

## ILLUSTRATIONS OF THE IPA

# Garifuna

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Garifuna (cab, ISO 639-3) is spoken by the Garifuna people (previously known as Black Caribs and currently also by the plural Garinagu – Cayetano 1993), who reside along the Caribbean coast of Central America in communities in Belize, Honduras, Guatemala and Nicaragua, as well as in a large immigrant population in the United States. Population estimates in the literature for Garifuna speakers worldwide vary widely, but Aikhenvald (1999: 72) estimated between 30 and 100,000 speakers of the language. The latest census in Belize reports a population of 19,639 people who report at least one of their ethnicities as Garifuna and 8,442 people who report speaking Garifuna well enough to hold a conversation (Statistical Institute of Belize 2010 census).

Garifuna is the only Arawak language currently spoken in Central America, and the language with the largest population of speakers in the Arawak family, which is itself the largest language family in South America (Aikhenvald 1999: 65). Garifuna is considered to be part of the North Arawak branch (Taylor 1977) which also includes Lokono/Arawak, Guajiro and Taino. The closest relative of Garifuna in the North Arawak branch is the more recently extinct Island Carib (Iñeri), documented by Taylor on the island of Dominica early in the 20th century.

A great deal of the linguistic description of the structure of Garifuna comes from Douglas Taylor, whose description is based on the language of speakers in Hopkins Village, on the southern coast of Belize (see map in Figure 1), in the late 1940s (Taylor 1951, 1955, 1956a, b, 1958, 1977). This illustration draws from the work of Douglas Taylor, as well as E. Roy Cayetano (Cayetano 1992, 1993). Others who have described various aspects of Garifuna morphology and syntax include Hagiwara (1993), Munro (1998, 2007), Ekulona (2000), Devonish & Castillo (2002), De Pury (2003, 2005) and Escure (2005), all working with consultants from Belize. Suazo (1991a) and more recently Haurholm-Larsen (2016) and Quesada (2017) base their descriptions on varieties spoken in Honduras. There is a small collection of literary work in Garifuna, including Lewis (1994) and Suazo (1991b), which were also consulted. This illustration is based on the speech of Zita Castillo-Muhsin, a woman who was born in the late 1970s in Hopkins Village, Belize (Figure 1) and emigrated to the USA as an adult. The speech that is the basis for the discussion of inter-speaker variation comes



**Figure 1** Map of Belize and surrounding parts of Central America, with Hopkins indicated. (Map created by the author using [tableau.com](https://www.tableau.com).)

from interviews conducted in 2007–2008 with multiple speakers in Hopkins (Ravindranath 2009).

While Garifuna is not critically endangered in all of the communities where it is spoken, and there are active efforts for language planning, revitalization, and maintenance (Langworthy 2002, Cayetano & Cayetano 2005) the communities in which it is spoken are becoming more heterogeneous, and in most of the Garifuna diaspora language shift to English (US, Belize), Kriol (Belize), and Spanish (Honduras, Guatemala, Nicaragua) at the expense of Garifuna is ongoing. In Belize, only in the village of Hopkins, which has a total Garifuna speaker population of less than 1000, are there still a significant number of child speakers, yet preschool-aged Garifuna monolingual children are no longer as common as they recently were (Abtahian 2017). In addition to a broad overview of the phonemic system of Garifuna, we also attempt to provide more detail on some aspects of sociolinguistic variation. As language use in different domains diminishes alongside language shift, stylistic variation is apt to become more limited, adding to the urgency of documenting natural texts.

## Consonants

There are seventeen phonemic consonants in the Garifuna spoken in Hopkins. This includes seven sonorants (including two glides and three nasals) and ten obstruents. The obstruents include six plosives, three fricatives and one affricate. Only the plosives have a voicing distinction. In the Hopkins variety of Garifuna there is variable lenition of the post-alveolar affricate to a palatal fricative; this is discussed below. The rhotic /r/ is usually an alveolar approximant in the Hopkins variety but a tap or a trill in other varieties of Garifuna (Suazo 1991a, Haurholm-Larsen 2016, Quesada 2017). In his description of the Hopkins variety in the 1950s Taylor (1955: 235) notes that ‘/r/ varies from an apical flap to a mild trill’, but in Hopkins today the tapped or trilled variant is rare. As younger speakers rarely produce it, this seems to be a change in progress that has gone to completion, as described in more detail in Ravindranath (2009). While it seems likely that the difference between the approximant in the Garifuna of Belize and the tap in the Garifuna of Guatemala and Honduras is due to

language contact with the dominant language (English or Kriol in Belize; Spanish in the rest of Central America), more detailed study is needed. In the Hopkins variety there is also variable deletion of /ɹ/, discussed further below. All of the words in the word list below were said alone and in a carrier phrase in this format ‘TOKEN, ne<sup>1</sup>.rɛgɔjɛ TOKEN hun, TOKEN’.

	Bilabial	Labio-dental	Alveolar	Post-alveolar & Palatal	Velar	Labio-velar	Glottal
Plosive	p b		t d		k g		
Affricate				tʃ			
Nasal	m		n	ɲ			
Fricative		f	s				h
Approximant			ɹ	j		w	
Lateral approximant			l				

*Note:* In this table and throughout this illustration we use the vowel /a/ to denote a low central vowel for typographical convenience, although strictly speaking the vowel in Garifuna is closer to /ɐ/.

The phonemic transcription the words in the word list here includes additional, phonetic detail for those phenomena that are discussed in more detail in this illustration. The orthographic form is based on Cayetano (1993).

PHONEME	PHONEMIC FORM	ORTHOGRAPHIC FORM	ENGLISH GLOSS
/p/	pa <sup>1</sup> sei	<i>pasei</i>	passage
/b/	<sup>1</sup> basei	<i>basei</i>	basil, a herb
/t/	<sup>1</sup> tapa [ˈtapə]	<i>tapa</i>	fishing line spool
/d/	<sup>1</sup> dema [ˈdemə]	<i>dema</i>	teasing; provocation
/k/	ku <sup>1</sup> e.ri	<i>kueri</i>	quail
/g/	gu <sup>1</sup> e.ru [gu <sup>1</sup> eu]	<i>gueru</i>	leather
/tʃ/	tʃa <sup>1</sup> fi	<i>chafi</i>	disorder
/m/	<sup>1</sup> maba [ˈmabə]	<i>maba</i>	bee +honey
/n/	<sup>1</sup> n-ala [ˈnalə]	<i>nala</i>	my seat
/ɲ/	ɲa <sup>1</sup> la	<i>ñalá</i>	rotted
/f/	<sup>1</sup> fapei [ˈfapɛi]	<i>fañei</i>	comb

/s/	'sagu	sagü	bag, sack
/h/	'hati	hati	moon, month
/ɪ/	ga'ɪifuna	Garifuna	Garifuna
/w/	'wuɪinouga [ˈwinouɡə]	wurinouga	yesterday
/l/	li'gia	ligira	that
/j/	'juuda [ˈjuːdə]	yurudu	went

### Voicing and aspiration

The phonemic contrast for the set of plosives in Garifuna is between a voiceless aspirated /p t k/ and voiced /b d g/. Although a voicing contrast is unusual for Arawak languages (Aikhenvald 1999), we find a voicing contrast in all three places of articulation for plosives. There is no voicing contrast for the three fricatives /f s h/ or the affricate /tʃ/. Taylor (1955) describes the voiceless plosives as unaspirated, allowing that they are occasionally aspirated in the onset of stressed syllables, but in our data we find aspiration of voiceless stops that is consistent throughout the data (see Table 3 and Figures 2 and 4 below). We cannot rule out the possibility that the development of the contrast between voiceless aspirated and unaspirated voiced stops was promoted by contact with English, where the contrast exists. Similar changes have been reported, for example for Maori, where the unaspirated plosives typical of Polynesian languages have developed into aspirated voiceless plosives (Maclagan & King 2007). A contact explanation for the development of aspiration in Garifuna does beg the question of why the word-initial voiced stops in Garifuna are pre-voiced, contra the usual English realization as voiceless and unaspirated, and highlights the need for further empirical studies of language contact and language variation in dialects of Garifuna.

The voice onset times were measured for both word-initial and word-medial plosives in three iterations of the words in Table 1, following Lisker & Abramson (1964), and Keating (1980), from the abrupt onset of energy of the stop's release. Word-medially, VOT was only measured in those plosives where there was a visible burst (as discussed below, word-medial voiced plosives are frequently lenited to approximants).

VOT measurements before the release were noted as negative, and those after the release were noted as positive. The average VOT for each type of plosive are given in Tables 2 and 3. Voiced plosives /b d g/ have mostly negative VOTs, except for a few instances. Positive and negative VOTs for voiced plosives are reported separately in Table 2.

Voiceless plosives are infrequent in the language; many of the instances of word-initial velar and bilabial plosives are in loanwords. There were no instances of word-medial /p/. In the word list elicitation, all of the word-initial voiceless plosives are aspirated, with all instances having positive VOTs. The number of tokens for each type is also given in Table 3.

The distinction between voiced and voiceless plosives is seen most clearly in the spectrograms for the minimal pairs *pasei* and *basei* (Figures 2 and 3) and *kueri* and *gueru* (Figures 4 and 5), where the voiceless stops /p/ and /k/ include a characteristic release burst followed by friction before transitioning to the vowel.<sup>1</sup>

<sup>1</sup> All spectrogram figures were created using a Praat script from: [https://github.com/wendyelviragarcia/create\\_pictures](https://github.com/wendyelviragarcia/create_pictures).

**Table 1** List of words used to measure stop VOTs.

Stop	Phonemic form	Orthographic form	English gloss
/b/	ba <sup>1</sup> ana	<i>barana</i>	sea
	<sup>1</sup> basei	<i>basei</i>	basil
	bi <sup>1</sup> sida	<i>bisida</i>	to visit (V-TRANS); visit (N-M)
/d/	da <sup>1</sup> barasi	<i>dabarasi</i>	tin container; can; pan
	da <sup>1</sup> bujaba	<i>dabuyaba</i>	house for ancestor rites
	<sup>1</sup> dema	<i>dema</i>	teasing; provocation
	di <sup>1</sup> na	<i>dinā</i>	to board a boat
/g/	<sup>1</sup> gabū	<i>gabū</i>	cocoa, cacao seed
	gabunu <sup>1</sup> luti	<i>gabunuru-ti</i>	lucky (ADJ)
	<sup>1</sup> gafe	<i>gafe</i>	coffee
	<sup>1</sup> gafu	<i>gafu</i>	wooden box
	<sup>1</sup> gaiiti	<i>gaiiti</i>	pain
	<sup>1</sup> gitaranigi	<i>gitaranigi-</i>	spiteful
	gu <sup>1</sup> eru	<i>gueru</i>	leather
	ga <sup>1</sup> ifuna	<i>Garifuna</i>	Garifuna
	/p/	pa <sup>1</sup> sei	<i>pasēi</i>
/t/	<sup>1</sup> tapa	<i>tapa</i>	fishing line spool
	to	<i>to</i>	this
	ti <sup>1</sup> ma	<i>-timā</i>	more
/k/	<sup>1</sup> kara	<i>kara</i>	each
	<sup>1</sup> kiapu	<i>kiapu</i>	cap
	ku <sup>1</sup> eri	<i>kueri</i>	quail

**Table 2** Mean VOT for voiced plosives in both word-initial and word-medial position.

Plosive		Mean (negative) VOT (s)	n	Std. dev.	Mean (positive) VOT (s)	n	Std. dev.
Word- initial	/b/	-0.096	8	0.030	n/a		
	/d/	-0.092	10	0.033	0.019	1	n/a
	/g/	-0.088	18	0.036	0.025	7	0.005
Word- medial	/b/	-0.094	7	0.038	n/a		
	/d/	-0.086	35	0.032	n/a		
	/g/	-0.069	40	0.017	n/a		

**Table 3** Mean VOT for voiceless plosives in both word-initial and word-medial position.

Plosive		Mean VOT (s)	N	Std. dev.
Word- initial	/p/	0.033	2	n/a
	/t/	0.050	9	0.019
	/k/	0.083	9	0.020
Word- medial	/p/		n/a	
	/t/	0.040	18	0.016
	/k/	0.057	3	0.003

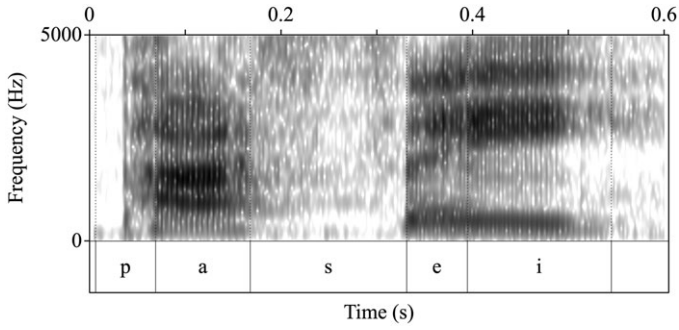


Figure 2 *Pasei* 'passage' with voiceless aspirated /p/.

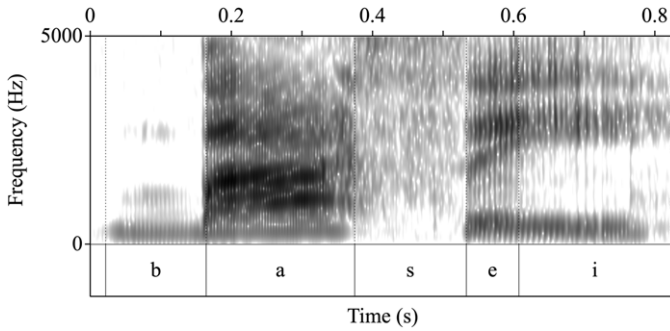


Figure 3 *Basei* 'basil' with voiced /b/.

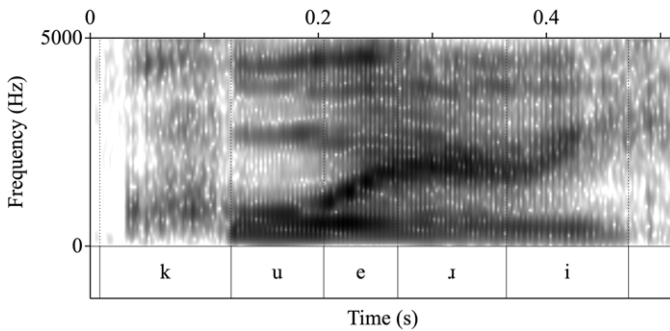


Figure 4 *Kueri* 'quail' with voiceless aspirated /k/.

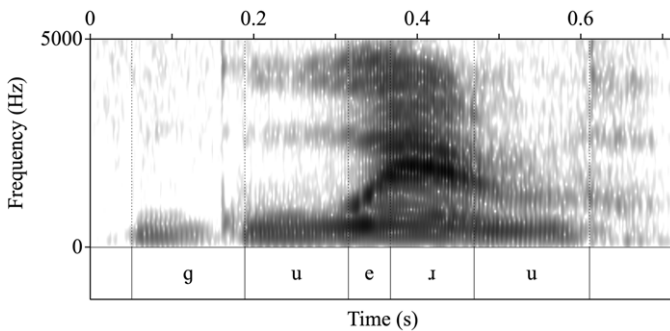
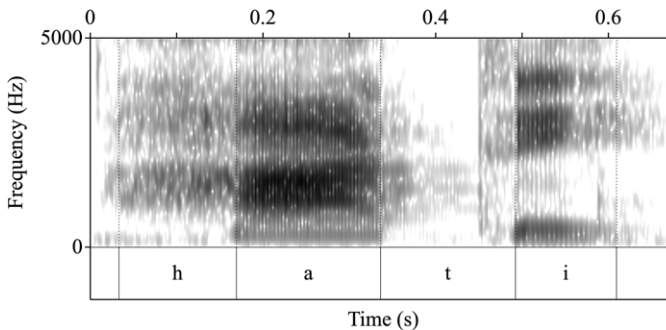


Figure 5 *Gueru* 'leather' with voiced /g/.

## Lenition

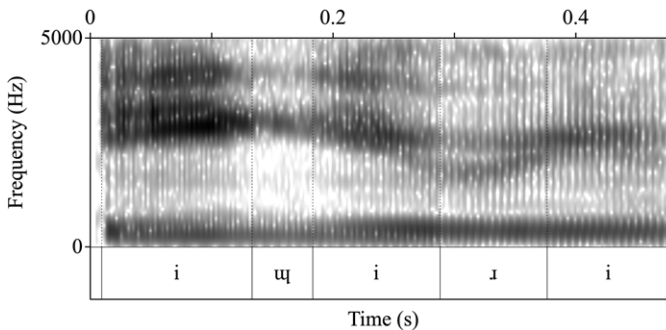
### *Plosives*

Although Taylor writes that intervocalic voiceless stops ‘vary freely’ with voiced stops, this does not occur in this data. In the speech of our consultant even many of the intervocalic voiceless plosives are aspirated, as shown in Figure 6 in the word *hati* ‘moon/month’, where the /t/ includes aspiration following the release burst before transitioning to the regular pulses of the vowel formants in /i/.



**Figure 6** *Hati* ‘moon/month’ with voiceless aspirated intervocalic /t/.

In contrast, her inter-vocalic voiced plosives sometimes lenite to voiced approximants; this seems to occur more often with alveolar or velar plosives than with the bilabial. Figure 7 demonstrates this lenition in the word *igiri* ‘nose’, where the velar plosive is lenited to an approximant.



**Figure 7** *Igiri* ‘nose’ with lenition of intervocalic voiced /g/.

### *Affricates*

The post-alveolar affricate /tʃ/ demonstrates lenition to a voiceless palatal fricative [ʃ]. This was described as allophonic and/or stable sociolinguistic variation by Taylor (1955: 235), who writes:

/c/ varies from a hushing sibilant, [ʃ], in unstressed syllables, to a palatal affricate [tʃ], in stressed syllables; most speakers employ the latter variant in deliberate speech for all positions.

The initial part of this description implies that the variation is allophonic if the affricate only occurs in the onset of stressed syllables and the fricative elsewhere, however the latter part of the description sounds as if the variation could today be described as sociolinguistic, that is that in any context the outcome is variable depending on speaker and ‘deliberateness’ of speech.<sup>2</sup>

Recordings of natural speech from sociolinguistic interviews in Hopkins provide evidence against a strictly allophonic analysis, as both variants are possible in the onset of stressed syllables. As there are no obstruent codas in Garifuna, all of the tokens of either variant are in syllable onsets. The examples in Figures 8 and 9 come from the speech of a Hopkins man, born in the 1940s, in the context of telling the Mercer Meyer story ‘A Boy, a Dog and a Frog’. In Figure 8 he uses the affricate in the onset of the stressed syllable <chu> in the word *tachubaru* ‘jump’, with clear evidence of a plosive (release burst) before the onset of frication; in Figure 9 he uses the fricative [ʃ] in the same word, with no evidence of a release burst.

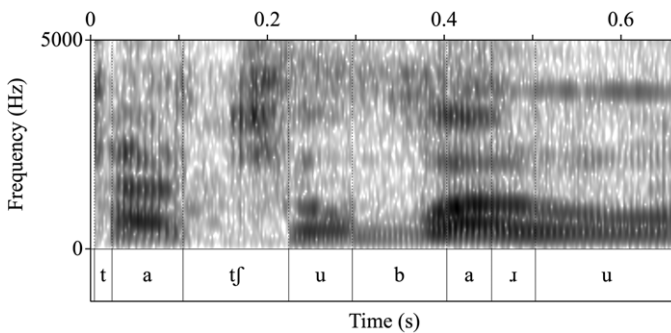


Figure 8 *Tachubaru* ‘jump’ with the affricate [tʃ].

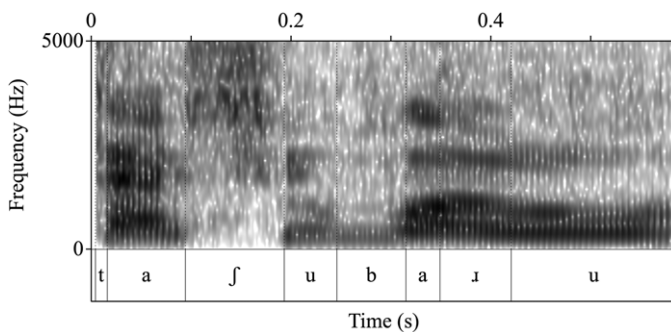


Figure 9 *Tachubaru* ‘jump’ with the fricative [ʃ].

The consultant for this illustration produces the affricate variant categorically in the word list as well as in the longer text, as do most speakers born after 1970 (for more on this see Abtahian 2020); this may be an effect of contact with English, where the two sounds are phonemic.

<sup>2</sup> Although we acknowledge that ‘deliberateness’ could also refer to strong prosodic positions, which could in principle still be a phonetic description.



### Rhotic

The rhotic in Garifuna is usually an alveolar approximant in Hopkins although the tap or trill are also attested in the community as well as in other parts of the Garifuna diaspora. In Honduras, where Garifuna is in contact with Spanish (where alveolar rhotics include a tap and a trill), the tap is the only reported variant (Suazo 1991a, Haurholm-Larsen 2016). In Belize, where Garifuna is primarily in contact with varieties of English and Kriol that use the approximant, the approximant is the more common variant (Ravindranath 2008, 2009). This demonstrates a real-time change in Hopkins from Taylor's (1955) description of the rhotic as varying between an apical flap and a trill. In fact, the change from tap to approximant seems to be an ongoing change: of the 61 speakers interviewed for Ravindranath (2009) only six produced any tokens of /r/, and all of these speakers were born before 1955. Speakers born after that time were categorical users of the approximant. The two variants may be heard in the examples *laru duna* 'to the water' [laru duna] and *ladagaragudüni* 'put it down' [ladagaragudüni], both from the same recording of a Hopkins man, born in the 1940s, telling the Mercer Meyer story 'A Boy, a Dog and a Frog'.

The alveolar approximant is also variably lenited or elided completely by some speakers. For this illustration our consultant read a list of words with /ɹ/ in various phonological environments and produced both the /ɹ/-ful and /ɹ/-less pronunciations when they were available for her. In some cases the /ɹ/ could not be elided, which may be a lexical phenomenon. Figures 10 and 11 demonstrate the word *arigei* 'ear' with both forms.

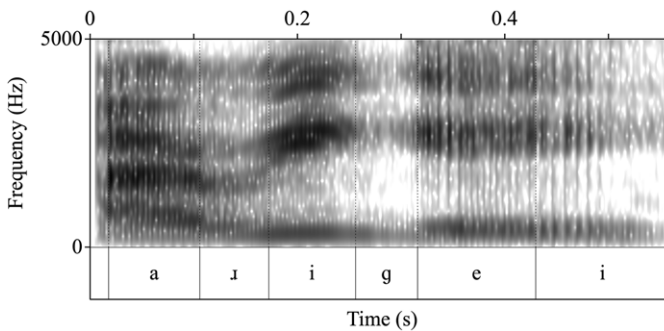


Figure 10 *Arigei* 'ear' with [ɹ].

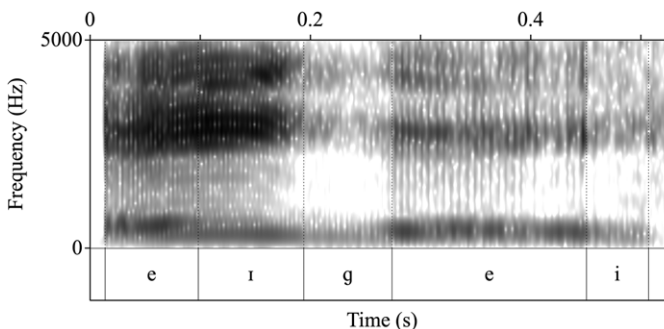
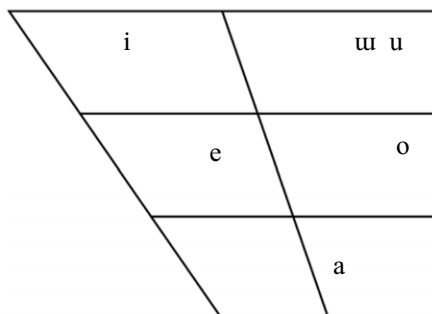


Figure 11 *Arigei* 'ear' with /ɹ/ elided and vowel coalescence of /a+i/ → [e].

When the rhotic is elided the /ai/ that is left may be variably realized as [ai] or as [eɪ] (sometimes with an accompanying stress shift to the initial vowel, as happens here). This is described further below in the section on vowels. In the examples in Figures 10 and 11, /ɹ/

is pronounced in Figure 10 but elided in Figure 11; in the latter case the initial vowel is also raised, such that [ai] > [eɪ].

## Vowels



The Hopkins variety of Garifuna has six phonemic monophthongs: /i e a u o ɯ/ (orthographic *i, e, a, u, o* and *ü*). There is generally broad agreement in previous descriptions on these vowels, with a few exceptions. First, the orthographic *e* is variably described as /e/ (Taylor 1955) or /ɛ/ (Haurholm-Larsen 2016); Taylor writes that [e] and [ɛ] are allophones; we have transcribed these as /e/. Second, the high back unrounded vowel /ɯ/ is described as a fronter /i/ by Haurholm-Larsen and left out of Taylor's description completely. We have used /ɯ/ here as the mean F2 values for that vowel suggest that it is more back, with a mean F2 similar to /u/ and /o/.

PHONEME	PHONETIC FORM	ORTHOGRAPHIC FORM	ENGLISH GLOSS
/i/	i'gija	igira	to leave
/e/	'ebu	ebu	support; handle
/a/	'abau	abaü	placenta
/u/	'aluda	áluda	to swell
/o/	'oubau	oubaü	half
/ɯ/	'aluda	álüda	to get lost

Cayetano (1993) additionally lists twelve 'compound vowels'. We have listed these in Table 4, but leave their further phonetic description for future work (Haurholm-Larsen 2016 describes them as vowel + glide while noting that Munro 2013 treats them as diphthongs). For the purposes of this illustration we have segmented and annotated each vowel separately in the spectrograms included here, even when they are tautosyllabic.

Although Taylor (1955) describes nasalization of vowels as phonemic with both monophthongs and diphthongs having nasalized counterparts, we do not find evidence that nasality is distinctive. Phonetically, both progressive and regressive nasalization of vowels can occur when following or preceding a nasal consonant. Haurholm-Larsen (2016: 20) posits that all nasal vowels that do not precede nasal consonants word-finally are derived diachronically

**Table 4** Garifuna compound vowels in Cayetano (1993).

	ie	ia	iu	iuu
ui	ue	ua		uuu <sup>a</sup>
ei			ou	auu
			au	

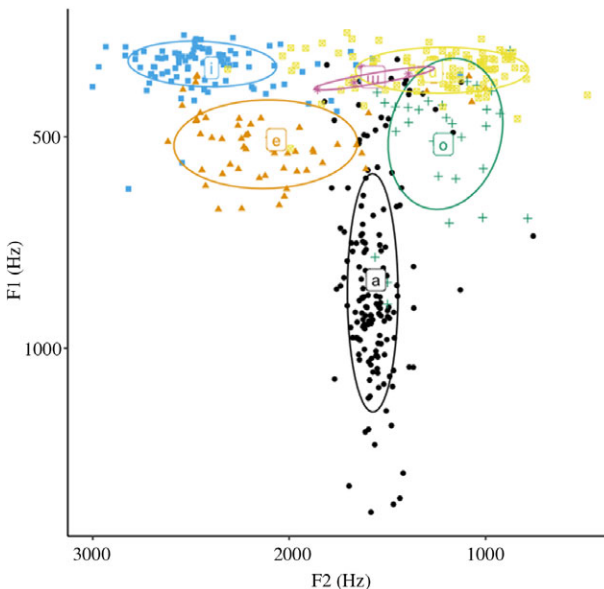
<sup>a</sup> Cayetano notates this as wuu; we have used uuu for consistency.

from a following, deleted, nasal segment. Examples of the nasalized /e/ and /ie/ occur in the illustrative passage and in the carrier phrase for the word list.

The vowel formants for the six monophthongs were measured manually using Praat: the vowel intervals were identified and the formant values were measured at the midpoint of these intervals. Table 5 presents the mean F1, F2, and F3 values for the six monophthongs in Garifuna. These values were calculated using 499 stressed vowel tokens: 153 for /a/, 57 for /e/, 142 for /i/, 30 for /o/, 111 for /u/, and six for /uu/, all from the same speaker. The F1 and F2 values are plotted in Figure 12 using R’s *ggplot2* and *dplyr* packages (with /uu/ represented in the plot by its orthographic form ü).

**Table 5** Mean F1, F2, and F3 values in Hz for the six Garifuna monophthongs.

Vowel	n	F1 (Hz)		F2 (Hz)		F3 (Hz)	
		Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
a	153	880	232.9	1539	327	2626	231
e	57	524	84.2	2071	402.8	2685	221
i	142	340	53.4	2461	340.3	2844	277.5
o	30	589	149.9	1305	221.4	2672	158.5
u	111	350	44	1414	349.2	2652	153.4
uu	6	366	20.5	1389	203.6	2954	277.8



**Figure 12** (Colour online) F1 and F2 values in Hz for the six Garifuna monophthongs from the word list.

The F1 and F2 measurements indicate a great deal of overlap between the monophthongs /u/ and /ʊ/, and there is disagreement in the existing Garifuna literature both as to the existence of /ʊ/ and its phonetic quality. Cayetano (1993) and Haurholm-Larsen (2016) list six monophthongs (although for Haurholm-Larsen the sixth vowel is an unrounded [i]), but Taylor (1955: 237) lists only five vowels, and treats [ʊ] as an allophone of /u/. The words *áluda* ‘to swell’ and *áliida* ‘to get lost’ serve as a minimal pair distinguishing the two vowels in our data, and in this minimal pair the tokens do not overlap; the three /ʊ/ tokens are fronted with respect to the three /u/ tokens. It seems likely here that the two vowels are distinguished by rounding. The mean F3 measurement for [ʊ], although based on only six tokens, is somewhat higher in our data than the mean F3 for [u].

### Resolution of vowel hiatus

When /ɪ/ is deleted, as described above, leaving two adjacent vowels, there are at least three possible outcomes, including vowel deletion, vowel coalescence, and/or vowel lengthening. We briefly illustrate some cases of vowel hiatus resolution here but leave a further discussion of this phenomenon for future work.

Deletion of one of the vowels may occur both when the r-deletion occurs between two different vowels or two of the same vowel. Figures 13 and 14 demonstrate this deletion in the word *achaguragua* ‘to chew tobacco’, where the following [a] is also lengthened.

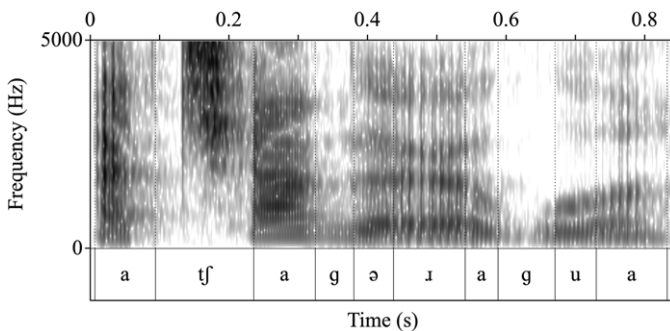


Figure 13 *Achaguragua* ‘to chew tobacco’ with canonical realization of /ɪ/.

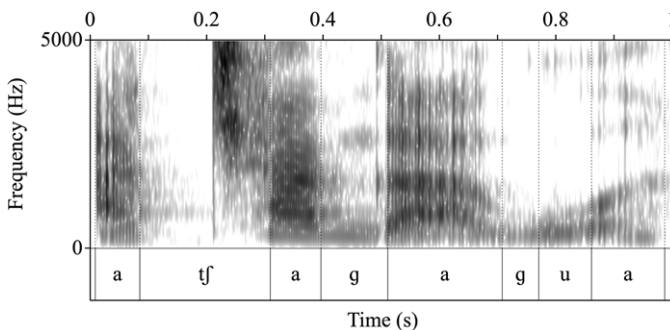


Figure 14 *Achaguragua* ‘to chew tobacco’ with deletion of /ɪ/ and vowel lengthening.

The pattern of vowel coalescence, where phonemic [a] is raised before high vowels [i] and [u] is demonstrated in Figure 11 above for the word *arigei* ‘ear’, and in Figure 16 for the

word *haruga* ‘tomorrow’, where vowel coalescence occurs following intervocalic r-deletion. Figure 15 shows a production of *haruga* with the /ɾ/ retained. Hagiwara (ms) explores a number of phonological processes concerning this phenomenon that are worth further investigation. In addition to the two types of coalescence described by Hagiwara (he names these AI-coalescence, and AU-coalescence), and exhibited in Figures 11 and 16, we also found several instances of /a/ and /i/ coalescence that resulted in diphthongs instead of the monophthongal [e]. This is demonstrated in the contrast between Figure 17 (with /ɾ/) and Figure 18 (without /ɾ/) for *marihiti* ‘blind’ where /a/–/i/ coalescence results in a more centralized [ə] before an offglide [i].

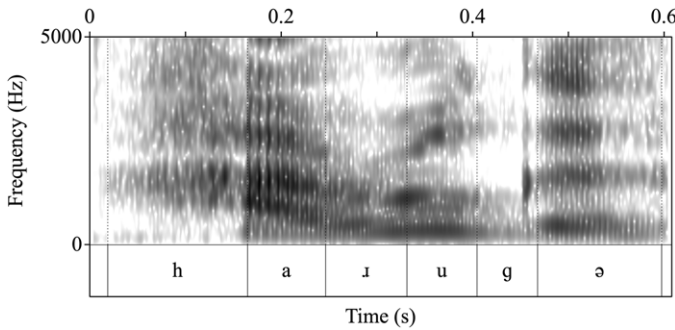


Figure 15 *Haruga* ‘tomorrow’ with canonical realization of /ɾ/.

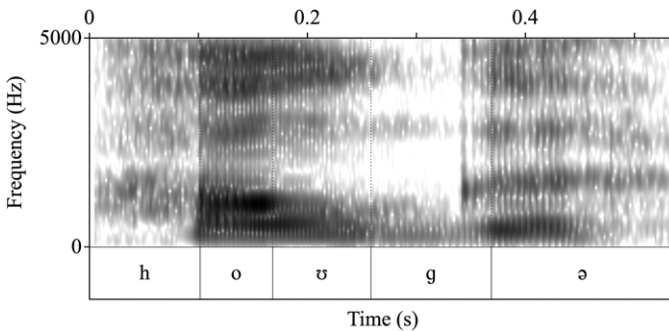


Figure 16 *Haruga* ‘tomorrow’ with deletion of /ɾ/ and vowel coalescence of /a+u/ → [oʊ].

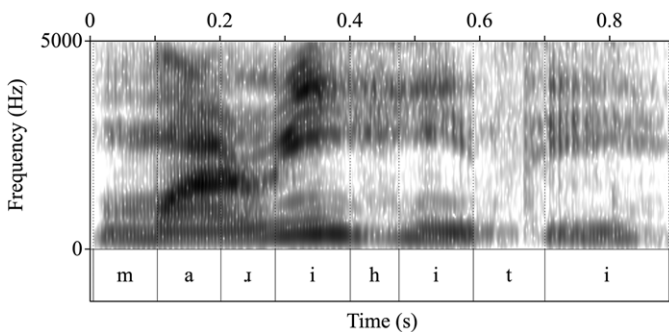


Figure 17 *Marihiti* ‘blind’ with canonical realization of /ɾ/.

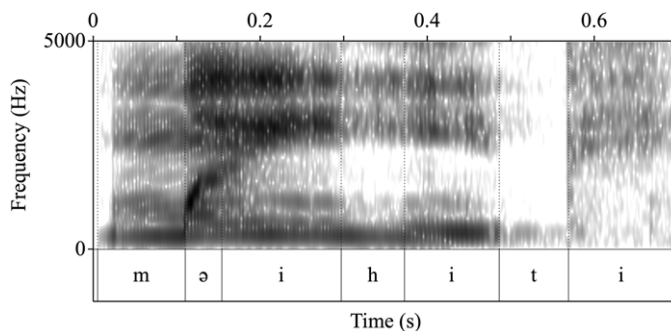


Figure 18 *Marihiti* 'blind' with deletion of /ɪ/ and vowel coalescence to a diphthong [əi].

### Prosodic features

Garifuna is maximally a CV language, except in borrowings, where CCV is permitted (but is often broken up with a vowel in slow speech). Taylor (1955: 235) notes at least one case where VC is permitted, that is in the exclamation *og!* – an exclamation of astonishment – but such cases are rare. All consonants may occur in onset position, although some are quite rare word-initially (including the voiceless stops /p/ and /k/, as well as /ɪ/). Additionally, vowel-initial words typically have glottalization preceding the vowel, as can be seen in the spectrograms in Figures 10 and 11 above, for *arigei* 'ear'.

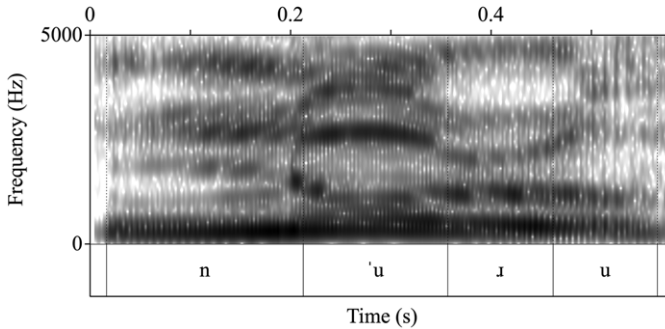
Although the placement of stress in Garifuna is usually predictable, it can be contrastive, as demonstrated by the following minimal pairs, from Cayetano (1992):

/ <sup>h</sup> ariha/	'to doze'	/a <sup>h</sup> riha/	'to see'
/ <sup>h</sup> abuuruha/	'to drop; to fall'	/a <sup>h</sup> buuruha/	'to write'

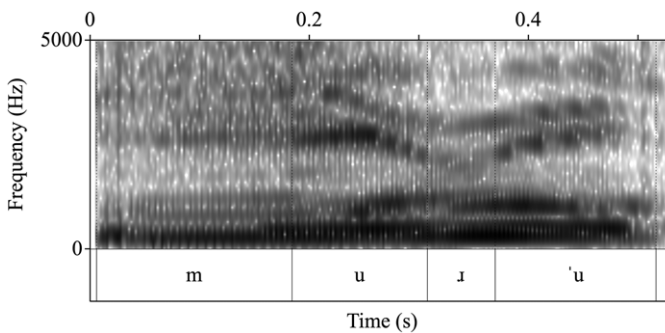
In our data *pasei* 'passage' and *basei* 'basil' serve as a near-minimal pair for the acoustic characteristics of stress (Figures 2 and 3 above), as do *nuru* 'northeast wind; sea breeze' and *murú-* 'tight' (Figures 19 and 20). In both pairs the stressed vowel has a longer duration than the corresponding unstressed vowel in the other member of the pair, and the stressed syllable exhibits a higher intensity and f<sub>0</sub> peak.

In order to determine the acoustic correlates of stress, f<sub>0</sub> and intensity were measured for stressed and unstressed vowels in the illustrative passage. These measurements, shown in Table 6, come from 64 primary stressed syllables and 126 non-primary stressed syllables in 64 words. The words in the passage range from one to five syllables long. Measurements were made at the highest f<sub>0</sub> and highest intensity peaks during the vowel. In the majority of the words the stressed syllable had the highest f<sub>0</sub> and highest intensity in that word. Moreover, stressed syllables were on average consistently and significantly higher for both f<sub>0</sub> and intensity than they were in unstressed syllables.

There are additional phonetic correlates of stress. Unstressed vowels in Garifuna are usually weak. Unstressed full vowels may be reduced to [ə], as in the word-final vowels in the word *haruga* 'tomorrow' in Figures 16 and 17, especially in final position. In addition, unstressed vowels may be devoiced in final position (Taylor 1955: 236). Figures 18 and 19 illustrate this variable devoicing: in Figure 18 the final /i/ in the word *marihiti* 'blind' is



**Figure 19** *Nuru* 'northeast wind; sea breeze' with primary stress on the first syllable.



**Figure 20** *Murzi* 'tight' with primary stress on the second syllable.

**Table 6** F0 and intensity in stressed and unstressed syllables in continuous speech.

	Stressed (n = 64)	Unstressed (n = 126)
Mean f0 (Hz):	242 (Std. dev. 58)	213 (Std. dev. 51)
Mean intensity (dB):	72 (Std. dev. 3.7)	70 (Std. dev. 4)

voiced, with a characteristic voice bar throughout in the spectrogram, while in Figure 19 the same final vowel /i/ is devoiced, as seen by the lack of a voice bar.

### Transcription of recorded passage

The recorded passage is a retelling of 'The North Wind and the Sun'. The transcription is primarily a phonemic transcription at the word level (morpheme boundaries are not included). Note that phonemic /ɪ/s are included in the transcription even when they are deleted in pronunciation and that final full vowels are transcribed even when they are reduced to [ə]. Phonetic nasal vowels are transcribed as such (in the orthography they are written as a vowel and following nasal consonant). An orthographic version and an English translation are included below the phonemic transcription.

'le.ɾegiẽ      'unabugiẽti    'luma    'weju    lu'agu    ka    la    'hadagiẽ      'herebei  
 Léreragua      ünabugiénti    luma    weyu    luagu    ka    la    hádagien      hérebei  
 'The North Wind and the Sun were arguing about which one of them was stronger.'

'uara    'luma    li'abi    'abā    'afajahati      'abati    ha'riẽgu  
 úara    luma    liabi    aban    áfayahati      abati    hariẽngu  
 'Along came a traveler so they told each other.'

le      a'.ɾagatʃubanu      la'nagu      'afajahati      'furumiẽ      li'gia    'herebei  
 "Le      aragachabanu      lanagu      áfayahati      furumien      ligía    hérebei"  
 "Whoever makes the traveler take his clothes off first is stronger."

'aba    'lafuɾa      'unabugiẽti    loũ    sũ    lu'gustu  
 Aba    láfura      ünabugiénti    lou    sun    lugustu  
 'So the North Wind blew with all his might.'

'pe.ɾo    e'.ɾedeina      'lafuru      'unabugiẽti  
 Pero    erederena      láfura      ünabugiénti,  
 'But the more the North Wind blew.'

'amu.ɾudeina    loũ    'afajahati      la'nagu      lu'agu  
 ámurudeina    lou    áfayahati      lanagu      luagu  
 'the more the traveler tightened his shirt.'

'aba    le'.ɾẽgu      'unabugiẽti    bu'tʃa    nu'agu      'aba    le'.ɾede.ɾa    'lafuɾa  
 Aba    laríenga      ünabugiénti    "bucha nuagu,"      aba    leredera      láfura  
 'Then the North Wind said, "I'm tired," so it stopped blowing.'

'aba    li'abi    'weju    loũ    'lusu  
 Aba    liabi    weyu    lou    lusũ  
 'Then the Sun came shining'

'aba    la'.ɾagatʃunu    'afajahati      la'nagu      lu'agu      lufu'.ɾese  
 Aba    laragachunu    áfayahati      lanagu      luagu      lufurese  
 'The traveler took his clothes off quickly because it was hot.'

'aba    le'.ɾiẽgu      'unabugiẽti    lun    'weju    bu'guja      'herebei    'wadagiẽ  
 Aba    laríenga      ünabugiénti    lun    weyu, "Buguya      herebei    wádagien."  
 'So the North Wind told the Sun, "You are the stronger of the both of us."

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## Supplementary material

To view supplementary material for this article, please <https://doi.org/10.1017/S0025100323000038>.

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