Does Gokana really have no syllables? Or: what's so great about being universal?*

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This paper is concerned with syllable universals, especially the claim that all languages have syllables. Expanding beyond my earlier work, I take a new look at Gokana, the major counterexample to the universal syllable, and present overlooked (but ambiguous) evidence for a weight-insensitive bisyllabic trochee. After demonstrating the theory-dependent nature of absolute universals, and distinguishing between analytic *vs.* descriptive claims, I focus on the latter as a means of 'normalising' the discussion of what constitutes evidence for the syllable, both in Gokana and in general. A typological approach is argued for in which languages differ in the nature and extent of the 'activation' of phonological properties, with Gokana representing a language which only marginally activates the syllable, if at all. The paper ends by situating the issue within the context of recent discussions of universals and diversity (Evans & Levinson 2009), which have not dealt primarily with phonology.

1 Introduction

Over 25 years ago, I made the claim that Gokana, a Cross-River Niger-Congo language of the Ogoni (or Kegboid) subgroup spoken in Nigeria, does not organise its consonants and vowels into syllables (Hyman 1983, 1985). This was a radical and in principle unwelcome position, given the centrality of the syllable in almost all phonological work at the time. Still, as Hayward (1997: 78) pointed out several years later, the extensive treatment of Gokana largely went unnoticed:[1]

> Hyman's account of the Nigerian language Gokana and in particular his
> well-argued claim that Gokana represents a case where invocation of the

[1] Among the few exceptions, Blevins (1995: 236) and Broselow (1995: 202) briefly mention the Gokana claim, while Ikoro (1996) posits syllables in closely related Kana, and assumes they must exist in Gokana as well.

syllable buys nothing insightful for explaining the phonology of the language should have disturbed profoundly the settled orthodoxy surrounding the universality of the syllable. That a vowel (the quintessential syllable nucleus) is not guaranteed syllable membership is a very strong proposal, but one has little sense that it has attracted overmuch comment. … In my view it would be unfortunate if Gokana were to be regarded simply as an interesting oddity, rather than as the limiting case in a clinal situation in which many languages may participate to some degree in the course of their phonologies.

Although there was almost no response to the claim of no syllables in Gokana, the proposal of Hyman (1985) to establish moras as a central building block in phonology did gain currency, and was particularly welcome to specialists of Japanese, long viewed as exclusively moraic in its prosodic structure. Since that time work on the syllable has gone in opposite directions: while Kubozono (1999, 2003) presents mostly metrical evidence that the syllable may in fact play a role in Japanese, Steriade (1999) and Blevins (2003) argue against syllable accounts of phonotactic constraints, and Steriade (2009) argues against syllable accounts of certain rhythmic effects. Instead, they show either that the generalisations are wrong, i.e. the constraints hold even across syllables, or that a string-based account without reference to the syllable is equally if not more revealing. It thus seems that the exact role of the syllable in phonology is once again up for grabs, as has been the case in its rocky 'on-again, off-again' past.

    In this paper I have two goals. The first is to take a new (and more extensive) look at Gokana with respect to the original claim of no syllables. The Gokana situation would seem to be important to resolve, given that most researchers still assume the syllable to be a building block in all languages, a psycholinguistic reality which is phonetically grounded in articulation and/or perception and supported by experimental evidence, language acquisition and orthographies (see, for example, the collection of papers in Cairns & Raimy 2011). While in my earlier work I was unable to find any evidence for the syllable, below I present an overlooked argument which, although ambiguous, can at least be shown to have advantages over the no-syllables account. The fact that the syllable plays at best a minor role in the prosodic organisation of Gokana has broader implications for both phonological typology and the quest for phonological universals. Thus, a second goal of the paper is to demonstrate that universal claims of the sort 'all languages have syllables' are necessarily theory-dependent and hence less testable than often assumed. This not only explains the numerous metamorphoses and instability of the syllable concept throughout the history of phonology, but also suggests that questions of (absolute) universality should not dominate the agenda. A more productive strategy is to 'normalise' the differences based on theoretical assumptions and focus on the ways in which diverse sound systems 'activate' structures and features in the sense of Clements (2001: 72): 'features are specified in

a given language only to the extent that they are needed in order to express generalizations about the phonological system'. The syllable has of course been very useful in expressing generalisations in a number of languages, e.g. concerning onset–coda asymmetries or closed-syllable vowel shortening. Perhaps this is what Hayward meant by 'cline': in some languages the syllable is activated to express multiple generalisations, in others only a few and in still others perhaps none at all, as in the case of Gokana.

The paper is organised as follows. In §2 I present general claims that have been made concerning the syllable, distinguish between analytic and descriptive claims, and show how one of them ('syllabification is always predictable') is highly theory-dependent. §3 then recapitulates the case for the descriptive claim of no syllables in Gokana, based on Hyman (1983, 1985). Potential new evidence for the syllable in Gokana is then presented in §4, followed by discussion in §5. Finally, §6 expands on the application of Clements' (2001) notion of phonological activation to the study of phonological universals and variation. The paper ends by situating the Gokana case within the ongoing debate initiated by Evans & Levinson (2009) concerning linguistic universals *vs.* diversity, which has only partially concerned phonology up to this point.

2 Theory, interpretation and the syllable

The purpose of this section is to demonstrate that universal claims about the syllable are highly theory-dependent. One indication of this is the wide range of positions which have been taken on the syllable over the past 100 years or so, including those in (1).

(1) a. whether the syllable exists or not
  b. what the syllable is (phonetic *vs.* phonological, articulatory *vs.* acoustic, abstract)
  c. what the syllable can (*vs.* cannot) do
  d. how syllable structure should be represented (flat *vs.* hierarchical, X slots *vs.* moras, iterations of CV only, maximally CVX etc.)
  e. how syllabification should be implemented (sonority- *vs.* edge-based, lexical *vs.* post-lexical etc.)
  f. what is universal *vs.* language-specific

While other linguistic constructs, such as the morpheme, word or sentence have had their own definitional and analytical problems, none has had such a 'chequered' past: at one end of the spectrum, various universal claims have been made for the syllable, such as those in (2), which also lists some of the few alleged counterexamples.

(2)   *claim*   *alleged counterexample*
  a. All languages have   Gokana (Hyman 1983, 1985)
     syllables.
  b. All languages have CV   Western Arrernte (Breen & Pensalfini
     syllables.   1999)
  c. All segments belong to   Bella Coola (Bagemihl 1991)
     a syllable.   Piro (Lin 1997)
  d. Syllabification is always   Barra Gaelic (Kenstowicz & Kisseberth
     predictable.   1979)
                                 English (Bloomfield 1933, Blevins 1995)

At the other end of the spectrum, in the early generative phonology era the syllable was claimed either not to exist or to be totally redundant and not necessary (Kohler 1966). How can it be that some scholars assume that syllables are universal and restricted to CV in all languages (Lowenstamm 1996), or are subject to a maximal CVX syllable structure (Duanmu 2009), while still others deny the syllable's appropriateness in some or all phonological analysis?

The problem is that the above claims are necessarily theory-dependent. As an illustration, consider the claim in (2d) that syllabification is always predictable:

> One argument which has been raised against phonological syllables is that, unlike segments, the location of a syllable boundary *within a morpheme* can never be phonemic. That is, two morphemes such as /a$pla/ and /ap$la/ cannot differ only in their syllable structure. (Hyman 1975: 192)

Although oft repeated (Clements 1986: 318, Hayes 1989: 260, Steriade 1999: 224, McCarthy 2003: 10, Blevins 2004: 232, etc.), care must be taken to interpret exactly what the nature of the claim is: is (2d) a *descriptive* claim stating that an underlying (surface?) contrast between mono-morphemic *a.pla* and *ap.la* is not possible, or is it an *analytic* claim stating that any such contrast, if attested, would have to be formalised other than by contrastive syllable structure? In the first case, one is making the empirical claim that an identical intervocalic /pl/ sequence could not have two sets of properties within different morphemes. In the second case, one is making the formal claim that if two such sets of properties did exist, they could not be analysed as a difference in syllabification. Rather, some other representation or device would necessarily be appealed to.

Assuming this latter response raises the question of which devices one would be willing to invoke to 'explain away' apparent counterexamples to (2d). Marking one of the syllabifications as exceptional, e.g. /apla/ *vs*. /ap.la/, would clearly violate (2d). One might therefore instead set up an abstract contrast between geminate and single consonants, i.e. /apla/ (→ *a.pla*) *vs*. /appla/, which first syllabifies as *ap.pla* and then undergoes

degemination to become *ap.la*. A variant of this analysis could be an empty C slot, i.e. /apla/ *vs.* /apCla/. Alternatively, one might posit a ghost V slot whereby /apla/ → *a.pla vs.* /apVla/, which would first become *a.pV.la*, then *ap.la*. The question is not only whether such analytic moves are motivated, but whether one or another of them violates the spirit of (2d). Does the extraneous C or V slot effectively undermine the basic point, that we should be able to predict syllabification within morphemes?

Steriade (1999: 224) proposes that the absence of such syllabification contrasts may have a functional basis. Citing the absence of a contrast between monomorphemic *as.ka* and *a.ska*, Steriade suggests that there would be insufficient perceptual cues to signal such a contrast. Note, first, that such contrasts are possible across morphemes and words, e.g. *my space vs. mice pace*, where timing and aspiration differences at least potentially disambiguate the two. Returning to /apla/, if a language were to combine English aspiration with Icelandic open syllable lengthening (Vennemann 1972), the surface contrast would be between [aː.pʰla] and [ap.la], which we can assume to be quite sufficiently distinct.

If we turn to other phenomena, we see that the issue is not so much one of perceptibility, or even CC syllabification, but rather whether specific theories allow underlying syllabification or not. The contrasts in (3), all of which are attested, would be as much a problem for such theories as a contrast between /a.pla/ and /ap.la/.

(3)	*unpredictable contrast*		'solutions'
a.	V syllabification	ai *vs.* a.i	glide *vs.* vowel: /aj/ *vs.* /ai/
			ghost C: /ai/ *vs.* /aCi/
b.	syllabicity of G *vs.* V	ju *vs.* iw	underlying C *vs.* V slots, or [±cons]
c.	secondary stress	*object* [ˈabˌd͡ʒɛkt] *subject* [ˈsʌbd͡ʒɨkt]	diacritic accent on *obj̱ect* underlying /ɛ/ *vs.* /ɨ/ (but cf. *obˈject*, *subˈject*, both with [ɛ])

Again we must ask whether the proposed 'solutions' are in the spirit of (2d). The case of (3c) is particularly pertinent. If one assumes that stress is a property of syllables, and if unpredictable stress must be indicated lexically, diacritic accents and other such indications necessarily mark syllable properties (Inkelas 1995: 295) and are hence not in the spirit of (2d).[2]

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[2] The same need for lexical syllabification can be found with respect to unpredictable tone, if the tone-bearing unit is the syllable: 'if syllables were allowed to bear features [i.e. tone], they would be the only feature-bearing units whose extension was completely predictable by an algorithm referring to other linguistic units' (Leben 1980: 192).

Citing the near-minimal pair *Ida* [ˈaj.dʌ] *vs. Aïda* [a.ˈij.dʌ], Blevins (1995: 221) writes:

> in the general case, syllable structure is not present in underlying representations. … For exceptional forms like [ʔa.íy.da] we can assume that minimal structure is specified in the lexicon.

However, in a later work, she writes: 'syllabifications within a given language are never contrastive' (Blevins 2004: 232). While not specifically talking about syllables, Bloomfield (1933: 121) assumes representations that make the syllabicity of sonorants unpredictable:

> Whether a sonant in any word is syllabic or non-syllabic, is determined in different ways in different languages. If the syllabic or non-syllabic character of a sonant depends entirely upon the surrounding phonemes (as in *bird* versus *red*), then the difference is not distinctive … In many cases, however, the syllabic or non-syllabic character of the sonant is determined arbitrarily, and constitutes a phonemic difference. Thus, in *stirring* [ˈstr̩iŋ] the [r] is syllabic, but in *string* [striŋ] it is non-syllabic; in the second syllable of *pattern* [ˈpɛtr̩n] the [r] is syllabic and the [n] is non-syllabic, but in the second syllable of *patron* [ˈpejtr̩n] the [r] is non-syllabic and the [n] is syllabic.

Here we directly observe the theory-dependence issue and the importance of agreeing on the analysis. We can ignore Bloomfield's first pair of examples, since *stirring* is bimorphemic, but the fact that he represents *pattern vs. patron* with phonemic syllabic sonorants, rather than with schwas, i.e. /pætərn/ *vs.* /petrən/, in more modern terms would require lexical indications of syllabification.

Given the above issues, the ultimate status of (2d) is not entirely clear. The possibilities seem to be those in (4).

(4) a. no syllabification in underlying representations (i.e. morphemes cannot contrast in syllabification)
   b. syllabification in underlying representations only in exceptions
   c. syllabification in underlying representations only where not 'predictable'
   d. syllabification in underlying representations even if predictable

What I hope to have shown is how difficult it is to maintain a coherent position across platforms: to evaluate any of the claims in (2) one must also know what the theoretical assumptions are, as well as what one would be willing to consider as a counterexample. A related metatheoretical question one should ask is how good a universal is if it is so easy to 'accommodate' it with representations such as in (3). In this study I attempt to 'normalise' the discussion of the syllable by focusing on the descriptive properties which claims such as (2d) are intended to account for rather than on the analytic models, which can be quite removed from the observed facts.

With this distinction in mind, let us now turn to the putative universal in (2a) and the more radical claim of no syllables in Gokana.

3 No syllables in Gokana

In §2 we went through a number of universal claims that have been made about syllables in (2) and considered (2d) in some detail. In this section we are concerned with the universal claim in (2a): 'all languages have syllables'. In the following paragraphs I recapitulate the case for no syllables in Gokana.[3] The metatheoretical question we face in this context is: what would it take to convince us that a language does not have syllables? Hyman (1983, 1985) argued that such a case is to be found in Gokana, which organises its phonology exclusively around moras ('weight units'). As an introduction to the problem, consider the sentence in (5a).

(5) a. mɛ́ɛ̂ɛ̂ ɛ̀ kɔ̄ m̄m̀ kɛ̄ɛ̄ɛ̀ɛ̀ɛ̄ɛ̄ɛ́ 'who$_i$ said I woke him$_i$ up?'
   b. kɛ̄ɛ̄ɛ̄ + ɛ̀ + ɛ̀ɛ̀ + ɛ̄ɛ̄ + ɛ́ < /kEE+È+ÈÈ+´EE+É/
      wake-CAUS-LOG-3SG-FOC   [+nasal]

As seen, the utterance ends in six lengths of [ɛ̃]. (5b) shows that that the six surface lengths derive from eight underlying vocalic moras: both /ÈÈ/ (LOGOPHORIC) and /´EE/ (3SG OBJ) undergo a rule which shortens a geminate vowel after another vowel (see (14b) below).[4] The question is: how many syllables are there in the form in (5b)? How can one determine? Assign a syllable to each vocalic mora, giving six syllables? Or to each pair of moras, giving three syllables? One indirect argument against syllable structure in Gokana was that it was virtually impossible to answer this question. However, I did recognise the following problem:

It is of course logically impossible to prove that a language does not have syllables, since it may be the case that it has them but does not show obvious evidence of it – it may also be the case that some future linguist

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[3] The material presented in this study is primarily based on the speech of Godwin Zoranen, who served as linguistic consultant during and subsequent to two field methods courses in the early 1980s at the University of Southern California. Besides this primary research, I have drawn from Brosnahan (1964) and four Nigerian BA dissertations and one MA thesis sent to me by the late Kay Williamson (see references) to produce a searchable Filemaker Pro™ lexicon of 964 entries, which has been invaluable in uncovering phonological generalisations, e.g. concerning the vowel + vowel co-occurrences in Table I.

[4] /E/ stands for an archiphoneme which is realised as [ɛ] after /ɛ ɔ a/, [e] after /i u e o/ and [ɛ̃] when nasalised. High tone is marked with an acute (´) accent, Low with a grave (`) accent and Mid is unmarked, or occasionally marked with a macron (¯). Thus, the 3rd singular object pronoun /´EE/ has M tone, with a preceding floating H.

might discover evidence for the syllable in Gokana which I have simply overlooked. (Hyman 1985: 27)

Although one cannot definitively 'prove' the *absence* of syllables, I appealed to two kinds of indirect arguments to support my original position: (i) a good-faith, but unsuccessful, effort was conducted to find the *presence* of syllables, based on the usual evidence and criteria; (ii) the system can be insightfully analysed without syllables.

In order to conduct such a 'good-faith, but unsuccessful effort', one has to know where to look for evidence that the syllable has been phonologically activated (§1). In (6) I list the properties which have provided the usual arguments for syllables and syllable structure in other languages:

(6) a. distributional constraints conditioned by syllable structure
   b. phonological rules conditioned by syllable structure
   c. morphological rules or allomorphy conditioned by syllable structure
   d. prosodies or word-stress targeting the syllable as a feature-bearing unit
   e. prosodic grouping of syllables into higher-order constituents, e.g. feet

I consider (6a–d) in the following four subsections; (6e) will be treated in §4.

3.1 Distributional constraints

The most revealing constituent affecting distributional constraints in Gokana is what I shall refer to as the 'prosodic stem' (PrStem), consisting of an obligatory root plus possible suffixes. Its phonological properties are summarised in (7).

(7) a. *shapes*
   CV, CVV, CVC, CVCV, CVVCV,
   CVCVV, CVVV, CVVCVV, CVVVV
   b. C_1 = p t k^j k kp ʔ + [m ŋ n ɲ] (= /B v D z/ with a
             b d g^j g gb   [+nasal] prosody)
             f s
             v z
                l (= /D/)
   c. C_2 = /B D G/ (see (9))

In (7a), I use the symbol V to indicate a mora. Unless subscripted as V_iV_i or V_iV_j, VV represents either a long vowel or a sequence of (like or unlike) vowels. As seen, the PrStem may consist of one to four moras. It must begin with a consonant (C_1), and may have a second consonant (C_2) or not. Examples of each of the above structures are given in (8).

(8) CV   té   'tree'   gɔ́   'hide'
    CVV   bèè   'plantain'   gbuu   'swell'
    CVC   búl   'mat'   mɔn   'see'
    CVCV   kávà   'tick'   kpárí   'sweep'
    CVVCV   bùùrù   'ashes'   kaànà   'pick (fruit)'
    CVCVV   tɔnàà   'branch'   kúmìè   'pound (LOG)'
    CVVV   Ɂoòà   'return'   kɛ̃ɛ̃ɛ̃   'wake up (TR)'
    CVVCVV gɔɔmáá 'cowrie'   zaàrìè 'scatter (LOG)'
    CVVVV   béèàὲ   'pass (LOG)'   kɛ̃ɛ̃àὲ̃   'wake up (INTR+LOG)'

Where possible, I have provided both a noun and a verb to exemplify. However, as the glosses indicate, the shapes CVVV and CVVVV are restricted to verbs, which, unlike nouns, are capable of taking suffixes (see §4). Note that nasalisation or 'nasal harmony' is a prosody in Gokana, affecting vowels and converting /B v l z/ to [m ɱ n ɲ].[5] Thus, *kaànà* 'pick (fruit)' is underlyingly /kaaDa/[+nasal] 'pick (fruit)' and pronounced [kãầnã̀]. Vowel nasalisation will be transcribed only when there is no nasal consonant in the form, e.g. *kɛ̃ɛ̃ɛ̃* 'wake (someone) up'.

As indicated in (7b), the stem-initial C_1 consonant can be any of 16 oral consonants plus the nasal variants, while C_2 is limited to the three archiphonemes /B D G/, which may be realised as oral or nasal. When occurring orally, the archiphonemes are realised as [b l g] finally and [v r g] intervocalically, as exemplified in (9a).[6]

(9)   *'coda-like'*   *'onset-like'*
  a. oral   /B/   zob   'dance'   tóví   'throw'   /tóB+i/
         /D/   kil   'go'   darà   'pick up'   /dà+Da/
         /G/   pig   'mix'   vììgà   'swing'   /vììG+a/
  b. nasal /B/   num   'groan'   kúmí   'pound'   /kúB[+nas]+i/
         /D/   ban   'beg'   bííná   'ask'   /bíí[+nas]+Da/
         /G/   Ɂaŋ   'pull out' maɲà   'laugh'   /BàG[+nas]+a/

The major issue, therefore, is how to account for the dramatic decrease in consonant contrasts in C_2 position. Although I have arranged the above forms in columns where the C_2 is labelled as 'coda-like' *vs.* 'onset-like', it is doubtful that syllable structure can account for the limitation of C_2 to /B D G/. A move to arbitrarily assign the C_2 to coda position in all cases, as in (10), is not only counterintuitive, but forces an analysis with an otherwise unattested long-vowel CVVC syllable in (10b).[7]

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[5] /B/ represents an archiphoneme which is realised as [m] when nasalised, e.g. *má* 'breast' is underlyingly /Bá/[+nasal] and pronounced [mã́]. While [l] is the realisation of /D/ as C_1 and C_2, /G/ only occurs as C_2.

[6] Some dialects realise /B/ as [β] intervocalically (Okotie 1971–72: 29, Arekamhe 1972: 15, Asinyirimba 1972: 18).

[7] Both Okotie (1971–72: 18) and Arekamhe (1972: 23) report *tàám* for 'cat', whereas I recorded *nwám̀báná*, a likely frozen compound. Brosnahan (1964: 47) also

(10) a. tóv.í   'throw'   b. viìg.à   'throw'
         dar.à 'pick up'   bíín.á   'ask'
         kúm.í 'pound'
         maŋ.à 'laugh'

It also can be seen in the last column of (9) that morphological structure cannot account for the distributions: the C_2 consonant may belong to the root or to a suffix.

A solution that does work is to say that a postvocalic consonant can only be /B D G/. This is true whether the generalisation is stated with respect to the PRStem or to the word, as there are no vocalic prefixes.[8] Alternatively, one could simply refer directly to the C_2 position within the PRStem. Either way, syllable structure is irrelevant.

3.2 Phonological rules

As discussed in Hyman (1985) and earlier work, the major phonological rules of Gokana are nasal spreading, vowel harmony and, most relevant to this study, the realisation of /B/ and /D/ intervocalically.[9] Since Gokana lacks underlying /j/ and /w/, the intervocalic context can be captured via [−consonantal], i.e. without reference to syllabicity.[10]

(11) a. /B D/ → [v r] / [−cons] __ [−cons]
     b. /B D/ → [b l]

Had there been a contrast between /i u/ and /j w/, it might have been necessary to refer to syllable structure in stating (11a). The absence of /j w/

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reports *biìn* 'bean', an obvious borrowing. In my earlier work I reported two CVVC words with non-identical vowels, *ɓiob* 'tsetse fly' and *biɔm* 'fingernail, claw'. Although such forms are relatively rare, Vopnu (1991: 15,48) presents a few more, which he analyses as /CjVC/: *fjob* 'type of snail', *kjág* 'type of speck of the eye'. This seems to be a better analysis, since Vopnu (1991: 56) also reports that *pjɔ́l* 'select' and *vjób* 'make the hitting sound of a tiny stick' become *pjɔ́pjɔ́l* and *vjóvjób* in CV-reduplication, rather than **pípjɔ́l*, **vívjól* (cf. (18)). The question of whether there is a distinction between potential Cj clusters and palatalised consonants, e.g. /kʲ gʲ/, is a complex one that would require cross-dialectal research to resolve (see also note 17).

[8] The only potential nominal prefix (proclitic?) in the language is a homorganic nasal /Ń-/ marking diminutives, e.g. *gà* 'skewer', *ŋ́gà* 'needle'. All other pre-stem grammatical morphemes are either proclitic or join with each other to form a separate phonological word (cf. *ʔeaὲ* in (36a) below).

[9] Within the PRStem and also vocalic enclitics, vowel harmony affects mid vowels which are realised [ε ɔ] after /ε ɔ a/, [e o] after /i u e o/ and [ɛ̃ ɔ̃] when nasalised.

[10] Although Vopnu (1991: 29) reports variation between C_1 [v] ~ [w] and [z] ~ [j] in other dialects, and setting aside ambiguous /CʲV, CjV, CiV/, the only [w] and [j] attested in the dialect under discussion here concerns an optional 'slight homorganic glide' (Hyman 1985: 66) between a long /ii/ or /uu/ and the following vowel, e.g. [siíe] ~ [siíʲe] 'catch him!', [ʔuúe] ~ [ʔuúʷe] 'cover him!'. I consider such 'glides' simply to be phonetic transitions between the vowels.

thus may not be an accident, but rather a further indication that Gokana does not reference syllables in its phonology.

3.3 Allomorphy

A third area where syllables seem quite beside the point concerns the statement of allomorphy. Gokana has two inflectional suffixes, which vary allomorphically as in (12).

(12)		*2nd pl subj*	*logophoric*	
	after CV$_i$V$_i$	-rii	-rèè	i.e. -DVV
	after CVC	-ii	-èè	-VV
	after (C)V	-i	-è	-V

Examples are provided in (13).

(13) oò sii-rii 'you (PL) caught'   aè sìì-rèè 'he caught'
oò zov-ii 'you (PL) danced'   aè zov-èè 'he danced'
oò tu-i 'you (PL) took'   aè tu-è 'he took'

While a pure allomorphy solution is certainly tenable, Hyman (1985 : 66) posits underlying /-ii/ and /-´ÈÈ/, and interprets the alternations as phonological, proposing a D-insertion rule, as in (14a).

(14) a. $\emptyset \rightarrow$ D /   μ   μ   __   μ   μ   D-*insertion*
            \/   \/ $\emptyset \rightarrow$ D / V: __ V:
        [−cons]   [−cons]   [r]

   b.   μ   μ $\rightarrow$ μ   /   μ   __   *Vowel shortening*
          \/ | | V: $\rightarrow$ V / V __
        [−cons]   [−cons]   [−cons]

As seen, D-insertion requires that both the preceding and following vowels be geminate: a single set of [−consonantal] features linked to two moras. In (13c), D is not inserted, since the preceding vowel is short. Instead, the rule in (14b) applies to shorten a geminate vowel when it is directly preceded by a vowel, whether long or short.[11] In neither rule is there any reason to refer to syllables. A second condition on D-insertion is that it is limited to the PRSTEM. Thus, when the 3rd person singular enclitic /´EE/ follows a long vowel, there is no epenthesis. Instead, vowel shortening applies: /aÈ sii ´EE/ $\rightarrow$ *aè siíe* 'he caught him', /aÈ sii ´ii/ $\rightarrow$ *aè siíi* 'he caught us'.

It should be noted that the motivation of the rules in (14) does not seem to be to improve syllable structure: in other languages, such as Turkish, Japanese and Korean, where some suffixes are vowel-initial after a C-final

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[11] The same vowel-shortening rule applies within the noun phrase: /mii=´EE/ $\rightarrow$ *miíɛ* 'his/her blood' (cf. *mɛnéɛ* 'his/her neck', *búe* 'his/her pus') (Hyman 1985 : 39).

base, but consonant-initial after a V-final base, the effect is to optimise CV syllables. What the rules in (14) do seem to have in common is that they minimise certain sequences of vocalic moras. However, as seen in examples such as in (15), they are hardly effective.

(15)			*2nd pl*	*logophoric*
	kuùà	'open (INTR)'	kuuai	kuùàɛ̀
	ɲááá	'change (INTR)'	ɲáaai	ɲáááɛ̀
	kɛ̃ɛ̃ɛ̃	'wake up (TR)'	kɛ̃ɛ̃ɛ̃ĩ	kɛ̃ɛ̃ɛ̃ɛ̃

The forms in the first column involve CVV roots followed by a -V derivational suffix, either anti-causative -*a* or causative -*Ȅ*. The second and third columns add the familiar 2nd plural subject and logophoric inflectional suffixes to these forms. The result is four successive vocalic moras uninterrupted by a consonant. Note finally the forms in (16).

			2nd pl	*logophoric*
(16)	bua	'cook (INTR)'	buai	buàɛ̀
	mɛà	'be born'	mɛai	mɛàɛ̀
	tóá	'carry on head'	tóai	tóàɛ̀

The question is: if D-insertion were claimed to have the function of creating more C-initial syllables, why doesn't it apply after CV and CV_iV_j bases? Why only after geminate vowels?

The forms in (16) indicate that Gokana fails to insert an onset to create a second, well-formed syllable: **bua-rii*, **buà-rɛ̀ɛ̀*, etc. We now consider another morphological process which in fact *removes* what would be an onset C_2 consonant. As seen in (17a), CV, CVV and CVC add an -*a* suffix to form an 'anti-causative', which is usually, but not always, intransitive.

(17)	a.	CV	gɔ́	'hide (TR)'	gɔ́á	'hide (INTR)'
		CVV	bii	'press (TR)'	biìà	'press (INTR), be too tight'
		CVC	ʔig	'twist (TR)'	ʔigà	'twist (INTR)'
	b.	CVC-*i*	ʔóví	'burn (TR)'	ʔóvá	'burn (INTR)'
		CVVC-*i*	zaari	'scatter (TR)'	zaàrà	'scatter (INTR)'
	c.	CVC-*a*	darà	'pick up'	daàà	'begin, pick up (INTR)'
		CVVC-*a*	kuùrà	'open (TR)'	kuùà	'open (INTR)'
		CVCE	bɛrɛ	'lean (TR)'	bɛɛ̀à	'lean (INTR)'

Verbs which end in -*i* replace this suffix with -*a*, as in (17b). The most surprising result is seen in (17c): when a CV(V)CV verb ends in -*a* or -*ɛ*, the C_2 consonant is deleted, the preceding vowel is lengthened (if it is not already long) and the final vowel is again -*a*. In producing CVVV sequences in both (16) and (17c), the associated operations indicate an apparent disinterest in establishing syllable onsets, at least with respect to C_2.

Still in the context of morphology, note finally in (18) that verb-stem reduplication does not give unambiguous evidence for the syllable.

(18) dɔ   'fall'   dɔ-dɔ̀   'falling'
      dib   'hit'   di-dib   'hitting'
      darà   'pick up'   da-dàrà   'picking up'
      pììgà   'try'   pi-pììgà 'trying'

While one could stipulate the copied CV as a monomoraic syllable
(RED = σ_μ), the CV reduplicant could just as adequately be identified as an
unsyllabified mora (RED = μ).

3.4 Prosodies and word-stress

In some languages prosodies have been reported whereby a syllable may
bear a prosodic feature as a unit, e.g. the 'emphatic' feature of Aramaic
(Hoberman 1988). The two prosodies in Gokana, nasal harmony and vowel
harmony, are not so restricted. First, while some syllables are completely
nasal and others oral, it is possible for a CV sequence to have an oral
consonant and a nasalised vowel, e.g. *bɑ̃́* 'pot', *gbɨ̃́* 'look for', *kɛ̃* 'place'. In
addition, both harmonies clearly extend beyond a single syllable and, in
fact, outside the PRSTEM onto vocalic enclitics. There is thus no need to
see either as syllable-based.

This leaves the question of word stress. Note first that Gokana does not
have perceptible stress differences in the sense of English and other such
languages. This should not be surprising, as the typical features of stress
(F0, duration, intensity) are not likely to be available in Gokana. First,
since the language has an underlying three-height tone system of /H/, /M/
and /L/, and a fourth derived downstepped ꜜM tone, there is little room
for F0 to play a role. Second, recalling (5), we have seen sequences of up to
six moras of identical vowel length, making duration particularly prob-
lematic for marking stress. This leaves intensity. While no differences
have been observed in the realisation of identical C_1 and C_2 consonants,
e.g. in stems such as *miimii* 'red' and *nánā* 'to pick up', dramatic inventory
differences in the contrasts that are allowed on C_1 *vs.* C_2 were pointed out
in (7). Is the more extensive set of C_1 contrasts evidence of initial stress?

This question will come up again in §4. For our present purpose the
issue is whether a putative initial stress provides evidence for the syllable.
One of the assumptions concerning word stress is that it is necessarily a
property of syllables, or at least the rhyme, which is either stressed or
unstressed. Any system that requires a heavy syllable, e.g. CVV, to con-
trast intrasyllabic prominence, e.g. on its first *vs.* second mora, at the very
least involves something more than stress (typically, tone). In order to
determine whether there is initial syllable stress in Gokana, we have to
establish what the possible structures are of the putative initial syllable.
Where the PRSTEM has the shape CV, CVC or CV_iV_i, there seems to be no
question. What about CV_iV_j stems, such as those seen earlier in (16)? How
many syllables are there in forms such as *buai* 'to cook (INTR + 2PL)', *kuìàɛ̀*
'to open (INTR) + LOG' and ultimately *kɛ̃̀ɛ̃́ɛ̃̀ɛ̃̀ɛ̃́ɛ̃́* in (5)? Suffice it here to
say that even if we accept initial prominence, we have not been able to

(a) V_2

	i	e	ɛ	u	o	ɔ	a
i	3	0	0	0	0	0	6
e	0	11	0	0	0	0	1
ɛ	0	0	8	0	0	0	0
V_1 u	1	1	0	4	0	0	0
o	0	0	0	0	7	0	1
ɔ	1	1	0	0	0	8	4
a	5	0	0	0	0	0	12

(b) V_2

	i	e	ɛ	u	o	ɔ	a
i	8	6	(4)	0	0	0	15
e	3	2	0	0	0	0	9
ɛ	4	0	9	0	0	0	6
V_1 u	7	3	(1)	1	0	0	8
o	5	2	0	0	0	0	8
ɔ	8	1	6	0	0	0	8
a	9	0	5	0	0	0	19

Table I

Vowel distribution in bisyllabic nouns and verbs: (a) nouns (74 out of a total of 311 noun entries); (b) verbs (159 out of a total of 316 verb entries). Cells with either no entry or one exceptional case are shaded. The V_2 vowels in parentheses are the result of nasalisation, which permits [ɛ̃], but not *[ẽ].

uniquely parse the PRSTEM into syllables. This issue is further explored in the next section.

4 New evidence for the syllable in Gokana

In the preceding section we ended by raising the issue of whether the distributional properties of consonants suggest an initial stress. The question is how to account for the asymmetries between C_1 and C_2, which are reminiscent of onset–coda asymmetries. First, C_1 has a much fuller inventory than C_2 (cf. (7b) *vs.* (7c)). Second, C_1 is obligatory, as opposed to C_2, which is not. It is not just consonants which show such an asymmetry, but also vowels. Restricting ourselves to lexical entries having the shapes $C_1V_1(\text{:})C_2V_2(\text{:})$, Tables 1a and b show that the vowels which follow C_2 are significantly restricted. In (a) I only counted nouns which meet the shape requirements in (7), i.e. ignoring compounds, borrowings and reduplications which have a C_2 consonant other than /B D G/ (cf. (32) below). As seen, 64/74 (86·5 %) of these nouns have an identical V_1 and V_2 or an /i–a/ or /a–i/ sequence. Thus mid vowels and rounded vowels are permitted as V_2 only if they are identical to V_1. The story is different in verbs, where, as seen in (b), the V_2 has one of the suffix shapes /i a E/, the last harmonising as [e] after /i u e o/ and [ɛ] after /ɛ ɔ a/. As indicated, only two verbs are exceptional: *gjɔ̀ʋè* 'wet', which has a final [e] instead of [ɛ], and *bunu* 'break', which has a rounded V_2.

Clearly all seven vowels contrast as V_1, but not as V_2, just as all consonants occur as C_1 but not as C_2. In recognition of the fuller distribution of C_1 and V_1, Hyman (1990) proposed a compromise: perhaps Gokana syllabifies the first CV of the word, while any remaining segments remain unsyllabified. If syllabified, all segments contrast; if not syllabified, there

are significant restrictions. However, the above asymmetries are clearly reflexes of stem-initial prominence, which licenses a fuller set of contrasts (Beckman 1998, Hyman 1998, 2008a, Smith 2002). In this connection, note that there is compelling evidence that the 'prosodic stem' is definable in terms of foot structure in related languages, e.g. in Ibibio, another Cross-River language (Akinlabi & Urua 2003, Harris 2004). As Akinlabi & Urua demonstrate, Ibibio verbs show evidence of a heavy–light trochee in the negative.

(19) *Affirmative* *Negative*

    a. dí   dííɣé   'come'
       sé   sééɣé   'look'
       dá   dááɣá   'stand'
       kpù   kpùùɣó   'be in vain'
       dó   dóóɣó   'be'
       nɔ̀   nɔ̀ɔ̀ɣɔ́   'give'

    b. dɨ́p /díp/   dɨ́ppé   'hide'
       dép   déppé   'buy'
       bót   bóttó   'mould'
       kɔ̀k   kɔ̀kkɔ́   'vomit'
       dʌ̀t /dùt/   dʌ̀ttɔ́   'drag'
       nám   námmá   'do, perform'
       bén   bénné   'carry'
       sàŋ   sàŋŋá   'go'

    c. déép   dééβé   'scratch'
       síít   sííɾé   'seal an opening'
       wúúk   wúúɣó   'drive something in'
       wèèm   wèèmé   'flow'
       ɲɔ̀ɔ̀n   ɲɔ̀ɔ̀nɔ́   'crawl'
       kɔ́ɔ́ŋ   kɔ́ɔ́ŋɔ́   'hang on hook'

    d. tòβó   tòβóké   'make an order'
       kéɾé   kéɾéké   'think'
       fèɣé   fèɣéké   'run'
       jòmó   jòmóké   'talk noisily'
       sɨ́né   sɨ́néké   'put on dress'
       sàɲá   sàɲáké   'walk'

    e. dààɾá   dààɾáké   'rinse'
       tòòró   tòòróké   'praise'
       jɔ́ɔ́ŋɔ́   jɔ́ɔ́ŋɔ́ké 'plaster (a wall)'

    f. dáppá   dáppáké   'dream'
       sɨ́tté   sɨ́ttéké   'remove stopper'
       sʌ̀kkɔ́   sʌ̀kkɔ́ké   'faint'
       dámmá   dámmáké   'be mad'
       ɲànná   ɲànnáké   'stretch'
       wɔ́ŋŋɔ́   wɔ́ŋŋɔ́ké   'turn'

In (19a), when the negative suffix /-ké/ is suffixed to a CV verb base, three things happen: (i) the root vowel lengthens; (ii) the /k/ voices and spirantises to [ɣ]; (iii) the vowel of /-ké/ assimilates in rounding and lowness to the preceding vowel. The same vowel assimilations are observed in (19b), where the /k/ assimilates to the preceding consonant, and (19c), where the /k/ is deleted. As a result, the root + negative forms have the shape CVV.CV or CVC.CV in (19a–c), i.e. a heavy–light trochee. The remaining forms, (19d–f), show that when the verb base already has two syllables, whether CV.CV, CVV.CV or CVC.CV, the negative suffix fails to undergo any of the modifications seen in (19a–c), and is instead realised as [-ké]. The explanation is that /-ké/ is modified only when it constitutes the second syllable of the trochaic foot, which determines the realisation of C_2 and V_2 segments. Can such a foot analysis work for Gokana?

   To help address this question, consider the internal structure of the Gokana verb stem in (20).

(20) *Root* + (*derivational suffix*)   +   (*inflectional suffix*)
       -È, -DE   CAUSATIVE   -ii   2PL SUBJECT
       -a   ANTI-CAUSATIVE   -ÈÈ LOGOPHORIC
       -mà   INSTRUMENTAL
       -Da, -i   (frozen, lexical)

As seen, there are three 'slots': an obligatory root, a possible derivational suffix and a possible inflectional suffix. Since each of these slots can be filled by only one morpheme, the PRSTEM has a maximum of one derivational and one inflectional suffix. Thus, when one of the productive suffixes -*mà* or -*a* is added to a verb which has an unproductive suffix, e.g. /-Da/, the latter deletes, as in (21).

(21) *lexical* -Da   bɛrà   'lean on sth'   kɛrà   'hang on neck'
     causative -DE   bɛrɛ   'lean (TR)'   kɛrɛ   'hang (TR)'
     anti-causative -a bɛɛ̀à   'lean (inTR)'   kɛɛ̀à   'hang (INTR)'
     instrumental -mà bɛɛ̀mà 'lean with'   kɛɛ̀mà 'hang with'

Just as one cannot stack derivational suffixes, inflectional logophoricity cannot be marked when the subject is 2nd person plural (cf. (13)).

   Having established the above morphological definition, recall from (7a) that the PRSTEM is restricted to the following shapes: CV, CVV, CVC, CVCV, CVVCV, CVCVV, CVVV, CVVCVV and CVVVV. As indicated, the PRSTEM must begin with a consonant.[12] In addition, it has a maximum of two Cs and four Vs. We saw in (7c) that C_2 is restricted to /B D G/. The

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[12] There is no advantage to analysing roots such as Ɂú 'to die' and Ɂέb 'to look at' as /ú/ and /έB/ with the glottal stop being epenthetic, since this glottal stop is always present. I therefore included /Ɂ/ as one of the C_1 consonants in (7b).

PRSTEM is also the domain of D-insertion (14a). Recall the verb form with six lengths of [ɛ̃] from (5a), repeated in (22a).

(22) a. mɛ́ɛ́ ɛ̃̀ kɔ̄ m̄m̀ kɛ̄ɛ̀ɛ̀ɛ̄ɛ̀ɛ́ 'who$_i$ said I woke him$_i$ up?'
     b. [kɛ̄ɛ̀ɛ̀ + ɛ̀ +   ɛ̀] = ɛ̄ɛ̀ = ɛ́ < /kEE+È+ÈÈ+´EE+É/
         wake-CAUS-LOG   3SG   FOC   [+nasal]

As indicated in (22b), the PRSTEM consists of the root plus two suffixes (causative /-È/, logophoric /-ÈÈ/). It is in turn followed by two enclitics: /´EE/ (3SG OBJECT), /É/ (FOCUS MARKER). Given the underlying input to the right in (22b), D-insertion could have applied between the logophoric suffix and the 3rd singular, both of which consist of a long vowel, but does not, because the enclitic falls outside the PRSTEM. Instead, both the logophoric suffix and the 3rd singular enclitic undergo vowel shortening (14b), which applies both within and outside the PRSTEM.

Another effect of the PRSTEM is tonal. The PRSTEM is restricted to at most a bitonal melody, e.g. HM, ML, MH, calculated on the basis of the root tone + morphological tone. If the M-toned 3rd singular enclitic belonged to the PRSTEM, this would produce a tritonal melody MLM. This would not only exceed the bitonal melody restriction, but also contain a prohibited output *L-M, which, if present in the input, surfaces as M-M, e.g. /kɛ̀-Dɛ̄/ → [kɛ̄rɛ̄] 'to hang (TR)' (Hyman 1985: 108).[13]

Given the structure of the verb stem in (20) and the restrictions of at most one derivational and one inflectional suffix, the PRSTEM will never be longer than CVV(C)VV. Nouns which exceed this length look suspiciously like compounds, reduplications or borrowings.

(23) ʔàáŋkɛ́rɛ́ 'groundnut'   kpɔ́gɔ́rɔ́ 'iron'
     begèsí̃ 'length'   lɔ̀rígjà 'orange'
     kúrútɛ̃́ 'hip, waist'   dúdúntɔ 'knee'
     kúkúúkɛ̃̀ 'dove'   kúkɔ̀ɔ̀rɔ̀ 'ceiling'

Of the 22 such nouns in my lexicon, several suggest frozen noun class prefixes, e.g. *págbárà* 'man' (cf. *gbárà* 'man', *pábia* 'woman'), *vikoko* 'chimpanzee' (cf. *vígà* ~ *ŋ́-gà* 'needle', *gà* 'skewer'), where *ví-* was likely a diminutive prefix cognate with Proto-Bantu class 19 **pi-*).

The crucial question is how to capture the fact that the PRSTEM has the maximum length CVV(C)VV. Among the possibilities are that the PRSTEM consists of a maximum of (i) four Vs; (ii) four moras; (iii) two moraic trochees; (iv) two heavy syllables. While all four correctly predict that there cannot be a fifth V (or mora), only the last accounts for two additional sets of prohibitions in (24).

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[13] In fact, L-M is often converted to M-M in the post-lexical phonology as well (Hyman 1985: 114–115). Still, an alternate pronunciation *kɛ̃̀ɛ̀ɛ̄ɛ̄ɛ̃̀ɛ́* has also been recorded.

(24) a. *CVCVCV, *CVCVCVCV
  b. *CVCVVV, *CVVVCV

In §3 we saw that the PRSTEM can have at most two Cs. Since this re-
striction can rule out the structures in (24a), just as it rules out *CVCVC,
there is no need to invoke syllables. Somewhat more surprising (and
overlooked in my earlier studies) is the unacceptability of the structures in
(24b), where the C_2 occurs between one and three Vs. Recall that both
CVVCVV and CVVVV are well-formed. All of this can be readily cap-
tured if we assume that the PRSTEM is subject to a maximum size con-
straint of two heavy syllables, i.e. a $[\sigma_s\text{-}\sigma_w]$ trochee, where each syllable can
have one or two Vs (or moras). Under this assumption, the nine CV
PRSTEM shapes in (7a) have the syllable structures in (25).

(25)

An unexpected by-product of this analysis can be seen in its interaction
with the conspiracy motivating the two processes in (14): both D-
insertion and vowel shortening respond to the constraint in (26a), which
prohibits a long vowel following another vowel (whether long or short).

(26) a.

As seen in (26b), if the first vowel were short, the result could be a long-
vowel split between two syllables. Since such a structure is often pro-
hibited in languages, the fact that vowel shortening applies to delink the
long vowel, as indicated, is not an unwelcome result.[14]

 This completes the case for the syllable in Gokana: the PRSTEM consists
exactly of one foot, which in turn can be mono- or bisyllabic, with either
syllable being heavy or light. Note that while this analysis correctly ac-
counts for the ill-formedness of (24), it does not do everything: we still
need to explain the restricted distribution of stem-final C_2 and the non-
occurrence of consonant clusters within the PRSTEM.

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[14] However, one would still have to explain why a form such as /tú-ÈÈ/ 'take+LOG',
 realised as [túè], is not instead syllabified *tú.èè vs. CV.CVV, which is an accep-
 table PRSTEM structure, e.g. /zoB+´ÈÈ/ → [zo.vèè] 'dance+LOG'.

(27) a. CVC *vs.* *CVVC, *CVCVC, *CVVVC, etc.
   b. *CVCCV, *CVCCVV, etc.

While several of the starred sequences in (27) can be ruled out by the maximum of two Cs, the bisyllabic trochee does not directly account for this limitation. Nor does it explain why CVCVC and CVVVC are unacceptable, since they could be syllabified as CV.CVC and CVV.VC, the latter on analogy with CVV.V and CVV.VV. One idea could be to assume that a stem-final C is necessarily a syllable, which might include an empty nucleus (Kaye 1990) and function as a word-final onset, as proposed by Piggott (1999), Harris & Gussmann (2002) and others. One might go further and assume that consonant clusters also have an intervening nucleus (see Scheer 2004 and references cited therein). Under this interpretation, both CV.CV.C and CV.C.CV would necessarily consist of three syllables, hence exceeding the bisyllabic maximum of the PRSTEM. This approach would be perhaps appropriate if C.CV and C.CVV were well-formed bisyllabic prosodic stems, with initial CC clusters disallowed in longer forms (where the PRSTEM would exceed two syllables). An empty nucleus or 'ghost V' approach will certainly be a bit abstract for many phonologists who, like myself, would be willing simply to impose further constraints on final consonants and consonant clusters.[15]

Except for this last consideration, I have attempted to normalise the discussion and avoid framework-specific positions of the sort considered in the last paragraph. Still, it must be pointed out that there is a potential argument that CVC verbs are not consonant-final at an abstract level of representation. In Gokana, verb roots show a binary tonal contrast, which I refer to here as [±H] (cf. Hyman 1985: 108ff). It turns out that all CVC verbs are [−H], while almost all CVC-*i* verbs are [+H].[16]

(28) CVC (45 verbs)   CVC-*i* (36 verbs)
   lab   'disperse (TR)'   láví   'pick'
   ʔul   'blow'   ʔúrí   'boil (INTR)'
   pig   'mix'   pɔ́gí   'scratch'
   num   'groan (in pain)'   ɲímí   'be sour'
   kin   'reject, refuse'   kɛ́ní   'tremble'
   ʔaŋ   'pull out'   sɛ́ɲí   'use up something gradually'

The tonal complementarity seen in (28) suggests that the CVC verbs can be analysed as /CVC-i/, with a tonally sensitive rule deleting the -*i* suffix of [−H] roots. It turns out that this -*i* appears in the aorist ('zero') tense, which adds a L-tone suffix when the subject is 1st or 2nd person (Hyman

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[15] It also would not explain why CVVC is prohibited (but cf. notes 7 and 17).
[16] Three CVC-*i* verbs have been found to be in a third category, with M-M tone: *bugi* 'count, read', *bagi* 'tear' (= *baa*), *ʔivi* 'fetch?'.

1985: 109). Compare the various realisations of the future and aorist forms in (29).

(29)   *future*   *aorist*
    CV   [–H]   òó sa   ò saà   'you (SG) (will) choose'
           [+H]   òó tú   ò túù   'you (SG) (will) take'
    CVC   [–H]   òó dib   ò divì   'you (SG) (will) hit'
    CVC-*i* [+H]   òó kórí   ò kórì   'you (SG) (will) call'
    CVV   [–H]   òó bii   ò bìì   'you (SG) (will) squeeze'
           [+H]   òó síi   ò síì   'you (SG) (will) catch'

While CV verbs add a mora with L tone in the aorist to which the root vowel can spread, CVC verbs appear to add -*ì*. In reality this is the underlying /-i/ suffix that accompanies CVC verbs, e.g. /diB-i/ 'hit', but which otherwise drops out in the [−H] tone class. The last examples in (29) show that a [+H] CVC-*i* verb and both tone classes of CVV verbs do not insert an additional mora to take the L tone. A reasonable interpretation, then, is that these aorist forms assign a L suffix which cannot link to the V_1. (Gokana does not allow ML or HL contours on a single mora.) As a result, an additional mora is required whenever the verb base is CV.

While there is reason to posit a 'floating' -*i* suffix after CVC verbs, there is no corresponding evidence in the case of CVC nouns, which contrast all three tones.

(30) High (31)   Mid (16)   Low (7)
    dém 'tongue'   dɛm 'rock'   dùm 'life'
    súŋ 'anger'   kib 'louse'   kùn 'basket'
    ʔól 'farm'   lɔg 'law'   kɔ̀l 'forest'

In this context consider the genitive construction in Gokana. As seen in (31a, b), when a noun has H or L tone, the genitive consists of a simple juxtaposition of possessed + possessor.

(31) a. CV   H   té   'tree'   té nɛn   'tree of person'
    b.   L   gè   'knife'   gè nɛn   'knife of person'
    c.   M   tɔ   'house'   tɔ̀ɔ̀ nɛn   'house of person'
    d. CVC   M   mɛn   'neck'   mɛ̀n nɛn   'neck of person'
    e. CVV   M   mii   'blood'   mìì nɛn   'blood of person'
    f. CVCV   M   kigi   'axe'   kigì nɛn   'axe of person'

In (31c–f), however, we observe that there is a L tonal morpheme that marks the genitive after M tone nouns. The example in (31c) shows that this L requires an inserted mora when the noun is CV (Hyman 1985: 24). Crucially, no mora is inserted when the M noun is CVC, as in (31d) or CVV (31e), nor when the noun is bisyllabic M–M (31f). It seems, therefore, that nouns such as in (31) are really /CVC/. Finally, note that while there are

no verbs of the shape CVCVC, 11 CVCVC nouns occur in my database (GZ = data from my consultant).

(32) a. bébél   'termite'   GZ
         kàkám   'ant' (also *kám*)   GZ
         sísìn   'scissors'   Brosnahan (1964)
         tùtúm bá   'elbow' (cf. *túm* 'pestle', *bá* 'arm')   Brosnahan (1964)

    b. víkól   'shadow'   Brosnahan (1964)
         víkùn   'basket' (GZ *ŋ́kùn* 'small basket')   Brosnahan (1964)
         vínɔ́m   'bird' (GZ *ńnɔ́m* 'bird')   Brosnahan (1964)

    c. pánwín   'brother' (cf. *nwín* [ɱín] 'child')   GZ
         kpòkúm   'base, lower part, underneath'   GZ

    d. kɛbèl   'jaw' (also *kɛbèm*)   GZ
         ɛ́nɛ́m dee   'lightning'   GZ

All but (32d) can be identified as reduplications (32a), diminutive prefix *ví-* + stem (32b) or compounds (32c). In any case, all of them except the last have a C_2 consonant which is not normally allowed in the PrStem. Unfortunately none of them end in a M tone, so we cannot test what would happen in the genitive. However, we can clearly say that CVCVC is marginal in Gokana and that closed syllable stems are almost exclusively CVC.[17] In the next section we consider some of the implications of these findings.

5 Discussion

In §4 we presented the following potential evidence in support of the syllable in Gokana.

(33) a. The maximum prosodic stem structure CVV(C)VV can be characterised as two syllables.

    b. If we assume two syllables, each with a maximum of two moras (Vs), the absence of *CVCVVV and *CVVVCV structures is accounted for.

    c. If we assume two syllables, we can account for why the prosodic stem allows only two CVs, i.e. *CVCVCV, *CVCVCVCV.

    d. The trochaic $[\sigma_s\text{-}\sigma_w]$ structure is consistent with the C_1/C_2 and V_1/V_2 asymmetries.

    e. If a final C must count as a syllable, either generally or only in verbs, we have an explanation as to why the prosodic stem can be CVC, but not *CVCVC.

[17] Recall, however, the potentially exceptional CVVC nouns mentioned in note 7. The fact that my earlier transcribed *pìob* 'tsetse fly' and *bìɔm* 'fingernail' appear as *pìòb̥ nɛn* and *bìɔ̀m̥ nɛn* in the genitive rather than **pìòb̥ nɛn* and **bìɔ̀m̥ nɛn* further supports the argument that they are better analysed as /pjoB/ and /bjɔB/[+nasal], hence *pjòb̥ nɛn*, *bjɔ̀m̥ nɛn*.

Among the above arguments, (33b) is stronger than (33a) and (33c–e), as these either have other possible explanations, e.g. positional prominence, or are highly theory-dependent, e.g. requiring a final C to be a syllable. It should be noted here that (33b) is insufficient in the absence of (33a), since it would be possible to characterise the CVV(C)VV structure either as a bisyllabic trochaic foot or as a 'colon' consisting of two moraic trochees (cf. Michael (to appear) for such a situation in Iquito, an Zaparoan language of Peru). Finally, it should be noted that the crucial piece of evidence in (33b) pertains only to verbs. In nouns the PrStem is limited to CV, CVV, CVCV and CVVCV.[18] While nouns can never be CVVV or CVVVV, my lexicon includes 23 noun entries of the shapes CVCVV and CVVCVV. However, of these, only two have an acceptable foot-internal C_2: *tɔnàà* 'branch', *gɔɔmáá* 'cowrie'. Rather than realisations of /B D G/, the second consonant of the remaining 27 nouns resembles C_1. Most of these are likely borrowings, reduplications or frozen compounds: *paàsĩĩ* 'tobacco', *gbɛ̂gbɛ̂í* 'bamboo', *záázóó* 'bee', *doodoo* 'red flower (sp.)', *bèkéé* 'European'. What this means is that the observation and syllable argument from (31b) pertain only to verbs.

Assuming that the Gokana PrStem does consist of a maximal bisyllabic trochee, if only for verbs, this still leaves open the question of how to syllabify moras which lie outside the one stem foot. The answer is that we still have considerable indeterminacy. For example, should the extra two moras of (22b) be interpreted as one bimoraic or two monomoraic syllables? Up until now we have tacitly proceeded by assigning stem moras to syllables in a left-to-right, two-by-two fashion. This would mean that forms like those in (16) would be syllabified as in (34a, b).

(34) a. 'cook (INTR)'   b. 'cook (INTR+LOG)'   c.
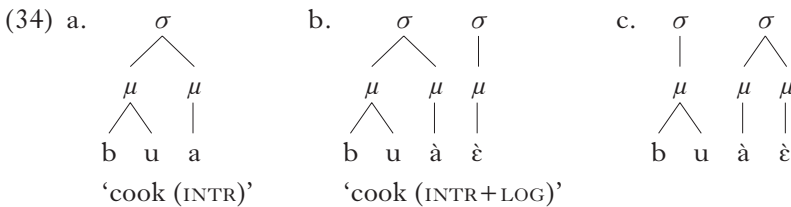
In (34a) /bua/ has been assigned to one syllable, although it could conceivably have been interpreted as two. In (34b), the first two moras have been assigned to the first syllable, and the third mora to the second syllable, basically because we want to fill up the head syllable of the trochee before moving to the second syllable. The reverse in (34c), however, would not pose any problems and would be needed in any case in forms like

[18] While these shapes might suggest a maximally heavy–light trochee, this would not explain why $[CVV_sV_w]$ is not possible in nouns. Rather, it would seem that one would have to stipulate that in nouns the second syllable of a bisyllabic PrStem must both be monomoraic and have an onset. Note that it is not unusual for nouns and verbs to have different phonological properties (Kabak & Plank 2008). Thus, both in segmental and tonal phonology, verbs are often more regular and more templatic than nouns (Smith 2001).

da.ràè 'pick up+LOG'.[19] Perhaps more serious indeterminacy arises in the case of enclitics. Consider the sentence in (35a), which should be compared with (22a).

(35) a. mɛ́ɛ́ɛ́ ɛ̀ kɔ̄ m̄m̀ kɛ̄ɛ̄ɛ́ɛ̄ɛ́ 'who$_i$ said I woke him$_j$ up?'
　　b. [kɛ̄ɛ̄ɛ̄ + ɛ́] = ɛ̄̄ = ɛ́̄ < /kEE+È+´EE+É/
　　　 wake-CAUS　3SG　FOC　　　[+nasal]

As seen, (35a) differs from (22a) in not having the logophoric suffix /-´ÈÈ/. As a result, 'who' and 'him' are not coreferential. If we follow the left-to-right syllabification procedure we have applied thus far, the PRSTEM will syllabify as *kɛ̄ɛ̄ɛ̄.ɛ́*. But how do we syllabify the remaining two moras? If the 3rd singular enclitic joins the causative suffix of the PRSTEM, this would produce *kɛ̄ɛ̄ɛ̄.ɛ́ɛ̄.ɛ́*. If syllabification is not permitted to apply across the PRSTEM-enclitic boundary, this will instead produce *kɛ̄ɛ̄ɛ̄.ɛ́.ɛ̄ɛ́*.

Whichever solution one adopts – and there seems to be no consequence of choosing one *vs.* the other – there is also the issue of what to do with the excess moras/syllables that would result: do they form their own foot or do they remain unfooted? The problems of how to syllabify and how/whether to foot extra-PRSTEM moras also arise with proclitics, e.g. the *eaè* sequence in (36a).

(36) a. nɛń ʔeaè mɔ̀n a 'the person that he saw'
　　b. nɛń ʔeoò mɔ̀n a 'the person that you (SG) saw'

This sequence is obtained by concatenating the relativiser /´e/, the 3rd singular subject pronoun /a/ and the past tense morpheme /È/. (The final /a/ is a determiner which occurs at the end of relative clauses.) As seen from the initial glottal stop, the sequence forms a different phrase from what precedes it. The two questions concern how this sequence should be syllabified and whether it should be considered a foot. Following what has been said thus far, the most likely syllabification would be *ʔea.ɛ̀* rather than *ʔe.aè* or *ʔe.a.ɛ̀*. The first syllabification would also be consistent with recognising *ʔea.ɛ̀* as a [σ_s-σ_w] trochaic foot. Consider, however, the corresponding sentence in (36b), which differs only in having a 2nd singular subject. Following the same assumptions, when /ó+È/ fuses as *oò*, not only

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[19]　One anonymous reviewer states that it seems 'odd (and even implausible) to place in the same syllable two vocalic segments of different qualities (at least when they are not claimed to form a diphthong and thus a complex nucleus)'. However, if *bua* is bisyllabic, then *buàè* is trisyllabic, in violation of the trochaic PRSTEM maximum which motivated the syllable in the first place. This same reviewer proposes that *kɛ̄ɛ̀-ɛ̀-ɛ̀-ɛ̄-ɛ́* from (5b) consists of five syllables, one for each morpheme. I remember discussing Gokana with another phonologist in the 1980s, who suggested, flippantly: 'Well, just assign each vowel to a syllable, what's the problem?'. It should be clear that the goal is not to come up with a proposal for syllabifying Gokana, rather to come up with an analysis in which one can have confidence. Given the marginality of the syllable in Gokana, this more demanding goal has been particularly elusive.

would this produce the unusual syllabification *ʔeo.ô*, with the long vowel split between two syllables, but we would also have to explain why the resulting long vowel does not undergo shortening by (14b). While a number of solutions come to mind (rule ordering, blocking of (14b) when the result would be the loss of a full morpheme, etc.), we have to at least recognise that questions of syllabification and footing are quite irrelevant, and even more underdetermined by the facts once one leaves the PRSTEM domain. In other words, other than the PRSTEM-specific argument in (33b), there is little reason to posit syllables in Gokana. We consider the implications of this last point in §6.

6 Conclusion

To sum up the previous discussion, we first saw in §2 that absolute universals in phonology have generally been theory-dependent, and are hence difficult to test, let alone disprove. As Bickel (2010) puts it, 'absolute universals can never be falsified by individual data. Their validity can only be evaluated by exploring whether they are consistent with other absolute universals that are claimed simultaneously'. The absolute universal of interest in this study is the claim that all languages have syllables. To minimise the problem of theory-dependency as much as possible and make the claim testable, the strategy followed in §§3–5 was to 'normalise' the discussion, attempting to the extent possible to convert what might be interpreted as an analytic claim into a descriptive one. Thus, the discussion focused on whether Gokana exhibits the descriptive properties in (6) which are traditionally cited as evidence for the presence of syllables and specific syllabifications. Recall that Hyman (1983, 1985) found no positive evidence for the syllable in Gokana – and in fact considerable indeterminacy if the syllable were adopted. In this study we have found minor, but ambiguous, evidence for the syllable: if the PRSTEM four-mora maximum of CVV.CVV and CVV.VV is characterised as a weight-insensitive trochee, each containing two bimoraic syllables, we can also account for the non-occurrence of *CV.CVVV and *CV.CVVV, where one of the syllables would unacceptably have to be trimoraic. All of the remaining properties discussed in §§3–5 can be equally well handled in terms of moras and without syllables. The question is what the significance of this is for the universality of the syllable in particular, and for the study of (phonological) universals in general.

   To determine the significance of the Gokana facts, we return to the distinction drawn in §2 between descriptive and analytic universals (cf. Newmeyer's 2007 'surface' *vs.* 'deep' universals in syntax). It turns out that each has its problem. First, descriptive phonological universals have been said to be both few and unimpressively general:

   The issue of language universals is difficult because there appear to be so few absolute universals. In the domain of phonology, we cannot move much beyond the statement that all languages utilize consonants and

vowels. Perhaps the most specific statements we can make would be to say that all languages have plain stop consonants and low vowels … (Bybee 2001: 191)

More specific universals have typically not held up under scrutiny. In Hyman (2008b) I pointed out the four consonant universals in (37), which were said not to be violated by the 451 sound systems in the UPSID database (Maddieson & Precoda 1990).

(37) a. Every phonological system has oral stops.
    b. Every phonological system contrasts [−continuant] phonemes (= stops) with phonemes which are specified with another feature.
    c. Every phonological system contrasts phonemes for place of articulation.
    d. Every phonological system has coronal phonemes.

Within almost no time, two of these have already been challenged. First, Mark Donohue (personal communication) points out that the Ontena dialect of Gadsup has the consonant system in (38).[20]

(38) ɸ   s   x   ʔ
      β   ɾ
      m   n   j

Let us assume that the glottal stop falls outside the claim in (37a), which refers instead to supralaryngeal stops. The remaining problem concerns allophony: word-medially, /ɸ s x/ are realised as [p t k] after a glottal stop, and /ns/ is realised as [nt]. While the phonemic analysis in (38) seems reasonable, the Gadsup dialect does not lack stop allophones.

Although to a lesser extent, a similar allophonic issue arises in Blevins' (2009) counterexample to (37d) from the northwest dialect of Mekeo, which has the consonant system in (39).

(39) p   k
       b   g   /g/ → [dzʲ] / __ i
        m   ŋ   /ŋ/ → [n] / __ i
      w~o   j~ɛ

While other dialects of Mekeo have an /l/, this latter has become [j] alternating with [ɛ] in Northwest Mekeo. Even if we ignore this [j], the rules in (39b) indicate that the voiced velar consonants produce coronal allophones before the vowel /i/. Unless we modify them to read 'oral stop allophones' and 'coronal allophones', the descriptive universals in (37a) and (37d) are clearly violated by Ontena Gadsup and Northwest Mekeo. Or, as Blevins puts it, 'another universal bites the dust'.

[20] A brief description occurs in Gadsup (SIL 2004).

What about analytic universals? Since phonemes do not occur on the surface, i.e. they are not phones, one could reanalyse the Ontena Gadsup voiceless obstruents as /p t k/, which are realised as [+continuant] except after glottal stop (and perhaps a homorganic nasal). While this does not seem too far-fetched, reanalysing Northwest Mekeo /g ŋ/ as, say, /d n/ would be highly unmotivated and unaesthetic, especially as /k/ is not modified before /i/. Hopefully, most linguists would find such a move totally ad hoc, designed solely to circumvent the counterexamples in question. Returning to syllables, in Hyman (2008b: 111) I considered the alleged counterexamples to the universal claims in (2) above and concluded:

> In each of the above cases, there is no 'knock-out argument'. Anyone determined to maintain the universals in [(2)] can continue to do so, the worst consequence being an indeterminate or more awkward analysis. One can establish syllables in Gokana, assign extrasyllabic consonants to syllables in Bella Coola and Piro, and reanalyze [the VC constituents of] Arrernte in terms of CV syllables. Architectural universals have this property: It all depends on your model and on what complications you are willing to live with.

That is, one can repackage the counterexamples and maintain all of the universals in (36), just as one can force all languages to comply with the universal claims in (2). The important question is not how phonologists should analyse Ontena Gadsup, Northwest Mekeo and Gokana, which show such little regard for stops, coronals and syllables, or even whether the claimed universals are actually violated, but rather what such 'outlier' systems say about the nature of phonological systems in general.

The possibility of no syllables in Gokana naturally leads us to the controversy initiated by Evans & Levinson. Stating that 'there are vanishingly few universals of language in the direct sense that all languages exhibit them' (2009: 429), Evans & Levinson argue that the attention of linguists and cognitive scientists should be redirected away from the quest for an abstract universal grammar (UG) and reoriented towards explaining the enormous diversity found among the world's languages, including some which appear to violate grammatical universals. It is not possible to review the tremendous richness in this article, the open peer commentaries which accompanied it and the others which have subsequently appeared in Rooryck *et al.* (2010). Instead I would like to compare the Gokana syllable facts with a point that Evans & Levinson (2009: 476) make in questioning whether syntactic constituency is universal. Remarking that some of the commentaries 'take up the issue of constituency, and argue that recent research finds it subtly present in languages previously claimed to lack it', they go on to distinguish two different senses in which syntactic constituency can be claimed to be universal.

(40) a. Is constituency universal in the sense that all languages exhibit it somewhere in their systems, even if marginally?

b. Is constituency universal in the sense that all languages use it as the main organisational principle of sentence structure and the main way of signalling grammatical relations?

The parallel to the universality of the syllable could not be clearer; cf. (41).

(41) a. Are syllables universal in the sense that all languages exhibit them somewhere in their phonology, even if marginally?

b. Are syllables universal in the sense that all languages use them as the main organisational principle of phonological constituency?

If it's the first, then Gokana might be consistent with claims of syllable universality, although it depends on whether we think (33b) is clear evidence for the syllable. If it's the second, then Gokana clearly is a counterexample, as it does not organise its phonology with the syllable as the main constituent; rather, it is the mora that is supreme in Gokana.

At this point we must ask: does it matter whether a property, e.g. the syllable, must be at least marginally present in every language, or whether a language can do without it entirely? If the latter, then the syllable may turn out to be similar to the characterisation which Evans & Levinson (2009: 443) ascribe to recursion:

The clear conclusion that these languages point to is that recursion is not a necessary or defining feature of every language. It is a well-developed feature of some languages, like English or Japanese, rare but allowed in others (like Bininj Gun-wok), capped at a single level of nesting in other (Kayardild), and in others, like Pirahã, it is completely absent. Recursion, then, is a capacity languages may exhibit, not a universally present feature.

This, then, leads to my subtitle: 'What's so great about being universal?' Whether evidence for the syllable can be found in all languages or in all languages in the world except Gokana hardly seems to make a difference. There is no controversy concerning the universal asymmetry between C to V *vs*. V to C transitions or the overwhelming tendency for languages to phonologise such transitions into constituents with open syllables prevailing over closed. Thus, even if one accepts the VC(C) 'syllable' constituents which are uniquely activated at the expense of CV in the phonology and morphology of Western Arrernte (Breen & Pensalfini 1999), it would not be surprising to find Western Arrernte exhibiting the same kind of phonetic C to V transitions that could ultimately give rise to CV syllable effects. Whether the syllable is an absolute universal definitional of language or 'just' an almost irrepressible universal tendency would hardly affect the work that phonology has yet to do. Specifically, it would seem that either position on its universality is compatible with

grounding the syllable in processing and/or production and with studying its cross-linguistic manifestations, both common and rare. Thus, while Evans & Levinson rightly emphasise the need to study and understand linguistic diversity, I suggest that the central explanandum of phonological theory is not the fact that languages vary in their reference to the syllable, but rather that they overwhelmingly refer to the syllable, typically showing some or all of the phonological activations mentioned in (6).

In §1 I included a quote from Hayward (1997) which expressed surprise at the lack of response to the earlier claim that Gokana lacked syllables. Ironically, if Gokana has syllables, then perhaps the field was correct to ignore Hyman (1983, 1985), feeling that further investigations would ultimately reveal them. Independent of the confidence we may or may not have in the evidence presented for syllables in Gokana in this paper, I would like to follow Hayward and argue for a less 'black and white' stance: some languages show extensive activation of syllable properties, while others show fewer. The activation is so slight in Gokana that all we have is the ambiguous interpretation of the CVV(C)VV PRSTEM maximum. In fact, a moment's reflection will reveal that lots of things in phonology are like this: some languages, like English, provide extensive activation of stress-accent properties, such that there can be no question that stress both exists and constitutes a major organisational property of English phonology. In other languages, stress accent is identifiable, but less acti-vated. Thus, in Hungarian, 'stress does not play a significant role in the word level phonology' (Kenesei *et al.* 1998: 428). Similarly, in Turkish, stress can be identified mostly on the basis of F0 (Levi 2005), but not a single phonological constraint or rule refers to stress. In fact, some languages have so little activation that they have been claimed not to have stress at all, e.g. Bella Coola:

> [There are] no phonemically significant phenomena of stress or pitch associated with syllables or words. ... When two or more syllabics occur in a word or sentence, one can clearly hear different degrees of articu-latory force. But these relative stresses in a sequence of acoustic syllables do not remain constant in repetitions of the utterance. (Newman 1947: 132)

Similar distinctions in the degree of activation are observed in the differ-ent ways in which phonetic features are phonologised: in some languages nasality is highly activated, e.g. as a contrastive feature on consonants and vowels, or as a prosody on morphemes. In others, e.g. several Lakes Plain languages of New Guinea, nasality may have no phonological activation and be phonetically absent as well. As these and many other such examples amply demonstrate, phonological typologists should be concerned with characterising and explaining these interesting variations in how phonetic substance is phonologised in different languages – but we needn't claim that every available phonetic feature or structure will be exploited to the same extent in every language. Finally, linguists on both sides of the Evans & Levinson debate should take special heed, as the Gokana case has two

lessons to share. On the one hand, proponents of universality should not rejoice too quickly, as the evidence for the syllable is both marginal and ambiguous. On the other hand, proponents of diversity should also beware: in the 1980s Gokana was claimed to be a language which falsified the universality of the syllable. With the current study we now know that if one looks hard enough an apparent counterexample may ultimately show weak traces of evidence for the universal. Whether or not Gokana has syllables, these are intriguing facts worthy of serious consideration in the pursuit of phonological universals and phonological typology.

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