

Onset glottal stop deletion in Suva Rotuman

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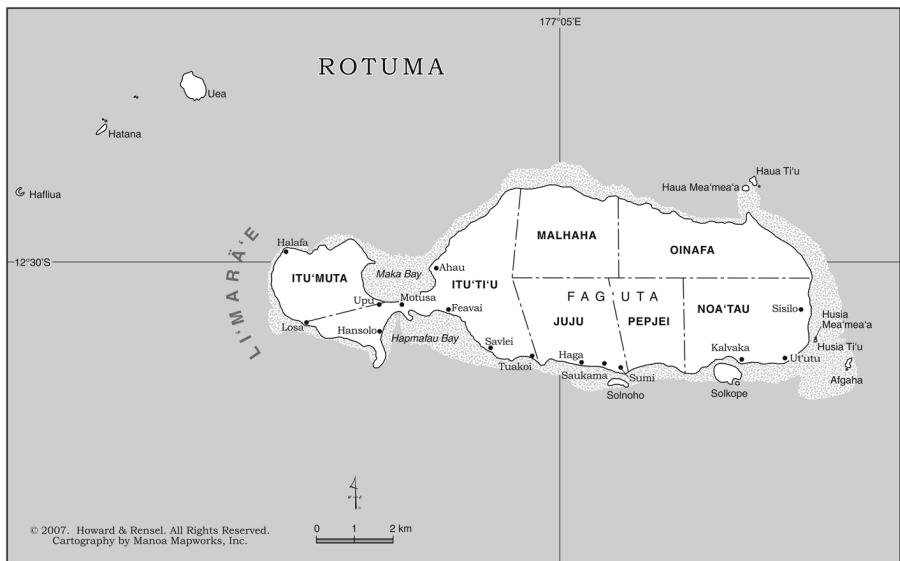
This paper studies onset glottal stop deletion in the speech of Suva Rotumans, Fiji. The speech of 18 speakers was analysed and seven factors were tested to identify their prediction on glottal stop deletion. The linguistic factors tested were preceding sound segment, grammatical class, syllable stress, and style, while the social factors were age, gender, and denominational affiliation. Results reveal a change in progress, but towards glottal stop retention. Younger Rotumans and older Rotuman women are deleting glottal stops less compared to middle-aged women and older men. The low incidence of deletion by younger speakers is most probably due to identity, language education in Rotuman, and their increased awareness of their role in preserving the language. Additionally, older women are deleting glottal stops less, which could be attributed to contact, identity, and their consciousness of the standard.

Keywords: Oceanic, glottal stop, deletion, language change, language maintenance

1. Introduction

Rotuman (ISO 639-3 rtm) is the indigenous language of Rotuma (see Map 1), an island about 400 kilometres north-west of Fiji. Since Rotuma's cession to Great Britain in 1881, Rotuma became administratively part of Fiji. This political affiliation and relatively proximal distance between the two in comparison to other Pacific Island countries have resulted in the relatively high migration rates of Rotumans to Fiji.¹

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Map 1. Island of Rotuma (Reproduced with permission from Alan Howard & Jan Rensel)

Spoken by about 6,000 of a global population of about 12,000,^{2, 3} Rotuman is considered to be ‘vulnerably’ endangered according to UNESCO (Moseley, 2010). Disrupted intergenerational transmission has been attributed to parents’ preference for their children to learn English because of its social relevance and economic benefits (Vamarasi, 2005) – a hangover from colonialization – as well as diasporic communities’ assimilation into the dominant cultures and languages.

This paper is the first of its kind in two ways: (i) it offers a variationist sociolinguistic perspective of Rotuman and (ii) focusses on the speech of Suva Rotumans (of a diasporic community). It investigates glottal stop deletion in onset position of syllables with the aim of discovering the social and linguistic factors that constrain the deletion and the motivations for such constraints. The two variants are: ? (standard) ~ Ø (non-standard).

for any obscurities and errors herein. I am also grateful to Rachel Fiu and David Solomone for assisting me in conducting the interviews. Special thanks go to Rachel Fiu and Rosarine Rafai for assisting with the Rotuman translation of the abstract.

2. Frawley (2003, p.393) records there to be 5,000 speakers in Fiji. Taking into account this was a record from nearly 20 years ago and the diasporic communities, an impressionistic figure would be 6,000.

3. Gordon (2005) reports 9,000 and Rovi (2019) reports 15,000. So the median between the two figures was assumed.

The paper begins by providing a background of the Rotuman community, particularly in Suva; an overview of the language; an account of the glottal stop; and its history in relation to Rotuman. Linguistic (grammatical class, preceding phonological segment, lexical stress, and style) and social factors (age, gender, and denominational affiliation) are discussed in the methodology section as potential predictors of onset glottal stop deletion. Following this, the results and discussion sections are presented.

The results show that all the linguistic factors (except for style), age, and gender are significant predictors of onset glottal stop deletion. Men delete glottal stops more compared to women. Possible reasons for this are gender norms, contact and identity. There also appears to be a change in progress, but towards glottal stop retention instead, which is unexpected, considering regular historical sound change from Proto-Oceanic and Proto-Central Pacific to Rotuman (POC PCP*? > Rot Ø; Biggs, 1965; Geraghty, 1986; Lynch, 1998). However, the retention change appears to be socially-motivated. A V-shaped pattern across age reveals glottal deletion was being led by middle-aged speakers for some time, but is now being reversed by younger speakers, influenced by education in Rotuman (prescribing the standard), and are conscious about their role in preserving the Rotuman identity and language.

2. Background on Rotuman society

In 2017 and 2007, there were 1,583 and 1,852 residents on Rotuma respectively (Fiji Bureau of Statistics, 2018). In 2007, there were 8,483 Rotumans living in Fiji, four times more than the population on the island,⁴ the majority of whom live in Suva, the capital of Fiji. There are also Rotuman enclaves in cities in Australia, England, New Zealand, and the United States. Depopulation on Rotuma has been a corollary of the upward trend of emigration to Fiji since the early twentieth century. Many migrate for better opportunities in education, employment, and lifestyle.

Suva is the largest and most multiethnic city in Fiji. Its ethnic composition comprises mainly iTaukei,⁵ Indo-Fijians, Europeans, Rotumans, Chinese, and

4. The 2007 census was the last census that included ethnicity data. The 2018 census does not include this, despite citizens answering an enumeration question on ethnic identity. This was due to a retrieval error: enumerators assumed a person's ethnicity just by looking at them or the whole household based on one family member (Hill, 2018).

5. In 2010, the "Fijian Affairs Decree" included changes to national and ethnic labels. The term "Fijian", which was previously used in reference to the indigenous population, became the

Gilbertese people. Its urban setting means that traditional village life is difficult to maintain, and therefore, cultural values and norms are susceptible to demise. Rotumans tend to be conservative of cultural practices, but an urban setting means that strict division of gender roles and codes are relaxed, and women and men have equal access to opportunities.

Assimilation into an urban city life also means that speaking Rotuman is difficult to maintain. The distance between Fiji and Rotuma does not help to maintain the language and culture. Rotumans are aware of this linguistic and cultural dilemma, and are taking measures to preserve them. For example, in June 2019, the University of the South Pacific (USP) offered its first Rotuman language course of a four-course minor programme. The credit programme is for any registered USP student, but targets especially Rotuman students with little to no knowledge of the language. There are also social classes held over the weekends for anyone from the age of five. Furthermore, such efforts have received an increasingly positive response from the Rotuman community in Fiji and abroad, as evident in the increased engagement in cultural activities such as handicraft, farming, and traditional dancing and singing, and the various informal maintenance programmes that have sprung up.

3. Rotuman

Rotuman is an Oceanic language, part of the Central Pacific subgroup of languages. Despite being a minority language, there have been several works written on it. The majority of these are on reconstructions (Biggs, 1965, 2004; Geraghty, 1986) and the phonologically governed lexico-semantics of the language using different theoretical frameworks (Besnier, 1987; McCarthy, 1989, 1995, 2000; Schmidt, 2002).

Rotuman has 14 consonants /p t k f v l r s tʃ m n g h ʔ/ and 10 vowels /a e i o u æ œ ɔ y ε/. It is typologically unique in that most content words have two forms: long and short forms. Long forms denote specificity and definiteness, while the short forms denote otherwise. The short form is derived from the long form through phonological processes such as metathesis, final-vowel elision, diphthongisation, and vowel coalescence as shown in Table 1. The general syllable structure of Rotuman is (C)V, but closed syllables occur as a result of the short forms.

national identity of every Fiji citizen and resident, regardless of ethnicity. Therefore, the indigenous people are now referred to ethnically as ‘iTaukei’, Standard Fijian for ‘owners (of the land)’.

Table 1. Forms and derivational sound processes

Derivational process	Gloss	Long form	Metathesis	Short form
Final-vowel elision	cup	kapa	–	kaØp
Diphthongisation	open	se.i	–	sei ^y
Vowel coalescence	sleep	mose	moes	mœs

There is little geographical variation in Rotuman. Table 2 shows the dearth of geographical variation found in Churchward’s dictionary (1940). Speakers from the eastern districts of the island (Mua) use different lexical items for the same concept from those from the western districts (Fā’u). Besides this, there has been no study carried out on regional variation. Thus, it is possible that these variations may not exist anymore, and also, given the growth of diasporic communities, there is a possibility of marked regional variation.

Table 2. Lexical doublets by region

English	Mua	Fā’u
chin	kumukumi	kumukumu
fine mat (for a bride at the wedding)	mafuaga	‘airoto
snapper (Lethrinus, k.o. fish)	ruki	riki
cup – <i>kapa</i> , used in Noa’tau (a <i>mua</i> district) instead of <i>ip</i>		

However, religious or denominational variation exists. The dominant religion of Rotumans is Christianity, with Wesleyan Methodism (WM) and Roman Catholicism (RC) being the dominant denominations. In the 1800s, Methodist missionaries and Catholic priests incited rivalry amongst Rotumans. Chiefs would threaten other chiefs who belonged to a different denomination or who believed in traditional deities to convert. This antagonism culminated in the ‘religious wars’ on the island in 1871 and 1878 (Howard & Kjellgren, 1994). Although religious tensions seemed to have waned over the years, they have influenced the way language is used. Table 3 shows lexical variation between Catholics and Methodists. However, some extent of levelling towards the Methodist forms might be the case nowadays (e.g., ‘āitu, Jisu, rī la’oga, rō’āitu), considering that Standard Rotuman is virtually Methodist Rotuman, as the only and widely-used Rotuman dictionary and orthography used in schools and language maintenance programmes were written and devised by a Methodist reverend and linguist, Maxwell Churchward. Church plays an important part of Rotuman life, and Methodism is the predominant denomination of Rotumans. This predominance

gives the Rotuman used by Methodists more prestige. As a matter of fact, as a heritage speaker and member of the Fiji Rotuman community, I grew up listening to Catholics being derided for their Rotuman, while Methodist Rotuman was considered prestigious and “correct”.

Table 3. Lexical doublets by denomination (Churchward, 1940)

Gloss	RC	WM
angel	‘agselo	‘agero
baptism, baptise	papitema, pāpitema	papetaiso
billy-can	pilikene	pelē
chalice	kalisē	ip ha’a
cross (of Christ)	kuruse	‘ai farava
Easter	pāsikatē, paskatē	terān fū hoi‘aki
eternity	av ne ava, av se ofi	av se ‘es gata ‘aga
glory	koloria	kolori
god	‘atua (obs.)	‘aitu
heaven	selo	hevāni
Jesus	Iesu (obs.) [*]	Jisu
Palm Sunday	terān ha’ ne palma	terān ne lā‘ riri‘i
pray	tapu‘aki (obs.)	rō‘aitu
prophet	profeta	parofita
teacher	–	puer‘aki ^{**}
toilet	piriki (obs.)	rī láoga
wine	vino (obs.)	uaini

^{*} ‘Obs.’ refers to a term that is obsolete. ^{**} Nowadays, fā/hán ne rako is used.

4. The glottal stop

4.1 Glottal stop as a phoneme and grapheme

In Rotuman, glottal stops occur in onset and coda positions as shown in Tables 4 and 5.

In writing, the glottal stop is represented by a reversed apostrophe, < ‘ >, or a straight single quotation mark < ' >. The earliest record of Rotuman (Hale, 1846), let alone many Pacific languages, did not record the glottal stop as a phoneme.

Table 4. Minimal pairs of onset glottal stop

Onset glottal stop			
ʔala	teeth	Øala	death
ʔara	to show off	Øara	mole on skin
ʔefe	stomach	Øefe	coconut milk refuse
ʔota	written order for goods	Øota	sago-palm
ʔufa	hen	Øufa	(from the sea) land, wharf

Table 5. Minimal pairs of coda glottal stop

Coda glottal stop			
heʔ < hɔʔi	singing band	heØ	boy, lad
heʔ < heʔe	call	heØ	numeral classifier
poʔ < poʔo	explode	poØ	can
seʔ < seʔe	upwards	seØ	to, for

This was because Hale, like many other American and European explorers, were not able to identify the sound, presumably due to its absence in their own languages. In response to someone who contested the glottal stop being an actual sound, Churchward (1929, p.83) writes:

The chief thing I object to is Mr. Stimson’s way of speaking of “the extinction of a consonant with the hamzah.”...Why, then should we say that k (or any other consonant) is extinguished when it becomes, or is replaced by, the consonant known as the hamzah or glottal stop? For the glottal stop is a consonant...True, to English ears it is often very hard to detect...I object, then, to any terminology, or any method of speaking which implies, or appears to imply, that the glottal stop is something less than, or other than, a consonant.

Today, the glottal stop is omitted generally in informal writing even by fluent speakers who have been educated in Rotuman, as in other Pacific languages (Lynch, Ross, & Crowley, 2002, p.30; Nicholas & Coto-Solano, 2019, p.3602),⁶ but particularly by those still learning the language whose problem is probably what Churchward states above. On Rotuma, Rotuman is a subject from Year 1 to

6. Known as ‘okina in Hawaiian, the glottal stop grapheme is omitted largely by L1 Hawaiian speakers, while L2 speakers retain it in their writing. This is considered to be an identity marker and not a case of education or literacy in the language (NeSmith, 2009, pp.9–10).

Year 12. It is only offered in one school in Fiji. Rotuman as a subject is not viable for Fiji schools as there are generally not enough Rotumans in a grade or school to take up the course (Mangubhai & Mugler, 2003, pp.403–404).

4.2 Glottal stop and sound change

Rotuman is an Oceanic language, specifically part of the Central Pacific subgroup. Comparative reconstructions demonstrate Rotuman glottal stop to be a reflex of POC PCP *k and *q (Lynch, 1998, p.234). Examples of PCP *ʔ > Rot. Ø are found in Table 6.

Table 6. Rotuman Ø reflexes of PCP *ʔ (Geraghty, 1986, pp.289–312)

Initial	Medial
*ʔayawa <i>k. tree, Ficus</i> > aeava	*liʔo <i>voice</i> > lio
*ʔate <i>liver</i> > afe	*mataʔu <i>right-hand</i> > mafau
*ʔatu <i>line, row</i> > ɔfu	*matuʔa <i>old</i> > mafua
*ʔatule <i>k. fish</i> > afule	*raʔa <i>branch, twig</i> > rā
*ʔ(cz)o <i>sun</i> > asa	*taʔo <i>cook</i> > fao
*ʔanuve <i>caterpillar</i> > aniha	*taʔu <i>year</i> > fɔu
*ʔo(cz)o <i>provisions for journey</i> > oso	*tinaʔe <i>intestines</i> > finae
*ʔoti <i>finished</i> > ofi	*tuʔa > <i>ridge, (leaf) midrib</i> > fua
*ʔulu-ña <i>its top, summit</i> > uluga	*tuʔu <i>stand</i> > fū
*ʔunavi <i>scale (fish)</i> > unehi	*vaʔa <i>stalk</i> > hā
*ʔuta <i>inland</i> > ufa	*vetaʔu <i>k. tree</i> > hefɔu
*ʔuza <i>rain</i> > usa	

While the changes in Table 6 are regular, there are also irregular changes. For instance, instead of PCP *ʔ becoming Rot. Ø, glottal stop has been retained in a few words such as PREP *ʔi > ʔe, GEN.POSS *ʔo- > ʔo-, *pour water on* *suʔi > suʔi, and *yam* *ʔuvi > ʔuhi (Geraghty, 1986, p.308).

5. Methodology

5.1 Speech sample and data collection

The sample included the speech of 18 speakers: seven men and 11 women. They were recruited randomly and by snowball sampling. Table 7 shows the distribution of the sample by age and gender (see Section 5.5.1). A challenge faced was recruiting speakers who were willing to participate. In a particular case, a potential participant had declined on the ground that he did not speak Rotuman fluently as he grew up in a predominantly Fijian-speaking neighbourhood. A week later at a wedding I attended, I observed him addressing the guests fluently in Rotuman. Many Rotumans brought up in Suva, let alone Fiji, rate their Rotuman poorly and prefer not to be recorded or looked upon as credible authorities on the language. Proficiency in the language is seen as associated with linguistic knowledge on ceremonies, proverbs, idioms – domains of language that Rotumans regard highly.

5.2 Interviews

The interviews were semi-structured, and lasted for an average of 20 minutes per participant. I had conducted interviews for 13 of the participants, while five were carried out by two research assistants. The interviews were conducted in mainly Rotuman while, in some instances, the interviewers and participants code-switched between English and Rotuman. The first part of the interview was structured to elicit careful speech, entailing questions on politics and religion. The second part of the interview was structured to elicit casual speech, including questions on topics such as superstition and family.

This paper focusses on glottal stop deletion as the variable of investigation. Glottal stops are sometimes deleted, while at other times are retained. /ʔ/ is the standard variant as its pronunciation is emphasised in language classes, whereas Ø is non-standard.

The first part of the interview was expected to yield higher rates of glottal stops, whereas the second part was expected yield lower rates due to (i) the formality of narrative types (Labov, 1972) and (ii) the fact that towards the beginning of an interview, the observer's paradox is heightened. In this part of the interview, participants are hyperaware of recording equipment as opposed to the latter part of the interview, in which they are more comfortable and less conscious about how they are speaking and more conscious about the contents of discussion (Becker, 2013, p.97).

5.3 The variable and coding

The recordings were transcribed and coded on ELAN (Wittenburg, Brugman, Russel, Klassman, & Sloetjes, 2006). The first and last five minutes of the interviews were extracted for analysis. This is not the norm for most sociolinguistic studies, as during the first five minutes the participants are still adjusting to the interview setting and are more conscious about their speech. However, when style is considered to be a potential predictor of glottal stop deletion, the first five minutes seems to be an ideal timeframe for extracting careful speech data. The narrative types also add to the formality, and due to the preponderance of glottal stops in Rotuman words, five minutes per context sufficed.

A ceiling of three tokens per lexical type per speech style was set: three for formal context and three for informal context. A ceiling of three tokens per lexical type was similarly set in a study of t/d-deletion in Detroit English (Wolfram, 1969, p. 58) and Glasgow speech (Macaulay & Trevelyan, 1973). The reason according to Wolfram was to control for token distribution or avoid a skewed distribution of a single token type or lexical item due to some words occurring more often than others.

When circumscribing the variable, tokens that occurred in neutralisation contexts were excluded from analysis. For example, adjacent glottal stops at word junctures such as in Examples (1) – (3). In Example (1), the final glottal stop in *‘ihete’* is adjacent to the glottal stop of the preposition. In (2) and (3), the glottal stops in the pronouns are adjacent to those in the preceding words.

- (1) *ʔe ʔon ʔiheteʔ ʔe ʔon av ta*
 PREP POSS.3S now PREP POSS.3S time DEF.ART
 “now and before” (Male, 52, AK)
- (2) *haʔ ʔon leʔ heta la paŋau*
 forbid POSS.3S now PREP FUT hit
 “it was forbidden to hit her child” (Female, 27, RF)
- (3) *heʔ ʔoris maʔpiag han ta*
 call POSS.3PL grandparent woman DEF.ART
 “called their grandmother” (Female, 82, LS)

Two other contexts were also excluded. One was categorical deletion, which occurred when the indefinite article clitic =*t* is followed by the preposition *ʔe*, as seen in Examples (4) – (6). (Note =*t* + prepositional phrase marks definiteness.)

- (4) *rako t-Øe Paptea*
 school INDEF.ART-PREP Paptea
 “the school at Paptea”

- (5) hanhapa t-Øe irisa
place INDEF.ART-PREP 3pl
“the place that is near them”
- (6) asoha t-Øe ka
afternoon INDEF.ART-PREP tomorrow
“the afternoon of tomorrow” (Churchward, 1940, p. 16; [analysis is mine])

The other context outside the envelope of variation was the liaison process, in which two functions words merge. The process is a two-step ordered rule. The first is the deletion of glottal stop, while the second involves the deletion of one vowel or coalescence of vowels. In Example (7), the glottal stop in *ʔon* is deleted, then both function words merge for /o/ to be deleted.

- (7) fäeag se-Øn räiʔi
talk to-3s.POSS children
“talk to her children” (Male, 23, FF)

Disfluencies such as repetition and stuttering, as well as noises that were ambiguous for identification were excluded from the analysis. After exclusions, there were a total of 1,105 tokens.

5.4 Linguistic factors

5.4.1 *Preceding sound segment*

Preceding place of articulation was included considering that many prior studies have shown place of articulation as a predictor of lenition. Moreover, regular sound changes from POc and PCP to Rotuman seem to change by place of articulation – for instance, dental to inter-dental to labio-dental (*t > θ > f), bilabial to labio-dental (*p > f), and velar to glottal (*k > ʔ) (Biggs, 2004, p. 7). Within the factor group, glottal, velar, palatal, alveolar, and labial consonants were tagged. Vowels too were included, but there was no division of the vowel category as it was assumed to have less of an effect compared to consonants.

5.4.2 *Grammatical class*

Grammatical class was chosen as sounds in function words are lenited more than in content words. This is because function words are generally short and therefore less salient than content words, which tend to be longer and occur less frequently (Pollack & Pickett, 1964; Raymond, Dautricourt, & Hume, 2006). Nouns, verbs, adjectives, adverbs, pronouns, preposition, affixes, and particles were coded for. However, after several multivariate analyses, there were still interactions. To rec-

tify this, two major categories were created. Nouns, verbs, adjectives, and adverbs were tagged as content words, while the others were tagged as function words.

5.4.3 Syllable stress

Syllables in which glottal stop occurred were coded for presence and absence of stress. The literature presents mixed results on its influence, with some research showing lack of stress promoting lenition, such as spirantisation of /s/ in Spanish (Gonzalez, 2006) and American English flapping, while other research shows the opposite, for example, lenition of /p, k/ in word-initial Murrinh Patha as stress is word-initial (Mansfield, 2015).

5.5 Social factors

5.5.1 Age and gender

The age range is from 19 to 82. Age was divided into three age cohorts: younger, middle, and older. The younger age cohort consists of participants aged 19–27, the middle between 31 and 46, and the older generation having those from 51 to 82.⁷ Following Rotuman cultural conventions, gender is treated as binary: men and women. Table 7 shows the distribution of age and gender. Age and gender were included to test for language change. In Figure 1, we see a pyramid-like or inverted V-pattern. Middle-aged speakers are deleting glottal stops the most, while the rates of deletion are low for younger and older speakers, but more so among younger women. However, multiple multivariate tests reveal an interaction between middle-aged men and older men. Therefore, in the final analysis, the two factors were collapsed into one: older men (see Figure 3 in Section 6). This shows us only two points of view for men.

Table 7. Sample distribution by gender and age (*n*=tokens)

Gender	Age		
	Younger (19–27)	Middle (31–46)	Older (51–82)
Men	3 (<i>n</i> =164)	2 (<i>n</i> =113)	2 (<i>n</i> =162)
Women	3 (<i>n</i> =179)	4 (<i>n</i> =247)	4 (<i>n</i> =240)
Total	6	6	6

7. It was extremely difficult locating younger fluent speakers of Rotuman, which supports the fact that the language is endangered as there is an increasing tendency for parents not to speak to their children in Rotuman. The middle-aged speakers were not difficult to find, but the only problem was their willingness to participate due to low confidence in their proficiency. The older speakers were both willing and easy to find.

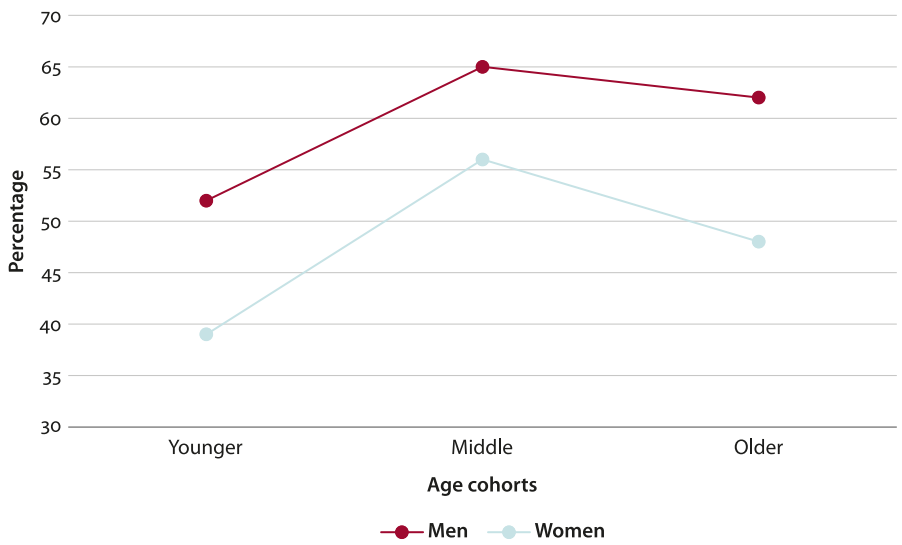


Figure 1. Deletion across age and gender

5.5.2 Denominational affiliation

Speakers were classified according to the denomination they identified themselves with. There were three categories: Methodists ($n=9$), Catholics ($n=6$), and Other (neither Methodist nor Catholic) ($n=2$). A few of the participants ($n=4$) had converted at some point in their life, so their denomination was determined by the one in which they had spent more of their life. Denominational affiliation was selected considering that it has been known to condition lexical variation, and since no study has looked into sound variation along religious lines, this paper chose to explore it as a potential predictor. Should results reveal denomination to be significant, we would expect Methodists to disfavour onset glottal stop deletion as they are normally associated with prestige, while Catholics and the Other would favour it as discussed in Section 3.

5.5.3 Style

Style, as attention paid to speech, was divided into careful and casual speech. The first part of the interview was careful, while the second part was casual. The aim was to capture style-shifting. Therefore, it was expected that the first part of the interview would yield low rates of deletion, while towards the second part, the rates will increase. However, the deletion rates show no evidence of style-shifting. Both contexts yielded 55% of onset glottal stop deletion, and in multivariate analyses did not turn up significant. For this reason, no further discussion on style will be made.

6. Results

The data were run on Rbrul, a multivariate logistic regression software (Johnson, 2009). The application value was Ø to represent the dependent variable of deletion. The above linguistic and social factors were tested for. Step-down and step-up procedures matched. The best step-down model returned all factors as significant except for style and denomination as shown in Table 8.

Table 8. Multivariate analysis results for onset /ʔ/-deletion

Log likelihood = -711.252 Input probability = 0.6 Total <i>n</i> = 1,105			
Factors	n/n	%	Factor weight
Preceding sound segment	<i>p</i> < 0.001		
Velar	36/43	84	.75 *
Glottal	20/25	80	.65
Alveolar	103/177	58	.51
Vowel	376/661	57	.46
Labial**	21/39	54	.44
None	55/160	34	.20
Age*Gender	<i>p</i> < 0.001		
Older men	178/275	65	.63
Middle-aged women	142/247	58	.55
Older women	131/240	55	.51
Younger men	87/164	53	.47
Younger women	73/179	41	.35
Grammatical class	<i>p</i> < 0.005		
Function words	329/573	60	.56
Content word	282/532	52	.44
Syllable stress	<i>p</i> < 0.05		
[-]	302/517	58	.54
[+]	309/588	53	.47
Denomination and style = Not significant			

Note.

* Bold factor weights indicate positive prediction of deletion.

** Also note that vowel is ranked higher than labial consonants. This is most probably due to the large difference in number between vowels and labial consonants.

Preceding place of articulation is the most significant predictor ($p < 0.001$). Within the factor group, preceding glottal and velar consonants are the most favourable environments for deletion. A preceding alveolar consonant exhibits a neutral effect, while vowels, labial consonants and no sound segment are the most unfavourable contexts. The positive effect of the dorsal consonants compared to the other sounds suggests some kind of dissimilation. That is, the closer the preceding consonant is to the glottis, the more likely the glottal stop is deleted.

Grammatical class also turned out to be a significant predictor of onset glottal stop deletion ($p < 0.005$). As expected, results reveal that function words overall favour deletion, while content words do not. When grammatical class is deployed into more specific categories as shown in Figure 2, similar results are obtained. The exceptions are adverbs, demonstratives, and particles. The reason for this behaviour can be attributed to the paucity of tokens as shown in Table 9.

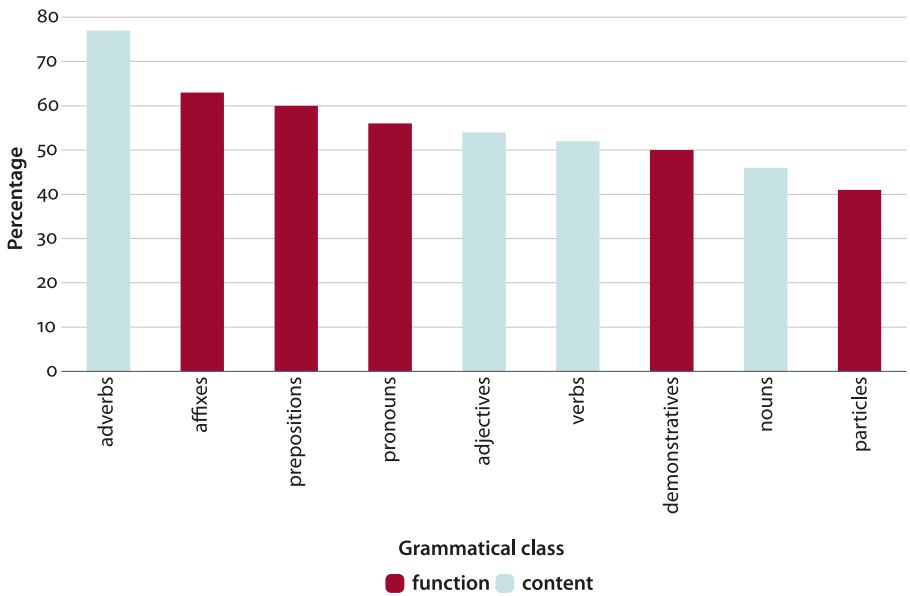


Figure 2. Deletion by grammatical class

Syllable stress ($p < 0.05$) is also significant. Glottal stops that occur in unstressed syllables are more likely to be deleted. Of all six of the independent variables tested, all three of the linguistic factors were significant.

Gender and age were returned as significant factors ($p < 0.001$). Older men are most likely to delete glottal stops, followed by middle-aged women, and then older women with a neutral effect. Younger speakers are the least likely to participate in onset glottal stop deletion. Figure 3 shows a monotonic pattern of men’s deletion probability (even though the differences are not huge between the middle-

Table 9. Distribution of deleted glottal stops by grammatical class

	Total tokens (N= 1,105)	Deleted glottal stops (N= 553)	Rate of deletion (%)
Adverbs	39	30	77
Affixes	104	65	63
Prepositions	101	61	60
Pronouns	328	185	56
Adjectives	76	41	54
Verbs	292	153	52
Demonstratives	18	9	50
Nouns	125	58	46
Particles	22	9	41

aged and older men), an inverted-V shape pattern for women, and V-shape pattern for women’s retention rates. While the monotonic pattern suggests a change in progress, the V-shape pattern hints at age-graded stable variation. However, further investigation into social factors such as contact, identity, and language prescription shows deletion rates to be in tandem with a change in progress. Overall, the results show that women are less likely than men to delete glottal stops across time.

Denomination did not exhibit significant results. This comes as no surprise considering that the only recorded variation along religious lines is lexical (see Section 7.5).

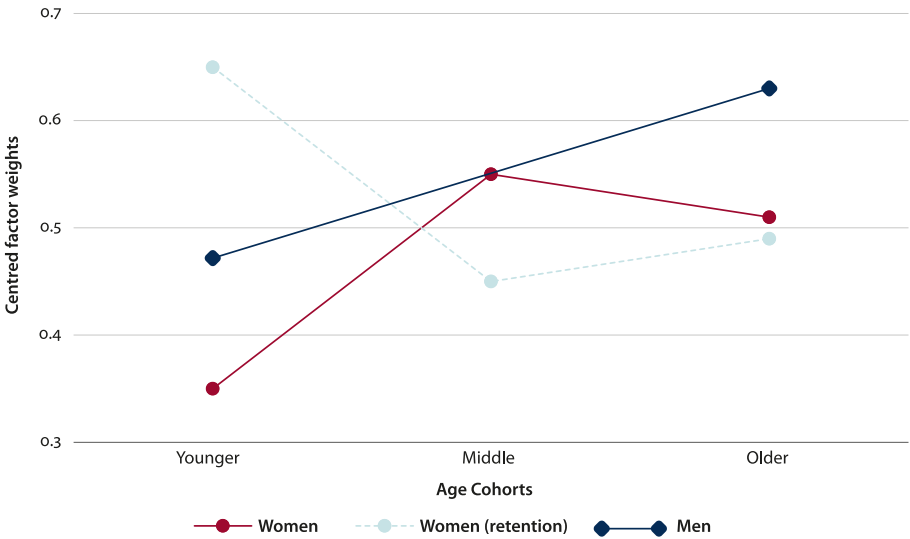


Figure 3. Deletion and retention across time

7. Discussion

7.1 Resyllabification and dissimilation

It would be reasonable to claim that preceding consonants have a tendency to delete glottal stops more than vowels and silence. A possible reason for this is a two-step ordered rule of deletion followed by resyllabification. The phonotactics of Rotuman is such that the sound preceding a glottal stop would be part of a preceding syllable (e.g., ‘teach’ /rak-ʔɛk/, CVC.CVC), and because the general syllable structure is underlyingly open (/rako- Øɔki/, CVCV.VCV), surface forms are most likely being driven to adhere to the underlying structure (/ra.kØɛk/, CV.CVC or /ra.kØɔ.ki/, CV.CV.CV). Therefore, glottal stop is deleted so that the preceding consonant resyllabifies to allow for open syllables. This could also explain why vowels have a negative effect on deletion as it occurs intervocalically, which matches the basic underlying phonotactic structure of a syllable. Variationist studies on t/d-deletion also consider resyllabification as a possible reason for deletion. For instance, final /t/ and /d/ in ‘west side’ and ‘old man’ respectively are variably deleted on the grounds that /ts/ and /dm/ are not legal onsets in English (Guy & Boberg, 1997). In Optimality Theory (Prince & Smolensky, 2004), onsets are generally maximised while codas are null. Onset consonants are less likely to be deleted because more emphasis is placed on pronouncing them, while coda consonants are the opposite. That is, towards the end of a lexeme, there is a range of reductive processes that operate on amplitude, pitch, and other marked features (Greenberg, Carvey, & Hitchcock, 2002, p.51).

While resyllabification makes for a sound argument, it does little to explain the internal factor group rankings. The results show that the presence of preceding dorsal consonants causes glottal stop to be deleted more compared to coronal and labial consonants (alveolar and labial). There appears to be a strong case of dissimilation here. The propensity for adjacent consonants sharing similar features to dissimilate evokes the Obligatory Contour Principle (Leben, 1973). Adjacent dorsal consonants tend to permit glottal stop deletion, while coronal and labial consonants variably block it. For the case of no preceding segment, it can be argued that it does not specify for either of those features, and therefore is not favourable for deletion (see Guy & Boberg, 1997).

7.2 Effects of lack of stress and function words

An unstressed syllable favours onset glottal stop deletion. This is expected as lack of stress tends to favour lenition, as in the case of schwa deletion in English (Gordon, 2011), tapping in Irish English (Hickey, 2009), and spirantisation in

Spanish (Gonzalez, 2006) among others. A stressed syllable is a prominence factor, meaning that more emphasis in pronunciation is placed on the syllable, inhibiting lenition, compared to an unstressed syllable (Raymond et.al., 2006, pp.65–66).

The grammatical class rankings show trends in the direction attested in the literature. The rates of deletion demonstrate positive results for function words, while content words have the most negative effect.

Studies also show that high frequency words are more likely to be lenited (Bybee, 2002; Pierrehumbert, 2001), such as the lenition of syllable-final lexical /s/ in a variety of Colombian Spanish (File-Muriel, 2009) or t/d-deletion in American English (Bybee, 2000). If we go back to Figure 2, we see that glottal stop in pronouns had a relatively high deletion rate. The majority of these pronouns are general possessive pronouns ($n=181/328$), whose base forms all begin with /ʔo-/. Considering the ubiquity of the base forms and the relatively high frequency at which pronouns occur based on the corpus (30%), the case for lexical frequency predicting deletion seems to be a likely conditioning factor. The same can be said for affixes and prepositions. The most common affix with an onset glottal stop is the causative suffix /-ʔɔki/ or its short form /-ʔɛk/, constituting 44% of affixes in the corpus ($n=46/104$). The others are the aspectual marker /-ʔia/ and reduplicated morphemes. The preposition /ʔe/ makes up the entire preposition class in the corpus. The order of ranking not only reveals the salience of function words per se, but appears to hint at lexical frequency too. However, given that establishing a ceiling per token/type, which this research does, is inappropriate to test for lexical frequency, such claims should be treated with caution. Additionally, a common process in Rotuman is the merging of function words (as shown in Example (7) in Section 5.3.4). The two-step ordered process involves deletion and then vowel coalescence. It is possible that most of these function words seemed to have undergone the first step of glottal stop deletion.

7.3 Rotuman women and the standard

Labov (2001, p.291) proposes that women conform more to overtly prescribed variants than men. Trudgill (1972, pp.182–183) reasons that women orient to prestige norms as a symbolic resource to index social mobility. However, in Rotuman culture and society, the dominant gender is difficult to determine. In some aspects, it is matriarchal while in others it is patriarchal (Titifanue, Varea, Kant, & Finau, 2018, pp.34–35). Particularly in Suva, the modernity of urban life affords equal opportunities to both men and women. For such reasons, it would be impractical to apply Trudgill's argument here.

Further inspection of gender seems to point at community of practice as a putative factor for older women. Based on the participants of this study, most of the older women tend to engage in craft work and church programmes. However, a community of practice was difficult to obtain for the older men in this study. A closer look suggests that it is the different frequencies of social interaction between the genders that are linked to deletion rates. Older Rotuman women are more likely than older men to meet often, be it at weaving and craft programmes or church, or even merely for visitation. On the other hand, older men in general have fewer networks, and therefore limited contact with other Rotumans. Rotuman meet-ups are occasions for Rotumans to communicate in the language and reify their Rotuman identity. The notion of standard speech is synonymous with being authentically Rotuman, and given that older Rotuman women have more access to networks that promote this within a larger predominantly English-speaking community, they are more likely to adopt standard variants than older men. Elderly Rotuman women tend to be caregivers of their grandchildren, as parents go to work. This role increases their sense of nurturing their grandchildren in the culture and language.

Interestingly, two older women produce uniquely low rates of deletion, diverging from the frequencies of glottal stop retention of the older women. A look at the backgrounds of the two women explains that they associate relatively less with Rotuman women compared to the other older women who attend cultural programmes and a Rotuman church. This is in conformity with the findings of social network theory which suggests that strongly-tied networks are resistant to non-conservative forms, while loosely-tied networks are weakly connected and are susceptible to language change (Labov, 1969; Milroy, 1980).

Middle-aged women tend to delete glottal stops the most, which is likely a result of their increased identification and socialisation into the dominant cultures. They reflect the population of urban Rotumans that seem to be moving away from Rotuman norms and practices in favour of a Western lifestyle. This generation of Rotumans, men and women, are responsible for the lack of intergenerational transmission of language and culture, as evident in the recent waves of language revitalisation and maintenance programmes designed for younger Rotumans over the past two decades. Even though the middle-aged men are conflated with older men following the multivariate analysis, the percentage deletion rates of middle-aged men seem more advanced.

7.4 Change in progress towards retention

Invoking the apparent time construct, we see deletion to be used mostly by middle-aged speakers and older men, while younger speakers and older women

tend to retain glottal stops. A pyramid or an inverted V-shape pattern hints at age-graded stable variation, but an investigation into contact, identity, and language prescription suggests a change in progress.

In Section 7.3, the use of the standard is attributed to the engagement in cultural activities with other Rotumans and Rotumans' attitudes towards cultural and language maintenance. The same themes also apply in the case of younger Rotumans. Younger Rotumans are more aware of the endangered status of the language, heightened by the fact that they tend to be looked upon negatively when they do not speak the language. According to Howard and Rensel (2001), language is the most critical component of the Rotuman identity in diasporic communities. Thus, younger Rotumans seem to be making it their responsibility to preserve it. In doing so, they assert their identity as Rotumans not only nominally but in their lifestyle, joining Rotuman language programmes, singing and dancing at Rotuman functions, preparing Rotuman delicacies, and other traditional activities that index an authentic Rotuman identity. This is in line with Chappell's (2015) study of Nicaraguan Spanish, in which speakers' adoption of local speech norms to reify a global identity.

During the interview, a question was posed on participants' observation of Rotumans that migrate to Fiji. They commented on dramatic social and physical changes only. However, it was after the interview when I disclosed information on the variables I was looking at that they commented on the accent shifting of Rotuman migrants. The younger participants who attend university tend to meet with several recent migrant Rotumans on campus. These recent migrants are said to have a tendency to reply in English when asked a question in Rotuman or orient to an overseas English or light Fiji English accent (e.g., aspiration of voiceless consonants, orientation to English vowels, use of the American English post-vocalic 'r'), which are typical stereotypes of young Rotuman migrants who seem to be identifying with their new place of residence, which is mostly urban. The participants go on to say that while they are trying to reverse the damage, there are others who are exacerbating the situation. Given that younger speakers tend to retain the glottal stops, I took this to mean that younger Rotumans are reclaiming the language and are speaking the standard variety more. The perception is that the standard is to language vitality as non-standard is to loss.

This reclamation of the Rotuman identity is somewhat similar to Dubois and Horvath's (1998) case of Cajun English. Cajun English is typically characterised by the replacement of standard [θ, ð] with [t, d] respectively. Dubois and Horvath (1998, p.246 & pp.255–259) find through an apparent time study a V-shaped pattern: the proportion of stop usage was high for older speakers, followed by a decline by middle-aged speakers, and then a rise by younger speakers. Older speakers' high plosive rates are attributed to French influence. However,

for younger speakers, their rate of stop usage is attributed to their pride in Cajun identity.⁸

Revitalisation language programmes have a part to play in the high retention rates of younger speakers. They prescribe against glottal stop deletion in curricula. Second language and non-fluent speakers, due to the absence of phonemic glottal stop in their first language, particularly English, need to learn where to insert the glottal stops. In fact, the way the alphabet is taught emphasises the phonemic load of the glottal stop, with glottal stop not learnt as a single sound but together with a vowel, for example, <a, 'a, a'>.

Historically, glottal stop deletion was a regular sound change from Proto-Oceanic and Proto-Central Pacific to Rotuman. This diachronic process seems to be reflected in synchronic onset glottal stop deletion. In fact, if we consider the historical change of POc PCP *ʔ > Rot. Ø against the onset data, in which three out of four significant predictors of onset glottal stop deletion are linguistic factors, then it seems as if the change was gradually taking place between older and middle-aged speakers. However, social pressure appears to be overriding the structural forces of linguistic change nowadays – hence the reversal.

Younger women's deletion rates are also diagnostic of a change from above. The pronunciation of the glottal stop is prescribed, and speakers are aware of this, particularly women who are sensitive to social evaluations of language and are generally the early adopters of linguistic change (Labov, 2001, p. 291).

7.5 Further questions on denominational variation

Although denomination turned out to be a non-result, there are several points that we can derive from this. The first is that the result comes as no surprise. The only denominational variation in Rotuman is known to be lexical, although I have suggested elsewhere (Fimone, 2020) that Methodists tend to delete coda glottal stops in Rotuman more compared to Catholics – contrary to stereotypical norms of Methodists largely employing standard variants. I attribute this pattern to attempts by Catholics to reverse the traditional stigma and notions of inferiority within the community. However, this interpretation should be treated as tentative, which leads to the second point. This study does not take into account the level of engagement each speaker has with their identified denomination. Different levels of participation could yield different results. Baker-Smemoe and Bower (2015) show that the degree of church involvement can have a positive influence on lin-

8. In another V-shaped pattern change, Raga older men appear to be leading the deletion of the velar fricative the most, while younger men are adopting this innovation as a result of frequent interactions and due to older men holding prestige in society (Duhamel, 2020).

guistic variation; for example, inactive Mormon members mark themselves differently linguistically from active members and non-members. Finally, the strained relations between Catholics and Methodists have considerably improved. As a result, it could either be that there is no sound variation based on religious lines or that it exists way below the social radar for variables to be shibboleths. Lexical variation, however, remains extant, but this is because of its high frequency usage in church.

8. Conclusion

This paper investigated glottal stop deletion on syllable onsets as the dependent variable in Suva, Rotuman. Multivariate analyses revealed preceding sound segment, grammatical class, syllable stress, age, and gender to be influential in conditioning deletion. Style and denominational affiliation disfavour deletion. The phonotactics and syllable structure of Rotuman could be driving glottal stop deletion. Within the preceding sound segment factor group, linguistic dissimilation seems to be at play with dorsal consonants favouring deletion. On grammatical class, function words tend to delete glottal stops more, while unstressed syllables as expected favoured deletion due to less emphasis placed on pronunciation of the syllables. Apart from younger Rotumans, older women were more likely to retain glottal stops, and this could be attributed to frequent contact and being able to speak Rotuman frequently, and thus reifying the Rotuman identity within the larger predominantly English-speaking community in Suva, Fiji. Finally, the apparent time study suggests age grading, but attitudes point to a change in progress with younger speakers reversing community-wide deletion, most probably due to language education in Rotuman and their increased awareness of their role in preserving the language. Such social forces have overcome the internal linguistic forces of glottal stop deletion.

Glossary

The glossing used in this paper are:

3	third person
s	singular
PL	plural
INDEF.ART	indefinite article
FUT	future marker
GEN	generic pronominal base
PREP	preposition
POSS	possession

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Abstract (Rotuman)

Peap te'is sākīroa fāeag Rotuām 'on famör Rotuma ne noh 'e Fiti. Iā sākīroa a'es'ao'ākiag ne tō ne 'an'āk ta 'e kamatag ne vāevāe ne fāega. Peap te'is garue'ākia *Rbrul* se fāeag 'on famör saghul ma vol ma 'io se tēkāe he hif: tō 'e muā ne 'an'āk ta, kilas ne fāega, mah ne vāevāe ne fāega, fā ne hānit, *style* ne fāega ma rotu. Tē het ne peap te'is kel'ākim ne fāeag Rotuām ta kamat la jen. Fā mamfua ma famör fāu folaghul se limaghul ta kat a'es'ao'āk ma'oi ra 'e tō ne 'an'āk la fak se fup haharāgi ma hāian mamfua hūn a'ti' se 'oris rakoag fāeag Rotuām ta tape'ma se 'oris la putuag ne fāeag Rotuām ta. Tēkāe hoi'akit ne rak'ākim ne hāian Rotuma kat a'es'ao'āk a'fuamamaū ra 'e tō ne 'an'āk ta 'e hūn se iris pa fāeag Rotuām ofrau ta.

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