class of the immediately preceding vowel.

While the data from female speakers present too much complexity to discuss here, the data from male speakers were found to corroborate the vowel harmony proposal. Underlyingly mid clitic vowels extracted from naturalistic speech were significantly more likely to be heard and transcribed as [+high] following high compared to non-high vowels (fig. 1). Similarly, clitic vowels were found to generally exhibit acoustic cues associated with high vowels following high vowels rather than low and mid vowels. However, the phonetic cues were different for /e/ than for /o/. As expected, /o/ raised following high vowels, as shown in fig. 2, but interestingly, /e/ did not. Instead, speakers produced /e/ significantly more front after high vowels, exploiting a secondary acoustic cue to index phonological height: frontness. Though /i/ and /e/ are phonologically distinguished by height in Ende, the [+high] feature is phonetically realized in both F1 and F2. Consequently, male speakers phonetically realize the phonological [+high] feature on the clitic vowel as change in F2 (fig. 3). This finding underscores vowel harmony’s place in the grammar as a phonological phenomenon that interfaces with, but is, at least synchronically, distinct from phonetics and processes such as vowel-to-vowel coarticulation ([3]). Furthermore, work on vowel harmony in Papuan languages is currently extremely rare. Thus, this study contributes to both the descriptive and theoretical sides of the body of work on vowel harmony cross-linguistically.

**References:** [1] Lindsey, K. (2015). *Language corpus of Ende and other Pahoturi River Languages*. Canberra: PARADISEC. [2] Lindsey, K. (2019). *Ghost Elements in Ende Phonology*. PhD thesis, Stanford University. [3] Nevins, A. (2010). *Locality in vowel harmony*. Cambridge: MIT Press.

Figure 1: Clitic vowel height (impressionistic data)

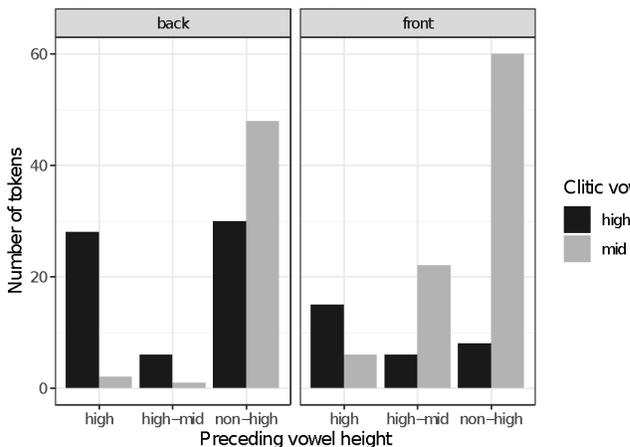


Figure 2: Clitic /o/ F1

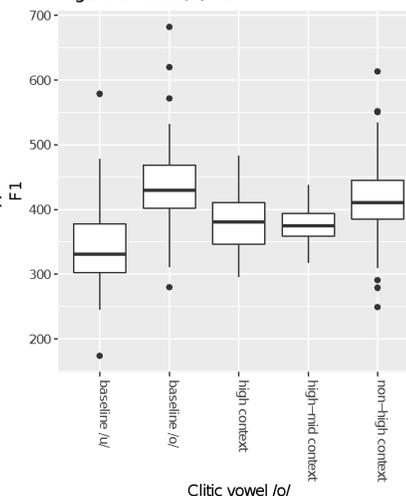


Figure 3: Clitic /e/ F2

