Linguistik Indonesia, Februari 2024, 21-35 *Volume ke-42, No.1*

ISSN cetak 0215-4846; ISSN online 2580-2429

PREVOCALIC WORD-INITIAL GLOTTAL STOPS IN ROTE: IMPLICATIONS TO LANGUAGE REVITALISATION

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Abstract

This paper presents an analysis of word-initial glottal stops in Rote and its implications for language revitalization programs. A number of phonological, morphological, and syntactic evidence confirms that, in most cases, the status of the initial glottal stops can be determined; some are epenthetic, while others are contrastive. The difference between the two is evident in specific environments. Only a few instances are found in which the data are ambiguous. The data from Rote shows that a unitary analysis of the word-initial glottal stops is not possible. Thus, the status of such glottal stops needs to be carefully considered in orthography design for Rote languages to avoid underrepresentation or overrepresentation, which may lead to issues in the learnability of the orthography. This study contributes to (i) the exploration of variation and universality of prevocalic initial glottal stops, especially in Eastern Indonesian languages, and (ii) the orthography development of languages in Rote and the neighboring languages as an effort to language revitalization.

Keywords: prevocalic word-initial glottal stops, language revitalization, Rotenese

Abstract

Makalah ini menyajikan analisis bunyi glotal pravokal awal kata pada bahasa Rote dan implikasinya terhadap program revitalisasi bahasa. Sejumlah bukti fonologis, morfologis, dan sintaktik menegaskan bahwa dalam banyak kasus, status bunyi glotal awal dapat ditentukan; sebagian adalah bunyi epentetik, dan yang lain kontrastif. Perbedaan antara keduanya terlihat jelas dalam lingkungan tertentu. Hanya ada beberapa contoh yang ditemukan di mana datanya ambigu. Data dari Rote menunjukkan bahwa analisis tunggal tidak dimungkinkan bagi bunyi glottal awal kata. Dengan demikian status bunyi glotal tersebut perlu dipertimbangkan dengan hati-hati dalam mendesain ortografi bagi bahasa Rote untuk menghindari representasi yang kurang memadai atau berlebihan yang dapat menyebabkan masalah dalam kemampuan belajar ortografi. Kajian ini berkontribusi bagi (i) explorasi variasi dan universalitas bunyi glotal awal pravokal, khususnya pada bahasa-bahasa di Indonesia Timur, dan (ii) pengembangan ortografi bahasa di Rote dan bahasa-bahasa di sekitarnya sebagai upaya revitalisasi bahasa.

***Kata kunci**: bunyi glottal pravokal awal kata, revitalisasi bahasa, bahasa Rote*

INTRODUCTION

Cross-linguistically, prevocalic word-initial glottal stops have been widely studied. In some languages, these glottal stops received unitary analysis as either epenthetic or contrastive, while in other languages, a unitary analysis is not possible. Consonant epenthesis occurs in many languages, and glottal stop epenthetic consonants are common (ee Culhane (2018) for a list of languages with glottal stop epenthesis). In German, for instance, a glottal stop is optionally

inserted before a vowel-initial foot regardless of its position (Wiese, 1996). Some examples are given in (1).

(1) Glottal stop insertion in German (Wiese, 1996: 58)

Atem	/aːtəm/	→	[ˈaːtm]	~	[ˈʔaːtm]̩	‘breath’
Edel	/eːdəl/	→	[ˈeːdl]	~	[ˈʔeːdl]̩	‘noble’
Opa	/oːpa/	→	[ˈoːpa]	~	[ˈʔoːpa]	‘grandpa’

A similar glottal stop insertion is found in Anejom̃ (Lynch, 2000: 17), in which an epenthetic glottal stop is inserted before all vowel-initial words in utterance initial position, as in (2).

(2) Glottal stop insertion in Anejom̃ (Lynch, 2000)

aek	→	[ˈʔaek]	‘you (SG)’
apam + aek	→	[ˌʔabamˈaek]	‘come (SG)!’
et + apam + aen	→	[ʔed̥ˌabamˈaen]	‘he came’

Glottal stop insertion, as found in Anejom̃ and German, is also attested to various rules in many language families worldwide. Blevins (2008) and Lombardi (2002) give an overview and discuss a number of languages with word-initial glottal stop insertion.

Despite the abundant cross-language research on prevocalic word-initial glottal stops, including in some languages in the greater Timor region: Helong (Balle, 2017); Dhao (Ballukh, 2020); Amfo’ang (Culhane, 2018); Amarasi (Edwards, 2017); Bunak (Schapper, 2009); and Miamafo (Steinhauer, 1996), similar studies in Rote languages are scarcely found except for a brief analysis of initial glottal stops (Edwards, 2018; Tamelan, 2021). Previous studies on prevocalic word-initial glottal stops in languages in the greater Timor region posited three different analyses, namely: (1) all initial glottal stops before vowels are contrastive (phonemic); (2) all initial glottal stops before vowels are epenthetic (phonetic), and (3) some initial glottal stops before vowels are contrastive and some are epenthetic. Ballukh (2020), in his analysis of Dhao, and Steinhauer (1996), in his studies of the Miamafo variety of Uab Meto, adopt the first analysis and treats all word-initial glottal stops as contrastive. The second analysis was adopted for word-initial glottal stops in Helong (Balle, 2017: 101), Leti (van Engelenhoven, 2004: 66) and Bunak (Schapper, 2009: 48). The third analysis was adopted by Edwards (2017) for his description of Amarasi variety of Uab Meto & Tamelan (2021) for her analysis of Dela data.

This paper builds and expands on these works and discusses the status of prevocalic word-initial glottal stops in Rote with data from Dela. The data in Table 1 gives minimal and near minimal pairs showing contrasts between four phonetically similar segments: *ʔ, k, h, Ø,* in different word positions. It shows the glottal stop contrast with all other consonants word-initially, between vowels and word-finally. At the same time, with zero, there is no contrast word-initially in the utterance initial position. Thus, no phonetically vowel-initial words are found in the utterance initial position in Rote.

Table 1. Contrasts between *ʔ, k, h, Ø*

	#_V		**V_V**		**V_#**	
ʔ	*ʔoni*	'pour'	*seʔu*	'visit'	*hieʔ*	'very'
k	*kosiʔ*	'kick'	*seku*	'distance'	*hiek*	'goat'
h	*hoi*	'dry'	*hehieiʔ*	'lobster'		
Ø	[*ʔ*]*oni**	'bee'	*seu*	'pick'	*hie*	'quiet'

*Uterance initial position: [*ʔ*]*oni* 'bee'*;* utterance non-initial positions: *oni* 'bee'

Based on the data above, a unitary analysis of initial glottal stops for Rote is not possible. This study provides evidence that some prevocalic word-initial glottal stops are automatic epenthetic insertions (phonetic), while others are contrastive (phonemic).[1] The difference between the two kinds of glottal stops emerges through several tests, namely prefixation, noun/verb-verb pairs, reduplication, compounding and the position of the word within an utterance. The epenthetic glottal stops only occur utterance-initially and word-initially in isolation. That is, there are no phonetically vowel-initial words utterance-initially in Rote. While in most cases, the status of the word-initial glottal stop can be determined, there are a few instances found in which the data are ambiguous, as these glottal stops have not been attested to occur in roots with prefix/es, noun/verb-verb pairs, reduplication, compounding or in utterance non-final positions.

The structure of the paper is as follows: an overview of phonology and morphology related to the topic is provided in the next section. Then, the status of the prevocalic word-initial glottal stops is described based on various tests. Finally, the study's implications for language revitalization programs are presented before the conclusion of the study. Following Edwards (2017), throughout this paper, contrastive glottal stops are transcribed with no brackets, epenthetic glottal stops in square brackets as [ʔ], and ambiguous glottal stops in regular parentheses as (ʔ). These transcription conventions are shown in the following words: *ʔaʔa* 'elder sibling' with a contrastive glottal stop, [ʔ]au '1SG' with an epenthetic glottal stop, and (ʔ)itaʔ 'perhaps' when the data is ambiguous.

DATA AND METHOD

The speech variety that is the focus of this paper is the Dela variety of the Rote language/dialect cluster spoken at the western end of the chain. The primary data for this analysis is from Dela corpus data collected by the author for the writing of the Dela grammar (Tamelan, 2021). The corpus consists of 155 recorded texts and a lexicon of 2476 entries; the texts total over ten hours of recordings and include different genres such as narratives, folktales, conversations, prayers, procedural, expository and hortatory discourse. All texts are transcribed and accessible in TOOLBOX files for interactive concordance searches. The data is archived at PARADISEC and can be accessed at https://catalog.paradisec.org.au/collections/TMT01. All data are from Dela unless labeled otherwise. Other linguistic data for comparison of epenthetic and contrastive glottal stops in Dela with other neighboring languages is documentation data collected from previous studies relating to the topic (Edwards, 2017; Tamelan, 2007; 2014). This descriptive-qualitative study uses an analytic method. The data are analyzed to determine and describe the status of prevocalic word-initial glottal stops and implications to language revitalization.

RESULT AND DISCUSSION

Prior to the discussion of the prevocalic initial glottal stops in Rote, some essential aspects of the phonology and morphology are given. In addition, the study's implications for language revitalization programs are discussed before the conclusion of the study.

Phonology and morphology essentials

The aspects of Rote phonology and morphology discussed here are the ones that are relevant for the understanding of the analysis of the prevocalic word-initial glottal stops. The description is based on the work of Tamelan (2021), where a more complete and detailed analysis of Dela phonology and morphology can be found.

Rote has 16 consonants /p, t, k, ʔ, ɓ, ɗ, ᵐb, ⁿd, ᵑg, m, n, f, s, h, l, r/ and five vowels /i, e, a, o, u/. All consonants occur in syllable onsets, both root-initially or medially, while root-final codas are restricted to the following consonants /t k ʔ n s r/. The glottal stop /ʔ/ is the most frequent consonant with almost equal distribution in word-initial, medial and final positions. See Tamelan (2021, p. 27) for Rote (Dela) consonant frequencies.

The basic syllable template in Rote is (C)V(C). The minimal syllable consists of a nucleus V-slot and the maximal syllable consists of an onset C-slot, a nucleus V-slot and a coda C-slot.[2] The syllable types are given in Table 2.

Table 2. Syllable types

Syllable type	Item	
V	***a.i***	‘fire’
CV	***re.na***	‘listen’
VC	*la.**us***	‘cactus’
CVC	*ɗa.**ɗis***	‘nephew’

Each segmental vowel is a syllable nucleus (syllable peak), and phonetically long vowels are analyzed as sequences of two vowels, with each vowel being the head of a syllable nucleus, regardless of whether or not the two vowels are like or unlike. The analysis was chosen primarily based on the stress patterns of the words with double vowels, in which the stress remains on the penultimate syllable (i.e., vowel) of the root for both like vowels and unlike vowels.

Maximally, Rote words allow a sequence of four vowels. Sequences of two vowels are very common, while sequences of three vowels are less common, and four vowels are rare and usually found in stems or roots that are lexicalized from historical compounds. Vowel sequences are realized without a glottal stop insertion. The stress pattern of the words with sequences of three or four vowels still falls on the penultimate syllable, the second vowel from the last. Some examples are given in Table 3.

Table 3. Examples of vowel sequences

No	VV		VVV		VVVV	
1.	*h**ai***	‘heal’	*k**oao***	‘boast’	*mb**aeao***	‘half ripe (beans)’
2.	*s**oo***	‘sew’	*sel**uao***	‘change clothes’	***Oeoi***	‘place name’
3.	*mb**ei***	‘little’	*Sed**eoe**n*	‘place name’		
4.	*s**eu***	‘pick’	*n**a-oe***	‘3SG-produce water’		
5.	*l**ao***	‘leave’	*n**e-ue***	‘0-clean garden’		

A morphological fact of Rote, which is relevant for the discussion of initial glottal stops, is that there is no glottal insertion in vowel sequences, nor is there inter-morphemic glottal insertion in words with a syllabic prefix and a vowel-initial root or stem.[3] Some examples are given in (3).

(3) Vowel-initial roots with syllabic prefixes

oe	'water'	*na-oe*	*naoe*	'3SG-produce water'
elu	'creep'	*na-elu*	*naelu*	'3SG-creep'
eiʔ	'leg'	*ma-ei-ʔ*	*maeiʔ*	'have legs'
uli	'steer'	*ne-uli*	*neuli*	'0-steer'
anin	'wind'	*ne-le-ani*	*neleani*	'0-windy'

TEST FOR PREVOCALIC WORD-INITIAL GLOTTAL STOPS

The status of the word-initial glottal stops can be determined through five different tests. These are prefixation, noun-verb pairs, reduplication, compounding and the position of the words within the utterance. The tests provide evidence that, in most cases, some of the word-initial glottal stops are epenthetic (phonetic), and some are contrastive (phonemic).

Prefixation

Several prefixes can be used to distinguish between roots that begin with a contrastive glottal stop and vowel initial roots. These prefixes are: 1) subject prefixes, and 2) verbal prefixes, namely: verbalizers, stative *ma-*, *ta-* and *ɓa-*, reciprocal *ma-* and *ɓa-*, and agentless passive *nene-*.

Many verbs in Rote obligatorily take a subject prefix to agree with the subject. It is a notable feature of the verbal morphology. The subject prefixes consist of two sets of paradigms: syllabic and non-syllabic prefixes, as presented in Table 4. The non-syllabic set consists of the consonant of the syllabic set.

Table 4. Subject prefixes

Person-number	Free pronoun	Subject prefix	
		Syllabic	**Non-syllabic**
1SG	*au*	*ʔu-*	*ʔ-*
2SG	*hoo*	*mu-*	*m-*
3SG	*eni*	*na-*	*n-*
1PX	*hai*	*mi-*	*m-*
1PI	*hita*	*ta-*	*t-*
2PL	*hei*	*mi-*	*m-*
3PL	*sira*	*ra-*	*r-*
0		*ne-*	

The syllabic subject prefix is quite common in the corpus (477 attested verbs), while the non-syllabic subject prefix is quite limited (only 12 attested verbs). The choice between the two sets of prefixes partially depends on the phonotactic shape of the root and is partly lexically and semantically determined, as summarised in Table 5 below.

Table 5. Subject prefixes according to root shape

Root shape		+ verbal prefix	Subject prefix	Example	Gloss
Σσσσ	4 syllables	none	none	*ʔesufani*	'sneeze'
Σσσ	3 syllables	none	syllabic	***na***-*talaɗa*	'sit between'
#V	vowel-initial disyllable	none	non-syllabic syllabic	***n***-*ela* ***na***-*elu*	'run' 'creep'
#V	vowel-initial disyllable	CV-	syllabic	***na***-*la-unu*	'stack into a pile'
#C	consonant-initial disyllable	CV-/none	Syllabic	***na***-*tutu* ***na***-*ma-tau*	'punch RECP' 'is/become scared'
#V #C	Transitive Intransitive	none none	Syllabic non-syllabic	***n***-*endi* ***na-n***-*endi*	'bring, pull' 'pulling (feature)'
#V #C	Transitive Transitive direct causation	CV-/none CV-/none	Syllabic non-syllabic	***n***-*isa* ***na-n***-*isa-ʔ*	'kill' 'kill (direct CAUS)'

Quadrisyllabic roots do not take subject prefixes, while trisyllabic and disyllabic consonant-initial roots take syllabic subject prefixes. Trisyllabic vowel-initial verbal roots are not attested in the corpus. The disyllabic vowel-initial roots can take either the syllabic or non-syllabic subject prefix, as shown in words *na-elu* 'creep' and *n-ela* 'run'. A few roots, such as *-isa* 'kill' can take both subject prefixes in different contexts to show a contrast in valency and/or meaning. See Tamelan (2021, p. 44) for a complete description of the choices.

When a root takes these prefixes, the contrast between vowel-initial roots and glottal stop-initial roots becomes evident. This is illustrated in Table 6 with three vowel-initial roots, two glottal stop-initial roots, and two other consonant-initial roots. As expected, the glottal stop-initial roots surface with a glottal stop after the subject prefix, while vowel-initial roots do not. Thus, the vowel-initial roots with glottal stop insertion contrast with the contrastive glottal stop-initial roots.

Table 6. Contrast between vowel-initial and glottal-initial roots with subject prefixes

Person-number	Free pronoun	#V *-ela* 'run'	#V *uli* 'shake'	#V *-isi* 'clean'	#ʔ *ʔisi* 'pinch'	#ʔ *ʔiɗu* 'kiss'	#C *holu* 'hug'	#C *moko* 'big'
1SG	*au*	*ʔ-ela*	*ʔu-uli*	*ʔu-isi*	*ʔu-ʔisi*	*ʔu-ʔiɗu*	*ʔu-holu*	*ʔu-moko*
2SG	*hoo*	*m-ela*	*mu-uli*	*mu-isi*	*mu-ʔisi*	*mu-ʔiɗu*	*mu-holu*	*mu-moko*
3SG	*eni*	*n-ela*	*na-uli*	*na-isi*	*na-ʔisi*	*na-ʔiɗu*	*na-holu*	*na-moko*
1PX	*hai*	*m-ela*	*mi-uli*	*mi-isi*	*mi-ʔisi*	*mi-ʔiɗu*	*mi-holu*	*mi-moko*
1PI	*hita*	*t-ela*	*ta-uli*	*ta-isi*	*ta-ʔisi*	*ta-ʔiɗu*	*ta-holu*	*ta-moko*
2PL	*hei*	*m-ela*	*mi-uli*	*mi-isi*	*mi-ʔisi*	*mi-ʔiɗu*	*mi-holu*	*mi-moko*
3PL	*sira*	*r-ela*	*ra-uli*	*ra-isi*	*ra-ʔisi*	*ra-ʔiɗu*	*ra-holu*	*ra-moko*
0			*ne-uli*	*ne-isi*	*ne-ʔisi*	*ne-ʔiɗu*	*ne-holu*	*ne-moko*

Since not all roots can take subject prefixes, some vowel-initial and glottal stop-initial roots can be contrasted when they take other prefixes such as stative *ma-*, reciprocal *ma-* and *ɓa-*, and agentless passive *nene-*. As illustrated in Table 7, the glottal stop-initial roots surface with a glottal stop after the syllabic prefix, while vowel-initial roots do not have a glottal stop.

Table 7. Contrast between vowel-initial and glottal-initial roots with other prefixes

Prefix	#V	#ʔ	#C
Stative	*oe* 'water'	*-ʔee* 'sweet'	*loleʔ* 'good'
ma-	*ma-oe-ʔ* 'watery'	*ma-ʔee* 'be sweet'	*ma-lole-ʔ* 'good'
RECP		*ʔira* 'convince'	*helu* 'promise'
ma-		*ma-ʔira-ʔ* 'RECP agreed'	*ma-helu-ʔ* 'RECP promise'
Passive	*uku* 'measure'	*ʔoi* 'chase'	*soi* 'open'
nene-	*nene-uku-ʔ* 'is measured'	*nene-ʔoiʔ* 'expelled'	*nene-soi-ʔ* 'is opened'

The data in Tables 6 and 7 clearly show that there is a difference between vowel-initial and glottal stop-initial roots. However, they do not provide evidence of contrast between vowel-initial and glottal stop-initial words for all the words, as some of the roots are bound roots. The evidence can be provided with the occurrence of the roots with and without prefix/es. That is, if a root surfaces with an initial glottal stop in both environments, then it is evident that both instances have a constrastive glottal stop. This is illustrated in the next section.

Noun/verb-verb pairs

Since many roots in Rote can occur as both a noun or verb without a prefix and as a verb with prefix/es, these pairs can provide evidence to determine the status of word-initial glottal stops. In Rote, verbs and nouns are derived through a number of strategies. These include verbal derivation with subject or verbal prefixes, verbalization by deleting a final consonant, nominalization with a suffix *-ʔ*, *-s* or *-t*, and zero derivation.

Table 8 presents some related noun/verb-verb pairs. Example numbers 1-3 are pairs of other consonant initial noun/verb. Examples 4-8 show five pairs of glottal stop initial noun/verb (prefixless) and verb (prefixed) that have a glottal stop after the prefixation. These pairs illustrate that when a glottal-initial noun/verb takes the prefix/es, the glottal stop remains present after the prefix/es. This shows that the glottal stop of both the prefixless noun/verb and the prefixed verb is a contrastive or phonemic glottal stop.

Table 8. Noun/verb-verb pairs

No	**Gloss**	**Noun/Verb**	**Verb**	**Gloss**
1.	'wide'	*loa-ʔ*	*na-loa*	'3SG-makes s.t. wider'
2.	'flower'	*ɓuna-ʔ*	*na-ɓuna*	'3SG-flowering'
3.	'big'	*moko*	*na-ʔa-moko*	'3SG-becomes big'
4.	'convince, forbid'	*ʔira*	*ma-ʔira-ʔ*	'agree with each other'
5.	'root'	*ʔoka-ʔ*	*na-ʔoka*	'3SG-has roots'
6.	'sit'	*ʔendoʔ*	*na-ʔendoʔ*	'3SG-make someone sit'
7.	'break'	*ʔetu*	*na-ʔetu-ʔ*	'3SG-decides'
8.	'kiss'	*ʔidu*	*ra-ʔidu*	'3PL-kiss one another'
9.	'water'	***[ʔ]****oe*	*na-oe*	'3SG-has/produce water'
10.	'work'	***[ʔ]****ue-s*	*na-ue*	'3SG-pulls grass'
11.	'content'	***[ʔ]****isi-ʔ*	*na-isi*	'3SG-has content'
12.	'be scattered'	***[ʔ]****ono*	*na-la-ono*	'3SG-scatters something'
13.	'dust'	***[ʔ]****afu*	*na-la-afu*	'3SG-becomes dusty'

Example 9-13 in Table 8 gives five pairs of glottal stop initial noun/verb roots (prefixless) and verb (prefixed) that have no glottal stop after the prefixation. These roots are

analyzed as vowel-initial roots, and the glottal stop of the noun/verb is analyzed as an epenthetic glottal stop inserted word-initially before a vowel.

An alternative analysis is to analyze all the initial glottal stops in the noun/verb (prefixless) roots as automatic insertion, and the glottal stop in the prefixed verbs is a kind of verbal prefix. Within this analysis, a word like *na-ʔoka* '3SG-has roots', in Table 8 number 5, would be analyzed as *na-ʔ-oka*, whereas a word like *na-ue* '3SG-pulls grass', in Table 8 number 10, is analyzed as not occurring with the prefix. Rote (Dela) does have the verbal prefix *-ʔ* (short form of *-ʔV*), as shown in Table 9. This verbal prefix is attached to certain roots in order to form verbs or new verbs with specific meanings, such as causative (Tamelan, 2021, p. 140f).

Table 9. Verbal prefix *-ʔ/-ʔV*

No	Gloss	Base	Verb	Gloss
1.	'die'	*mate*	*na-ʔa-mate/na-ʔ-mate*	'3SG-becomes numb'
2.	'big'	*moko*	*ʔu-ʔu-moko/ʔu-ʔ-moko*	'1SG-become big'
3.	'sit'	*ʔendoʔ*	*na-ʔa-ʔendo/na-ʔ-ʔendo*	'3SG-helps someone to sit'
4.	'short'	*ʔeku-ʔ*	*na-ʔa-ʔeku/na-ʔ-ʔe~ʔeku*	'3SG-makes s.t. shorter'
5.	'water'	*[ʔ]oe*	*mi-ʔi-oe/mi-ʔ-oe*	'2PL-get wet'
6.	'small'	*[ʔ]ana-k*	*na-ʔa-ana/ na-ʔ-ana*	'3SG-becomes small'

The alternative analysis, however, cannot be adopted for the glottal stop-initial verbs in Table 8, as the glottal stop of the roots in Table 9 co-occur with the verbal prefix *-ʔ* as shown in the short/long form of the example *na-ʔ-ʔendo/na-ʔa-ʔendo* '3SG-helps someone to sit'.

Reduplication

Similar to prefixation, reduplication can provide evidence for contrastive and epenthetic word-initial glottal stops. Reduplication is a productive morphological process in Rote. Rote has two basic reduplication patterns: full and partial. The two reduplication patterns have derivational and inflectional functions. It can derive new words or denote different meanings, including continuative, iterative, habitual, intensity, attenuation and distributive.

As the basic syllable template in Rote is (C)V(C), and the intervocalic C is ambisyllabic, the partial reduplicant has the form of V, CV, VC or CVC, which is prefixed to the base. Examples are presented in Table 10, and the reduplicants are given in bold. When the stem consists of more than two syllables, as in examples 8-15, the reduplicant occurs between any pre-foot material and the foot as a kind of infix. A non-syllabic subject prefix also occurs as part of the reduplicant (examples 6 and 7), while a syllabic subject prefix and other prefixes do not (examples 8-15).[4]

Full reduplication denotes a range of meanings, including continuation, intensity, iterative and attenuation. Examples are given in Table 11. Unlike partial reduplication, any prefix in full reduplication also occurs as part of the reduplicant, as shown in examples 7 and 10. The non-syllabic subject prefix *n-* in *n-inu* '3SG drinks' and the syllabic subject prefix *na-* and the verbal prefix *ma-* 'STAT' in *namanasa* '3SG is angry' are part of the reduplicant.

Table 10. Partial reduplication

No	Gloss	Base		Reduplicated	Gloss
1.	‘shake’	*[ʔ]uli*	→	***[ʔ]u*~*uli***	‘shake repeatedly’
2.	‘sing’	*soɗa*	→	***so*~*soɗa-k***	‘sing casually’
3.	‘talk’	*ʔolaʔ*	→	***ʔo*~*ʔola-ʔ***	‘is talking’
4.	‘one’	*[ʔ]esa*	→	***[ʔ]es*~*esa***	‘each one’
5.	‘a lot’	*lapa*	→	***lap*~*lapa***	‘very many’
6.	‘3SG eats’	*n-aa*	→	***na*~*naa-t***	‘food’
7.	‘3PL drinks’	*r-inu*	→	***ri*~*rinu-k***	‘drink casually’
8.	‘3SG asks’	*na-tane*	→	*na-**ta**~tane*	‘asks around’
9.	‘3SG lead, steer’	*na-uli*	→	*na-**u**~uli*	‘leading, steering’
10.	‘hot’	*ma-tobi-ʔ*	→	*ma-t**o**~tobi*	‘warm’
11.	‘sour’	*ma-ʔei*	→	*ma-**ʔe**~ʔei*	‘slightly sour’
12.	‘cold’	*ma-ʔa-sufu*	→	*ma-ʔa-**su**~sufu*	‘slightly cold’
13.	‘3SG flies’	*na-ta-mbele*	→	*na-ta-**mbe**~mbele*	‘flies around’
14.	‘3SG breaks’	*na-mba-lutu*	→	*na-mba-**lu**~lutu*	‘is breaking to pieces’
15.	‘3SG is old’	*na-ma-lasi*	→	*na-ma-**la**~lasi*	‘is getting old’
16.	‘stale’	*melutane*	→	*melu-**ta**~tane*	‘a bit stale’
17.	‘hiccup’	*mesuʔuɗu*	→	*mesu-**ʔu**~ʔuɗu*	‘hiccups’
18.	‘broken-shatter’	*lutu-ʔetoʔ*	→	*lutu-**ʔe**~ʔetoʔ*	‘very broken-shatter’

Table 11. Full reduplication

No	Gloss	Base		Reduplicated	Gloss
1.	‘creep’	*[ʔ]elu*	→	***[ʔ]elu*~*elu***	‘creeping’
2.	‘one’	*[ʔ]esa*	→	***[ʔ]esa*~*esa***	‘each one’
3.	‘little’	*mbei*	→	***mbei*~*mbei***	‘little by little’
4.	‘day’	*fai*	→	***fai*~*fai***	‘every day’
5.	‘sting (spicy)’	*ʔete*	→	***ʔete*~*ʔete***	‘slightly spicy’
6.	‘kiss’	*ʔiɗu*	→	***ʔiɗu*~*ʔiɗu***	‘kiss repeatedly’
7.	‘3SG drink’	*n-inu*	→	***n-inu*~*ninu***	‘3SG is drinking’
8.	‘boasting’	*koao*	→	***koao*~*koao***	‘keep boasting’
9.	‘crow’	*koʔokee*	→	***koʔokee*~*koʔokee***	‘crowing’
10.	‘3SG is angry’	*na-ma-nasa*	→	***namanasa*~*namanasa***	‘3SG is very angry’

The examples in Table 11 illustrate reduplication of both the glottal stop-initial and vowel-initial stems. Again, the epenthetic glottal stops are presented in brackets (Examples 1 and 2), while contrastive glottal stops are presented without brackets (Examples 5 and 6). No glottal stop occurs in the stem when a vowel-initial root is reduplicated. Thus, the glottal stop in the reduplicant is analyzed as an epenthetic glottal stop, which is automatically inserted when a vowel-initial word is used in isolation or occurs in the utterance initial position. By contrast, when a glottal-initial stem is reduplicated, the glottal stop occurs in both the reduplicant and the stem. The fact that the glottal stop occurs in both the reduplicant and the stem provides evidence that the initial glottal stops in examples 5 and 6 are contrastive.

Although there is evidence that reduplication in Rote may occur after a prefixation (Examples 6 and 7 in Table 10) and thus the initial glottal stops in such examples may also be analyzed as automatic insertions, the initial glottal stops in Table 10, example 3 and Table 11, examples 5 and 6, are not analyzed as automatic insertion. This analysis is chosen since the

reduplications in these examples do not occur after a prefixation, and they can also be tested with other tests, such as the position of the roots within an utterance. In Rote, reduplication after a prefixation only applies to a limited set of verbs. None of the examples in Table 12 is reduplicated after a prefixation.

Table 12. Reduplication with vowel-initial and glottal stop-initial stems

No	Gloss	Base		Reduplicated	Gloss
1.	'sob'	*[ʔ]ei*	→	***[ʔ]ei***~*ei*	'(cry) sobbingly'
2.	'shake'	*[ʔ]uli*	→	***[ʔ]u***~*uli*	'shake repeatedly'
3.	'chew'	*[ʔ]ale*	→	***[ʔ]ale***~*ale*	'chewing'
4.	'child'	*ʔana-ʔ*	→	***ʔa***~*ʔana=n*	'her childhood'
5.	'chop'	*ʔedî*	→	***ʔe***~*ʔedî*	'chopping'
6.	'be.short'	*ʔeku*	→	***ʔe***~*ʔeku-ʔ*	'short'
7.	'kiss'	*ʔidu*	→	***ʔidu***~*ʔidu*	'kiss repeatedly'
8.	'pour'	*ʔombo*	→	***ʔombo***~*ʔombo*	'pour repeatedly'
9.	'sneeze'	*ʔesufani*	→	***ʔesufani***~*ʔesufani*	'sneeze repeatedly'

The evidence from reduplication regarding initial glottal stops is, therefore, ambiguous. Although, there appears to be evidence for identifying word-initial glottal stops before vowels as contrastive. It cannot be used solely as evidence for all glottal stop-initial words since reduplication may occur after the application of other rules. A similar analysis is proposed by Edwards (2017) for reduplication in Amarasi.

Compounding

Compoundings can also provide evidence for contrastive and epenthetic word-initial glottal stops. Some examples are given in Table 13. When a vowel-initial root preceded by an epenthetic glottal stop (e.g. *[ʔ]ama-ʔ* 'father') occurs as the second pair within a compound word, no glottal stop is found in the second pair of the compound (e.g. *[ʔ]ina-**a**maʔ* 'parent'). However, when a glottal stop-initial root (e.g., *ʔaʔau* 'cooked.rice') occurs as the second pair within a compound word, a glottal stop is found in the second pair of the compound (e.g., *sisi-**ʔ**aʔau* 'various food').

Table 13. Vowel and glottal stop initial roots in compounding

Base		Base			Compound	Gloss
[ʔ]ina-ʔ	'mother'	*[ʔ]ama-ʔ*	'father'	→	*[ʔ]ina-**a**maʔ*	'parents'
[ʔ]isi	'content'	*[ʔ]oe=n*	'water'	→	*[ʔ]isi-**o**e=n*	'content'
leŋga	'disassemble'	*[ʔ]ofe*	'dismantle'	→	*leŋga-**o**fe*	'disassemble-dismantle'
bafa-ʔ	'mouth'	*[ʔ]aro-ʔ*	'open'	→	*bafa-**a**roʔ*	'loud person'
[ʔ]umbu-ʔ	'grandchild'	*[ʔ]ana-ʔ*	'child'	→	*[ʔ]umbu-**a**naʔ*	'offspring'
sisi	'meat'	*ʔaʔau*	'cooked.rice'	→	*sisi-**ʔ**aʔau*	'various food'
rumu	'massage	*ʔame*	'knead'	→	*rumu-**ʔ**ame*	'massaging'
ʔodî	'younger.sib'	*ʔaʔa*	'older.sib'	→	*ʔodî-**ʔ**aʔa*	'siblings'
ʔetu	'pick'	*ʔoru*	'harvest'	→	*ʔetu-**ʔ**oru*	'harvest'

Position within an utterance

In addition to reduplication, prefixation and compounding, the contrast between glottal initial and vowel-initial roots for most roots can be tested through their occurrence within the utterance. Examples are given in (4) and (5). Example (4) shows that the vowel-initial word *ama* '2PL.VOC' has a glottal stop inserted word-initially when it occurs in an utterance-initial position but no glottal stop insertion in a non-utterance-initial position. Thus, the glottal stop in the utterance-initial position in (4) is epenthetic. By contrast, the glottal stop-initial root *ʔaʔau* 'cooked.rice' in (5) occurs in both utterance initial and utterance non-initial positions with an initial glottal stop phoneme. Thus, the initial glottal stop in the root *ʔaʔau* 'cooked.rice' is contrastive.

(4) ***[ʔ]ama*** *mi-ʔi-nae* *na* ***ama*** *ʔonaʔ* *mbera!*
2PL.VOC 2PL-VBLZ-big DISC 2PL.VOC PROH lazy
'When you grow up don't be lazy.' [EM1.19]

(5) a. ***ʔaʔau*** *nese* *ena.*
cooked.rice not.exist PFV
'There is no more cooked rice.'

b. *ɗoɗe* ***ʔaʔau,*** *ɗoʔ*
cook cooked.rice or
'Do you cook rice?' [HL3.9]

There are few attested glottal initial words that always occur in the utterance initial position. Thus, the status of the glottal stop cannot be tested with their occurrence within the utterance. One example is the root *(ʔ)itaʔ* 'even, whether'. This root also does not take prefixes nor occur in compounds. Thus, whether the initial glottal stop is contrastive or epenthetic is unclear.

IMPLICATIONS TO LANGUAGE REVITALIZATION

One of the language revitalization efforts is to carry out language documentation to help create new domains of local language use. To support the government's efforts in revitalizing local languages in Rote, several individuals and institutions are actively documenting languages by collecting texts, writing grammar, designing orthographic systems, translating texts, and preparing language-learning teaching materials for local content (Muatan lokal).

A number of materials written in Rote languages have been circulated and used by the community. Among those are the Rote-Indonesia dictionary, the stories for elementary school students, and the bible translated by the Language and Culture Unit (UBB GMIT) and the Indonesian Bible Society (LAI). These materials are written using orthography design by different individuals and institutions.

An observation of the printed materials shows that often, in some of the materials, the glottal stops, especially the word-initial glottal stops, are not written at all or not written consistently. For example, in his Rote-Indonesia dictionary, Ingguoe (2021) claims that there are no word-initial glottal stops in Rote. Thus, he does not have a section in the dictionary for glottal stops-initial words. However, it is clear from the dictionary that some of the so-called vowel-initial lexemes are actually glottal stop-initial lexemes. Two examples are the word *'a'a* /ʔaʔa/ 'elder sibling' and *'a'au* /ʔaʔau/ 'cooked.rice' are written as *a'a* and *a'au* instead.

Inconsistent writing of the glottal stops is also found in the bible written in Rote. Some of the contrastive glottal stops-initial words are written as vowel-initial words.

The glottal stop is one of the phonemes that often become a source of problems in orthography design for many languages in Eastern Indonesia. Regional languages with long vowels and glottal stop /ʔ/ as phonemes often pose challenges in developing orthography for Indonesian-centric people (Grimes, 1998). In Indonesian, the glottal stop sound is not written because it is not phonemic and does not play a significant role. On the contrary, the languages in Rote have very productive glottal stop sounds. Since Rote has both epenthetic and contrastive glottal stops, it is suggested that only contrastive or phonemic glottal stops are written. The epenthetic glottal stops need not be written since there is a straightforward rule that all vowel-initial roots that occur utterance-initially or in isolation will have an epenthetic glottal stop inserted word-initially. Linguistically, the ideal principle is one phoneme, one symbol. That is, only phonemic sounds are represented in the orthography (Cahill & Karan, 2008; Jany, 2010).

The phonemic glottal stops in Rote must be written to disambiguate words with or without glottal stops. Examples of minimal pairs of glottal stop and no glottal stop phonemes are given in Table 14.

Table 14. Minimal pairs with/without glottal stop phonemes (Tamelan, 2021)

Word-initial position with ***ʔ*** phoneme			Word-initial position with no ***ʔ*** phoneme		
ʔ*etu*	[ˈ**ʔ**etʊ]	‘break (rope)’	*etu*	[ˈetʊ]	‘catfish’
ʔ*ena*	[ˈ**ʔ**ɛnɐ]	‘close (door)’	*ena*	[ˈɛnɐ]	‘PFV’
ʔai	[ˈ**ʔ**aɪ]	‘forbid’	*ai*	[ˈaɪ]	‘fire’
ʔa	[**ʔ**a]	‘only’	*a*	[a]	‘DEF’
Word-medial position with ***ʔ*** phoneme			Word-medial position with no ***ʔ*** phoneme		
ⁿdaʔe	[ˈnda**ʔ**ɛ]	‘betel nut’	*ⁿdae*	[ˈndaɛ]	‘put’
toʔo	[ˈtɔ**ʔ**ɔ]	‘uncle’	*too*	[ˈtɔː]	‘year’
ʔeʔo	[ˈʔɛ**ʔ**ɔ]	‘move over (sit)’	*ʔeo*	[ˈʔɛɔ]	‘stir (drink)’
Word-final position with ***ʔ*** phoneme			Word-final position with no ***ʔ*** phoneme		
*tute****ʔ***	[ˈtutɛ**ʔ**]	‘immediately’	*tute*	[ˈtutɛ]	‘continue, connect’
*una****ʔ***	[ˈunɐ**ʔ**]	‘fish scale (n)’	*una*	[ˈunɐ]	‘scale (fish) (v)’
*ɓau****ʔ***	[ˈɓaʊ**ʔ**]	‘bat’	*ɓau*	[ˈɓaʊ]	‘increasingly’

Failure to represent the glottal stops consistently in the orthography would lead to challenges in the acceptability and learnability of the system, especially when the glottal stop is a very productive phoneme in Rote. Reading and writing in a language become more complicated when there is a mismatch between spoken and written language, and different alphabet options for the representation of the same sound in adjacent languages will inhibit transfer to other languages.

The choice of sound representation is crucial to the language maintenance in Rote. Consistencies in the representation of glottal stop phonemes across Rote varieties would support the acceptance of orthography and the ease of learning the sound systems of the Rote languages. Transparent orthographies with consistent grapheme-phoneme correspondences are learned more easily than complex orthographies with inconsistent and irregular spellings (Caravolas et al., 2013). A good orthography is easy to learn and transfer to other adjacent languages and would support the government’s language revitalization program.

CONCLUSION

This paper has presented evidence for the status of prevocalic word-initial glottal stops in Rote. A thorough phonological, morphological, and syntactic analysis shows that some of the initial glottal stops are contrastive (phonemic), and some are automatic insertions or epenthetic (phonetic). While in several languages in the greater Timor region, all word-initial glottal stops before vowels have been described either as automatic insertion with no examples of contrastive glottal stops in this position (See Balle (2017, pp.101f) for Helong, van Engelenhoven (2004, p. 66) for Leti, and Schapper (2009, p. 53) for Bunak), or as contrastive glottal stops with no automatic insertion in this position (See Ballukh (2020) for Dhao, data from Rote reject a unitary analysis of the initial glottal stops.

Evidence for a difference between the initial contrastive and automatic glottal stops in Rote comes from five different tests. The most apparent evidence is provided by prefixation, noun/verb-verb pairs, compounding and the position of a root within an utterance. The evidence from reduplication cannot determine the status of all word-initial glottal stops since reduplication may occur after prefixation. In prefixation, a glottal stop-initial root surfaces with a glottal stop after the prefix, while a vowel-initial root does not. An automatic glottal stop in Rote is inserted into vowel initial roots when the roots occur in isolation or in utterance initial position. Regardless of how the contrast between glottal and vowel-initial roots is tested, the status of a few glottal stops cannot be determined as either glottal or vowel-initial roots, as they have yet to be attested to occur in different environments.

On initial inspection, the behavior of glottal stops in Rote seems similar to other language/s in the region. However, a thorough analysis of a number of phonological and morphological processes and syntactic analysis reveals the differences. Thus, a thorough linguistic analysis of glottal stops for language in the area is necessary before designing an orthography.

NOTE

I would like to thank two anonymous reviewers for constructive comments on the earlier draft.

LIST OF ABBREVIATIONS

0	= zero person	PFV	= perfective
1	= first person	PROH	= prohibitive
2	= second person	PROX	= proximal
3	= third person	PX	= plural exclusive
C	= consonant	RECP	= reciprocal
CAUS	= causative	REL	= relativiser
DEF	= definite	SG	= singular
DEM	= demonstrative	STAT	= stative
DISC	= discourse	V	= vowel
PI	= plural inclusive	VBLZ	= vocative
PL	= plural	VOC	= verbalizer

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[1] The fact that Rote (Dela) has contrastive word-initial glottal stops, Ingguoe's (2021, p.iii) claim that Rote does not have word-initial glottal stops is not true.

[2] Consonant clusters are only found after antepenultimate vowel deletion (Tamelan, 2021).

[3] By contrast, in Amarasi (Edwards, 2017, pp. 427f), a glottal stop is inserted morpheme-initially between two vowels at morpheme boundaries to mark the hiatus between the prefix and the verb stem, as in *n-inu* 'drink' → *na-[ʔ]inu-ʔ* 'give a drink to'. Similar to Amarasi, in Helong (Balle, 2017), a glottal stop is inserted intervocalic in reduplication to distinguish the reduplicated form from the root, as in *a.ken* 'floating log' → *aʔ-a.ken* 'specific floating log'.

[4] The non-syllabic subject prefixes are limited. They are attached to bound roots to form words with two syllables (a single foot). In contrast, the syllabic subject prefixes are attached to both bound and free roots to form words with more than two syllables. See Tamelan (2021) for a complete discussion on subject prefixes in Dela.