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Syllable prominence in Unua

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Abstract

An acoustic study based on data from a collection of audio recordings of Unua (Malakula, Vanuatu) narratives found a lack of systematic distinctions of prominence in two-syllable lexemes. Duration, pitch and amplitude were marked variably on individual lexical items. However, a phrase-based analysis of *seten* 'what' versus *seten go* 'what FOC' showed higher pitch on the first syllable of the two-syllable sequence, but on the second syllable of the three-syllable sequence. The results of the study suggest that prominence in Unua is phrase-based and that it is manifested as higher pitch on the penultimate syllable of the phrase. These findings constitute an initial step towards more extended research on the prosodic characteristics of the language.

1. Introduction

This paper reports on an investigation of the nature and placement of prominence/stress in Unua, an Oceanic language of Malakula, Vanuatu.* Using Praat software (Boersma and Weenink 2016) to perform acoustic analysis on selected words spoken in the context of a variety of stories by a range of speakers of Unua,[1] we analysed the vowels in the syllables of each token of each sample word and compared their duration, amplitude (dB) and pitch (F0). The aim of the study was to determine which syllables might be stressed in each word and what might be the parameters of syllable prominence in Unua. From the results of our study, we report that syllable prominence is not very distinctive, but we tentatively conclude that it is likely that syllable prominence in Unua is a prosodically conditioned phrase-level phenomenon that assigns a higher F0 on penultimate syllables. Such penultimate prominence is not however totally systematic and this finding of penultimate phrasal prominence awaits verification over a more extended

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[1] Eleven female and 14 male speakers, ranging in age from 13 to over 65 years, were recorded resulting in a data set of 45 narratives.

range of data. The role of discourse effects on prosodic patterns also requires further investigation. We nevertheless contend that our study provides a viable and useful starting point for such investigations.

Unua is the vernacular language of a community located on the southeast coast of the island of Malakula. Unua has about 800 speakers and, with Pangkumu, it is a co-dialect of the Unua-Pangkumu language. Pangkumu is spoken in a separate community located to the south of the Unua area. In previous work, Tryon (1976) gives vocabulary for some 290 items from both Unua and Pangkumu and Morton (1891) is a short sketch of the grammar of Pangkumu with occasional comments on different forms in Unua. Pearce (2015) presents a substantial account of the grammar of Unua. In these previous works, the only discussion of stress placement is found in Pearce (2015). Although Pearce (2015: 35-39) finds a tendency for penultimate stress, her discussion is inconclusive and it lacks the underpinning of acoustic analysis .

Phonological stress or prominence is notoriously difficult both to define and analyse cross-linguistically. Stress is neither as concrete nor definitively measurable as many other phonological features because prominence only exists relative to surrounding words or syllables having less prominence (Himmelmann and Ladd 2008: 248). Furthermore, the significance of any individual correlate of stress in relation to any other can vary from language to language. There is a distinction, for instance, between stress-accent and nonstress-accent languages (Beckman 1986). In stress-accent languages, F0 is found to be a fairly consistent correlate of stress but not necessarily in nonstress-accent languages (Ortega-Llebaria and Prieto 2010: 73). Syllable duration is also a correlate of stress cross-linguistically but again this is variable and subject to influence by a range of other factors such as the manner of articulation of consonants, place of articulation of the vowel, whether the syllable is open or closed (Himmelmann and Ladd 2008: 247) or whether or not there is voicing of the following consonant if there is one (de Jong 2004). In a recent survey of cross-linguistic acoustic correlates of word stress, Gordon and Roettger (2017: 16) find that "[s]tatistically, duration was the most reliable exponent of stress across languages". However, their analysis also shows that, for many of the languages studied for the relevant dimensions, stress is signalled by F0 characteristics or by intensity. Stress placement could also be correlated with "assorted frequency-weighted measures of intensity" and with vowel formant frequencies (Gordon and Roettger (2017: 16).

Given the parameters that have been reported as applying to the marking of syllable prominence in different languages, in our investigation of syllable prominence in Unua, we employ acoustic analysis to identify the possible roles of duration, pitch (F0), and intensity in order to determine what evidence can be found for patterns of stress assignment.

In accordance with much of the previous literature on Vanuatu languages (Lynch et al 2002), an initial expectation would be that the data would show a tendency towards penultimate lexical stress (Lynch et al 2002). Lynch (2000b:59) states that penultimate stress is widespread in the Southern Oceanic linkage in which the Vanuatu languages are situated. Among the languages of Malakula, penultimate stress has been reported for Tape (Crowley 2006a: 104); Naman (Crowley 2006b: 39); Neve'ei (Musgrave 2007: 21); Nerverver (Barbour 2012: 66); and Unua (Pearce 2015: 35). In another pattern reported for Malakula languages, penultimate stress placement applies only to vowel-final words, with words ending in closed syllables having primary stress on the final syllable (Avava: Crowley 2006c: 36; Tamambo: Jauncey 2011: 31).[2] Somewhat similarly, Brotchie (2009: 737-739) reports for Tirax that stress is usually penultimate and

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[2] This pattern is also found in some other Vanuatu languages: Southeast Ambrym (Parker 1968, Crowley 2002: 661), Abma (Schneider 2010: 35), and Lamen (Early 2002: 672), albeit in the case of the latter the consonant-final forms are associated with final high vowel elision.

that it can be final in words with closed syllables.[3] However, for Ahamb, Rangelov (2020: 78-81) reports that stress is final, but with exceptions: (i) where stress is penultimate when the penultimate vowel is /a/ and the final vowel is other than /a/ and (ii) where suffixes on verbs do not attract stress which is then located on the final syllable of the verb stem. Rangelov also reports instances of words that are found to occur with stress placed variably on the penultimate or the final syllable. For Nahavaq, on the other hand, Dimock (2009: 46) finds that there is no lexically-based pattern of stress placement.

Except for Dimock (2009) and Brotchie (2009), the identification of stress placement in these accounts of Malakula languages is based on the auditory perception of the respective investigators and these descriptions are largely silent on what are the perceived parameters (duration, amplitude, frequency, pitch) that mark syllable prominence. Outside of Malakula, Lynch (2000a), however, reports for Anejom̃:

"Stress is manifested as a slight increase in the loudness and a slight raising in the pitch of the stressed syllable in comparison with neighbouring unstressed syllables. For some speakers, or in some styles of speech, either the vowel and/or the consonantal coda of the stressed syllable may be slightly longer than in unstressed syllables (though not as long as geminate clusters)." [Lynch 2000a: 24]

In commenting on their observations as to stress placement in Navahaq and Unua respectively, Dimock (2009: 46-48) and Pearce (2015: 35) both report that they had difficulty in identifying syllable prominence auditorily. Dimock (2009: 46-7) also states that English's heavy reliance on pitch as a stress marker may have affected her perception of which syllables were stressed in her auditory analysis of Nahavaq. She also remarks that our perceptions of prominence are finely tuned to the language/s we speak and that this will consequently affect our perception of prominence in unfamiliar languages. Although we do not intend to here contest the findings that Lynch has reported for Anejom̃, Cutler's (2005) discussion of research on the auditory perception of stress shows that a range of interacting characteristics in one's first language can influence the perception of stress placement in another language.

Dimock's (2009: 48-50) acoustic analysis of Nahavaq examines recorded word forms in phrase-medial and phrase-final positions for pitch (F0), loudness (intensity), duration, and vowel quality (F1 and F2). Her conclusion is that none of these parameters serve to provide evidence for consistent contrastive syllable prominence. Utterance- and phrase-final syllables, however, have low amplitude, low F0 and greater duration. In contrast with the low amplitude and low F0 on the final syllable, the penultimate syllable is then perceived as more prominent. Brotchie (2009: 737) identifies stress in Tirax as the syllable with highest pitch. In an acoustic analysis of an extra-Malakula Vanuatu language, von Prince (2015: 34-35) finds that there is no evidence of word-level stress in Daakaka (spoken on the island of Ambrym), neither for duration, pitch nor intensity, but that the final syllable of an intonation phrase is marked by lengthening, and boundary tones are assigned to phrase-initial and phrase-final syllables. From yet another acoustic analysis of a Vanuatu language, Nafsan, Billington et al (2018) provide an update on Thieberger (2006) and present evidence for final F0 prominence on two-syllable words, leaving open for further investigation the possibility that the final prominence is phrase-, rather than lexically based. It is of interest that out of these four studies employing acoustic analysis, two (Dimock 2000 and von Prince 2015) claim the absence of lexically-based syllable prominence and one (Billington et al 2018) leaves open the possibility that prominence is phrase- rather than lexically based.

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[3] Morphological increments also affect stress placement in Tirax (Brotchie 2009: 738).

For Unua, it is yet to be determined what the correlates of prominence marking are and whether prominence marking might be defined on lexical items or on phrases. The present paper sets out the results of our investigation of these questions.

Section 2 describes the methods that we employed in our investigation and the results of the study are presented in Section 3.

2. Method

The data used for our investigation comes from recordings made by Pearce in field trips carried out between 2003 and 2009. These comprise 45 stories told by speakers of Unua of different ages and genders and from different villages.[4]

Pearce (2015: 36-37) gives lists of Unua lexical items showing consistent penultimate stress on two-syllable words, but contrasting penultimate and antepenultimate stress placement on three-syllable words. Whilst the data on the three-syllable items indicates possible lexically determined stress placement, the forms that are shown are based on the results obtained through elicitation with a single speaker. Especially for the two-syllable items, it is unclear whether the indicated stress assignment is lexically or utterance based. For all tokens shown, the role of the artificiality of the elicitation context is also unclear.

Dimock (2009) points out the importance of examining stress in words that are part of larger utterances, rather than analysing words elicited individually:

"Words in isolation present a problem when looking for prosodic patterns at word level because they constitute an utterance which has its own prosodic patterns […] In order to be sure that a pattern of prominence is associated with a word rather than with a higher level of prosody, one must look at a word in a variety of contexts." (Dimock 2009: 47)

There are many challenges in undertaking the analysis of aspects of prosody in narratives. Our recorded data was produced by different speakers and included a number of variables: hesitations, repetitions, stretches of cited speech within the narratives, along with the prosodic effects associated with different types of utterances. The nature of our data was such that, given the diversity of the utterances and the placement of the words within them, it was not globally feasible to control for the variety of utterance-internal effects.

For our analysis, we selected out a set of frequently occurring two-syllable words. In order to control for effects of vowel quality, the set membership was restricted to tokens with the same vowel in both syllables. All of the selected words were nouns having the shape CVCVC, a very common word shape in Unua.[5] Tokens were excluded where the phonemes were not sufficiently distinct so as to be segmented

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[4] For further details, see Pearce (2015).

[5] Unua words have neither initial nor final consonant clusters. Medial CC can occur in root word forms: *bitmos* 'bald', *matvun* 'blind (person)', *rovxot* 'mat (for roof)', *xovsar* 'mullet'. A large number of verb roots are CC-initial. Verbs always appear with prefixes and when a prefix is a consonant-final, tri-consonant sequences are possible: *mor-krox-ni* 1EXCL.DU-look for-OBL/'we looked for', *mur-b-sir* 2DU-IRR-burn/'you will burn', *mor-b-mej* 1EXCL.DU-IRR-die/'we will die'. The irrealis affix /ᵐb/, however, commonly occurs followed by an epenthetic vowel when preceding a consonant-initial root: *mor-bo-kro* 1EXCL.DU-IRR-look/'we will look', *mur-be-pre-i* 2DU-IRR-take-TR/'we will take'.

clearly, as was often the case with words where two vowels were separated by the velar fricative /ɣ/. Our data supplied us with a total of 159 usable CVCVC noun tokens. These, with the total number for each token form, were *naman* (22) 'garden', *namar* (21) 'chief', *namat* (20) 'snake', *nemen* (20) 'bird', *noxobb* (21) 'fire' and *norrom* (55) 'yam' or 'year'.[6] Ideally, we would have used words in which both syllables were closed or both open instead of the first being open and the second closed but this was not possible given the limited number of frequently occurring words in the data base.

The words were segmented and analysed using Praat. Following the approach of Dimock (2009), the vowel duration was measured and F0 and amplitude of the vowels were measured at their mid-points and compared for the two syllables. Measurements were captured only where the recording was of sufficient quality for the measurements to be reliable. For some words, Praat was unable to measure the pitch, either because the recording was too noisy or the word was too devoiced or unclear. Where examples of the Praat grids for various utterances are shown below, the transcription is phonemic and based on Pearce's (2015) orthography.[7]

As detailed in section 3.1 below, at this stage of the analysis, the results failed to provide evidence for any consistent pattern of lexical stress assignment. The nouns that we were studying occurred in different positions in sentences with different argument roles and the tokens appeared in phrases with and without preceding and/or following content. The token numbers were insufficient to provide the means to control for these context variables. However, we found another item that was more limited in the forms and in the positions in which it appeared: the interrogative/relative pronoun *(s)eten* 'what' [8] was found to occur overwhelmingly in one of two forms, either as bare *(s)eten* or as *(s)eten go* 'what FOCUS'. As discussed in section 3.3, when the tokens of both *(s)eten* and *(s)eten go* were subjected to the same kind of acoustic analysis as had been applied to the CVCVC nouns, the results pointed to the existence of penultimate phrase-level prominence correlating with higher readings for F0 on the penultimate vowel.

3. Data analysis

Section 3.1 describes the findings from the acoustic analysis that we undertook of the selected CV_iCV_iC nouns. Given that the findings of Section 3.1 are quite inconclusive, Section 3.2 then takes a brief look at the role of the phrase in the utterance. In Section 3.3, the case for phrase-based prominence is examined through the analysis of tokens of *(s)eten* versus *(s)eten go*. From the analysis in Section 3.3 we find evidence for penultimate phrase-based prominence manifested as high F0.

3.1. Two-syllable words

In this section we set out our findings from the acoustic analysis of our set of selected CV_iCV_iC nouns. The figures given below separate out the results for duration, intensity and pitch.
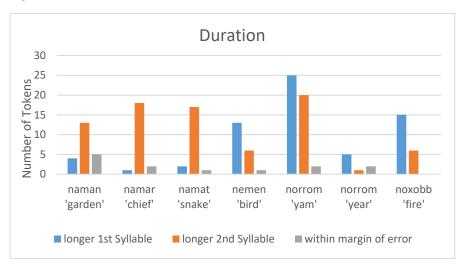

Vowel length is not phonemic in Unua. Double vowel sequences are assigned to separate syllables, unless the second vowel is /i/, in which case, the sequence is pronounced as a diphthong (Pearce 2015: 33).
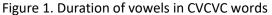
[6] The /nV-/-initial pattern occurs commonly in Unua with nouns that have accreted an earlier determiner-like particle **na* (Pearce 2007, 2015: 49-52).

[7] In the phonemically-based orthography in which all voiced stops and the bilabial trill are prenasalized, <bb> = /ᵐʙ/, <j> = /tʃ/, <v> = /β/, <x> = /ɣ/, <ng> = /ŋ/, <r> = /ɾ/, <rr> = /r/, and all other orthographic symbols have the corresponding IPA values.

[8] The form *eten* appears as a variable, possibly speaker-dependent, for *seten* (Pearce 2015: 113).

Figure 1 shows how many tokens for each word had vowels of longer duration in either syllable as well as tokens that were within the margin of error (less than 0.005 of a second).

Figure 1. Duration of vowels in CVCVC words

In Figure 1 there seems to be a clear divide between words with the <a> vowel in which the second syllable generally appears longer and those with the <e> or <o> in which it is more frequently the first syllable that has longer duration. The tokens for *norrom* are divided into those where the word was used to mean 'yam' and those where it was used to mean 'year' (although there were only eight instances in the case of the latter), but there does not appear to be a significant difference between the realizations of this word, regardless of meaning, ruling out the possibility of it being a minimal pair to illustrate lexical stress.

Moving on to intensity, Figure 2, with the margin of error at <1db, shows a slightly different pattern of distribution.
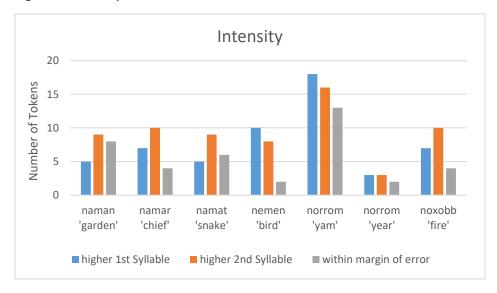
Figure 2. Intensity of vowels in CVCVC words

Figure 2 shows that there is less contrast in the intensity range across the syllables. There is a tendency for higher intensity to match with longer duration for most words although this is not necessarily the case for each individual token. The exception to this is the word *noxobb* where it is mostly the first vowel that has longest duration but the second more often has highest intensity (although the difference is slight).

Finally, for F0, with the margin at error at <5Hz, the distribution is quite evenly spread between the syllables for *naman*, *namar*, *namat* and *nemen* (Figure 3).
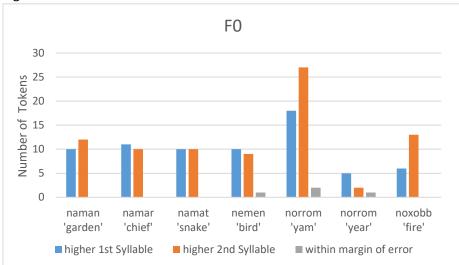
Figure 3. Pitch of vowels in CVCVC words

F0 is the only stress indicator in Figure 3 in which we see any real difference in the tokens for *norrom* depending on meaning. Unfortunately we do not really have enough tokens of *norrom* used to mean 'year' to draw any meaningful conclusions about whether the realisation might be distinct.

There is an interesting comparison to be drawn with Dimock's (2009) analysis of the Nahavaq word /ne mʲen / 'NV-bird', shown in Figure 4.[9]
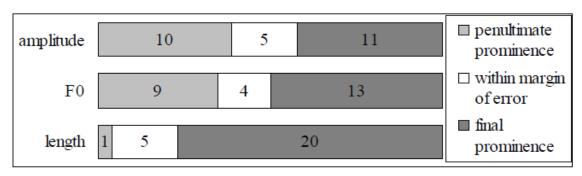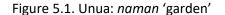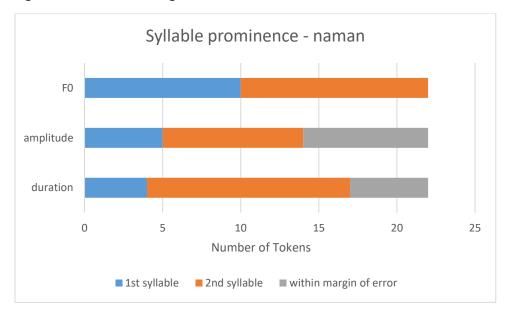
Figure 4. /ne-mʲen/ 'NV-bird' (reproduced from Dimock 2009: 49)

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[9] In his most recent proposal as to the subgrouping of Malakula languages, Lynch (2016) posits three higher order subgroupings: a Northern subgroup, a Western linkage (including Nahavaq) and an Eastern linkage (including Unua).

In Dimock's analysis, the pattern most closely resembles what we found in Unua for the words with 'a' vowels, that is, relatively even amplitude and F0, but with a longer final vowel, such as seen in Figure 5.1 for *naman* 'garden'.

Figure 5.1. Unua: *naman* 'garden'

Interestingly, this is not the case for the Unua word *nemen* 'bird' in which the first vowel tended to have longer duration as seen in Figure 5.2.
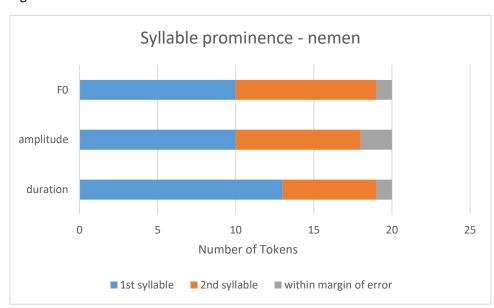
Figure 5.2. Unua: *nemen* 'bird'
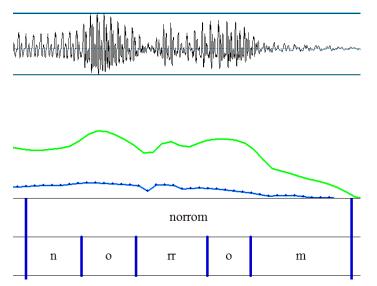
3.2. Prominence and the phrase

In our analysis of the two-syllable nouns we found different correlates of stress falling variably on different vowels in the same token type. There were also instances where all three indicators of stress would fall on the same syllable in one token of a word but on a different syllable in another token of the same word produced by the same speaker in the same story. In (1) we see the word *norrom* 'yam' appear twice in an almost identical context:
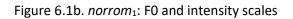
(1) Ale,   naxerr   nge   tu,   ra-vase   *naman*,   ra-vase   narog   go

     alright   time   PROX1   too   3PL-make   garden   3PL-make   laplap   and

     Alright, at this time also they made a garden, they made laplap

     ni norrom₁, ra-vase   narog ni norrom₂,   bbue i-xan-i   sobon,

     IO yam   3PL-make   laplap IO yam   pig   3SG-eat-TR   some

     with the yam, they made laplap with the yam, the pig ate some, [YG.37-38]

If we compare the waveform and the accompanying pitch and intensity trajectories for the first token (Figure 6.1a,b) of *norrom* with that for the second (Figure 6.2a,b) it is clear that duration, intensity (continuous line in 6.1a/6.2a) and F0 (dotted line in 6.1a/6.2a) are greater on the penultimate vowel of the first token but the reverse for the second token. Figures 61.b and 6.2 b show duration in seconds on the x axis and have "dual" y axes, showing F0 (upper/black line) plotted against a scale of 0-300Hz and intensity (lower/red line) against a scale of 44.29 - 77.2 dB (for 6.1b) and 42.7 - 75.79 dB (6.2b).
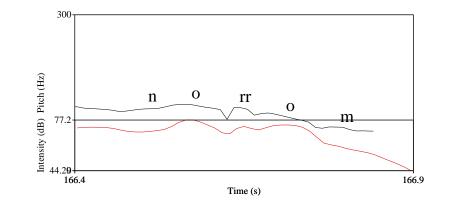
Figure 6.1a. *norrom₁*: Wave form, intensity and F0

Figure 6.1b. *norrom*₁: F0 and intensity scales

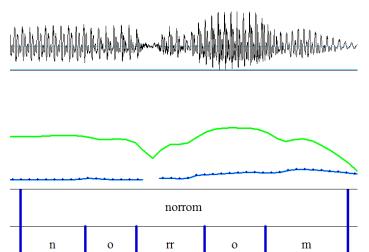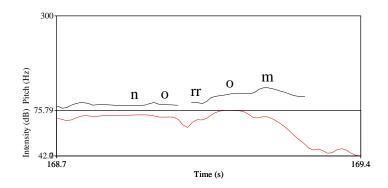Figure 6.2a. *norrom*₂: Waveform, intensity and F0

Figure 6.2b. *norrom*₂: F0 and intensity scales

The phrase *ni norrom* is repeated, initially uttered with what sounds like a falling inflection and then repeated with a rising inflection. Intensity, however, is greater on the first vowel in the first phrase, but on the second vowel in the second phrase. The differences in the placement of the prominence markers in these two occurrences of *norrom* appear to derive from differences in the prosodic patterns in the utterances in which they occur. In effect, although in both cases the word *norrom* occurs in phrase-final position following the particle *ni* and the second phrase is almost a complete repetition of the first, the presence of the focus marker *go* marks an important distinction between the two phrases in their discourse functions. In its use as a focus marker, *go* tends to occur phrase-finally. In the first phrase, the fact that *ni norrom* follows *go* suggests that this phrase is an add-on. The repeated second phrase is a restatement of the essential content of the first. Thus, despite the similarities between the two phrases, we find no evidence here for lexically-based stress and the results are indicative of prosodic effects in the utterance context.

3.3. Phrases

Given the indeterminacy in the results from our first look at the placement of prominence markers on two-syllable words, we have been led to the conclusion that prominence in Unua is not lexically based. If we are then to investigate prominence as a phrase-based phenomenon, we need to be able to find a means of zeroing in on prominence in phrases.

So far, all the words we have looked at have been simple nouns occurring in differing argument roles in sentences. Furthermore, these nouns occur in phrases either as bare nouns or as nouns followed by modifying expressions. For example, the 22 instances of *naman* 'garden' occur either bare or with a range of following modifiers as shown in Table 1:

Table 1 Modifiers following *naman*

Modifier type	Modifier	Total
Bare	-	8
Compound	*noxobb* 'fire'	1
	norrom 'yam'	1
Possessive	*sen* 'of it'	1
	se xamru 'of you(DU)'	1
	se raru 'of they(DU)"	3
	se raru go 'of they(DU) FOCUS'	1
	se raru tuen ba 'just one of they(DU)'	1
	se rate 'of they(PL)'	1
Demonstrative	*nga* 'that'	2
Adjective	*kiki ma* 'just little'	1

The modifiers following *naman* are monosyllabic or they are made up of between two and six syllables. The other nouns that we have investigated also occur either bare or with a range of following modifiers. With the data that we have available for the two-syllable nouns it is therefore not feasible to investigate how they fare in terms of the composition of the phrases in which they occur.

However, another kind of relatively frequently occurring lexeme is the interrogative/relative pronoun *(s)eten* 'what'.[10] *(S)eten* occurs most frequently either bare or followed by the focus particle *go*. We found data for *(s)eten* (*go*) in 11 of the narratives produced by a total of 8 speakers, a 13 year old female, a female approximately 60 years old, and 6 male speakers between the ages of 40 and 70 years. The data provided a total of 21 analysable tokens of *(s)eten* with 10 of the tokens as the sole item of their phrase and 11 instances in which *(s)eten* was followed by the focus particle *go*. The occurrences of the *(s)eten go* phrase unit were fairly evenly distributed across the interrogative versus relative categories, with *go* appearing 6 times after interrogative *(s)eten* and 5 times after non-interrogative *(s)eten*. Examples showing instances of *(s)eten* in interrogatives are given in (2) and in non-interrogatives in (3):

(2)a. E,   eten   go   m-i-bro-g   go   nu?

        e   what   FOC   REL-3SG-like-that   FOC   again

        'And what does that mean then?   [SS.027]

   b. Xa-u-ngar   ni   seten?

        2SG-2SG-cry OBL   what

        'What are you crying for?   [BO.061]

(3)a. b-e-ke-i   ba   seten go   i-mo-roror   nungo.

        IRR-1SG-see-TR ATTEN   what   FOC   3SG-shine   place.the

        'I will see what is shining there' [AV.009]

   b. Go   mokiki   i-rivsa   ju   seten nga   tue-n   rin   re-m-vaxe.

        and   boy   3SG-know   already   what C   brother-3SG   PL   3PL-REL-plan

        'and the boy already knew what his brothers were planning.'   [GS.056]
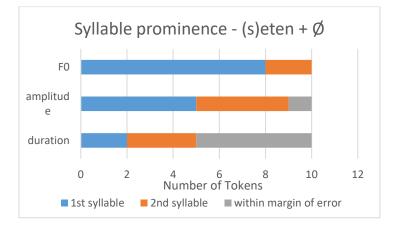

The existence of the two-syllable versus three-syllable variants (*(s)eten* versus *(s)eten go*) gave us the possibility of comparing the syllable prominence in these contrasting phrases.[11] Here, as we show below, we found an important difference in the prominence marking patterns for *(s)eten* versus *(s)eten go*.

First, Figure 7 shows the distribution of the potential stress correlates when *(s)eten* is not followed by *go*:

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[10] The form *eten* appears as a variable, possibly speaker-dependent, for *seten* (Pearce 2015: 113).

[11] The counterpart person-referring interrogative *ase* 'who' also occurs frequently with following *go*. However, the data provided only 9 tokens with *ase* and, although there was a tendency overall for the three stress indicators to fall on the second syllable of *ase*, given the degree of variability in the data already discussed, it was not evident that meaningful conclusions could be drawn on the basis of this small number of tokens.

Figure 7. *(s)eten* 'what'

Duration appears to be fairly even across syllables, with half the tokens being within the margin of error. Both vowels also seem to have a similar rate of being higher in amplitude. Higher F0 occurs mainly on the penultimate vowel (8 out of 10 instances). But, when we look at the pattern for *(s)eten* when it is followed by *go* (Figure 8), the pattern for F0 is quite different:

Figure8. *(s)eten go* 'what FOCUS'

With the three-syllable sequences in Figure 8, in contrast with the results shown for two-syllable sequences in Figure 7, the most salient finding is that, here, high F0 is found on the second vowel instead of on the first vowel. That is, in both types of sequences high F0 is manifested on the penultimate syllable. Amplitude is only slightly more marked on the second vowel with *(s)eten go* and duration favours the final vowel. From this comparison, the high F0 results across the two kinds of sequences for the penultimate syllable lead us to consider that phrase-based prominence could be marked by the realization of high F0 on the penultimate syllable.

With respect to the overall results showing high F0 on the penultimate syllable, of the total of 21 tokens represented in Figures 7 and 8, 17 were conforming and 4 were non-conforming. One of the non-conforming tokens ((5b) below), in fact, occurs with an additional following particle after *go*.[12] The four non-conforming tokens are shown without *go* in (4) and with following *go* in (5).The accent mark shown in (4) and (5) identifies the location of the highest F0 of the phrase:

(4)a. Xa-u-ngar   ni   setén?

      2SG-2SG-cry OBL   what

      'What are you crying for?   [BO.061; repeated from (2b)]

  b. Setén nati-n   i-ngar b-i-min?

      what child-3SG   3SG-cry   IRR-3SG-drink

      '(For) what is the child crying to drink?   [SS.054]

(5)a. Ale,   go   xini   i-vra: "Séten go"?

      OK   and   3SG   3SG-say   what FOC

      'OK, so she said: "What?"'   [BO.043]

  b. B-u-ke-i   ba   séten go   nu?

      IRR-2SG-see-TR ATTEN   what FOC   again

      'Just what do you see now?' [RBb.029]

In the case of (5b), the frequently occurring particle combination *go nu* could itself be a unit of the sentence,[13] rather than a part of the *(s)eten* phrase. Under this interpretation, *(s)eten*, with high F0 on the penultimate syllable, is here conforming. If so, we then remain with three out of 20 non-conforming tokens for the high F0 placement.

We can note too that interrogative expressions, whether preposed or in argument position,[14] are natural foci in sentences and should thus bear some level of prosodic prominence. Focus is manifested also by the inclusion of following *go* with the interrogatives in 5 out of 9 instances[15] and in 5 out of 11 instances with the non-interrogatives. The rough comparability of the presence of *go* with both the interrogatives and the non-interrogatives is, we suggest, support for the combining together of these two categories in

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[12] Various of the tokens in the data are attested with a preceding particle (*ni* 'OBL' or *re* 'LOC'). These preceding particles, however, although making up part of the phrases including *(s)eten*, are not expected to impinge on a penultimate syllable metric.
[13] As is the case with the final *go nu* sequence in example (2a).
[14] The alternative placement patterns did not seem to have an effect on the pattern of stress indicators either way.
[15] Not including the case of *go nu* in (5b).

our analysis. In this respect, our findings with regard to high penultimate F0 in both types of expressions would seem to provide some confirmation to our approach to the data.

The kind of data on which our analysis is based is subject to the kinds of hesitations, repetitions, false starts, and disfluencies that are characteristic of spoken data. What we believe is significant is that we have found evidence for a high level of consistency in the general F0 contrast between the two-syllable and the three-syllable tokens of a pair of minimally contrasting phrases. It is essentially on this basis that we claim that we have evidence for penultimate phrasal prominence marked by high F0.

4. Summary

For the most part, the results for this study with respect to the analysis of two-syllable words proved similar to the findings of Dimock (2009) and von Prince (2015) in Nahavaq and Daakaka, in that little concrete effect of lexical stress appeared in the data. Frequently, we would find tokens of words with no significant difference in duration, amplitude or F0 from one syllable to another. Other tokens would have different correlates of stress falling on different syllables and when all correlates did fall on one syllable for a particular token of a word we would often find another token with indicators on the other syllable.

However, where we were able to examine the two kinds of phrases with *(s)eten*, *(s)eten* and *(s)eten go*, what was constant was the tendency for high F0 to occur on the penultimate syllable of these expressions.

5. Conclusion

Despite rather inconclusive results on a number of counts, this study lays some ground work for the further investigation of stress and prominence in Unua. It is one of only a small number of studies to apply acoustic analysis to the study of stress placement in specific Oceanic languages of Vanuatu. Two of these studies, Dimock (2009) and von Prince (2015), suggested an absence of lexically-based syllable prominence in the languages they were investigating. A third acoustically-based study, that of Billington et al (2018), came with the finding of high F0 prominence on the final syllable of lexical items, but explicitly left open the possibility that the prominence might be phrase-, rather than lexically-based. Putting these studies together with ours, points to the possibility that phrase-based prominence could be characteristic of a wider range of Vanuatu languages.

It is notable that Pearce's (2015) claim as to a tendency towards penultimate lexical stress placement in Unua based on the data of a set of elicited lexical items has been absolutely thrown into question by our findings from the acoustic analysis of two-syllable words in narrative contexts. It seems to us that our findings serve as a strong caveat with respect to methods that should be applied to the determining of stress placement. Since it is the case that it is very hard to control for multiple variables in samples of continuous speech, we suggest that, if stress placement is to be tested through elicitation, then one good strategy could be for the researcher to construct phrases of varying length and constituency including particular test items. Alternatively, in cases where for some reason work in the field is not an option, as we have shown, it can be possible to discover in pre-recorded data salient categories of items that may be amenable to one or more aspects of prosodic analysis.

Given especially that our analysis has been limited to the investigation of a single contrasting phrase type, the extent to which our findings can be replicated over a wider range of data is left open for future

research. Such further research both with respect to Unua and to other Vanuatu languages would also, as noted in Billington et al (2018), make an invaluable contribution to the understanding of the historical relationships between the languages. It remains that the initial work that we have undertaken provides evidence in support of a conclusion that, at least in Unua, prominence is phrase- rather than lexically-based and that, at least in certain kinds of phrases, prominence is manifested as high F0 on the penultimate syllable.

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