

VARIATION IN THE VOICED CORONALS OF TWO FATALUKU-SPEAKING VILLAGES

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Abstract

Several studies comment on regional variation in Fataluku, but no detailed study of phonetic variation has yet been published. This paper reports on the distribution of [z], [j], and other voiced coronals in phonetically-controlled speech from fourteen Fataluku speakers—seven from the village of Tutuala and seven from the village of Lospalos. In Tutuala, I find complementary distribution between voiced coronal obstruents and glides, while in Lospalos, the relationship between obstruents and glides is chaotic and speaker-dependent. This difference in homogeneity parallels the make-up of these villages, as Lospalos draws a diverse array of workers from across the Fataluku-speaking area, while Tutuala is relatively remote and has a much smaller draw.

Keywords: Phonetic variation, language documentation, sociophonetics, East Timor, Timor Leste

ISO 639-3 codes: ddg

1 Introduction

The island nation of Timor Leste is not only Southeast Asia's youngest nation, it is also one of its most linguistically diverse. This country of just over a million people is home to at least twenty languages from two language families, most of which remain highly underdocumented (Hajek 2006, Simons & Fennig 2018). The present paper is part of a larger project examining regional phonological and phonetic variation in one of East Timor's larger indigenous languages, Fataluku. Fataluku is reported to exhibit substantial dialectal variation, and there have been suggestions that the title "Fataluku" may even encompass more than one language (Simons & Fennig 2018). Most academic discussions of Fataluku comment on the existence of regional variation, and it has been a recurrent issue in orthography development workshops (Langford 2014). In spite of its acknowledged importance, comments on variation in Fataluku are generally impressionistic, and no study has yet made comparison of regional Fataluku varieties its primary focus.

Here, I present new data on the distribution of voiced coronal obstruents and glides, as the distribution of these sounds is often highlighted as a key distinguishing feature of the regional varieties of Fataluku (Langford 2014, van Engelenhoven 2009). I compare the phonetic realizations of these sounds in two villages reported to differ from one another, Lospalos and Tutuala. While the data collected here confirm the existence of differences between the two villages, these results differ in several ways from previous reports. Perhaps most interestingly, no clear evidence is found here for the phonological contrast reported to exist between /j/ and /z/. The data from Tutuala show glides and voiced coronal obstruents in complementary distribution, while the data from Lospalos show substantial variation between glides and obstruents that is not obviously connected with any sociolinguistic variable.

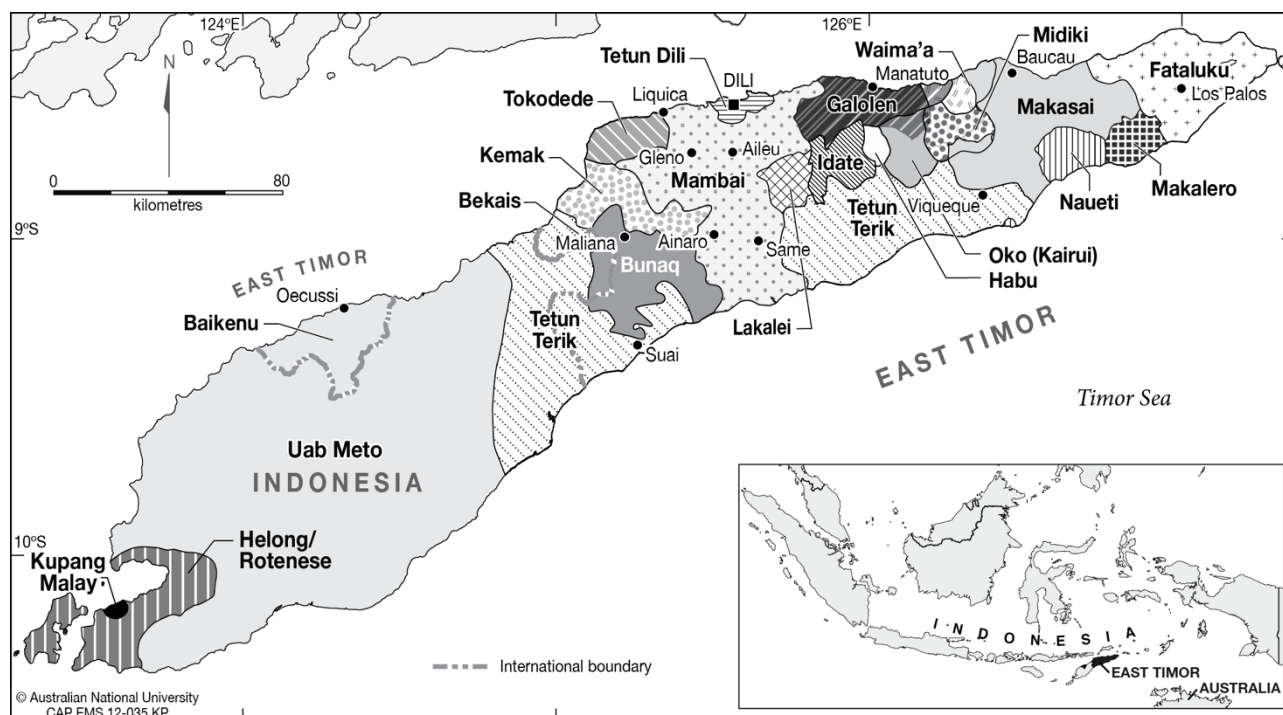
Section 2 provides background on the Fataluku language and previous work on variation. Section 3 describes and justifies the methodology for this study. Section 4 presents the results, and section 5 discusses their implications for the analysis of Fataluku. Section 6 gives conclusions and directions for future work.

2 Language environment and background

2.1 Historical relationships and current context

Fataluku is a non-Austronesian language spoken by approximately 37,000 on the eastern tip of the island of Timor (Simons & Fennig 2018, Schapper et al. 2014; see map in figure 1). It is closely related to Makasai and Makalero, which are spoken in adjacent regions. Many Fataluku speakers also speak Tetun Dili, the national lingua franca; Portuguese, the language of education until 1975; Indonesian (also known as Malay or Bahasa), the language of education from 1975-1999; or one of the other indigenous languages of Timor.

Figure 1: The languages of East Timor (All maps produced by CartoGIS, College of Asia and the Pacific, Australian National University, made available under a Creative Commons SA BY copyright).



2.2 Fataluku Phonology

Fataluku has a moderately small phoneme inventory and a simple (C)V(V)(C) syllable template. My past analysis of Fataluku's phonemes, based on first-hand fieldwork with speakers from Lospalos, is presented in tables 1 and 2. This analysis follows previous work on the language in broad outline (Campagnolo 1973, Hull 2005, Nácher 2003, 2004, van Engelenhoven 2009).

Table 1: Fataluku's consonant phonemes, according to Heston (2015)

	Bilabial		Labiodental		Alveolar		Palatal	Velar		Glottal
Stop	p	(b)			t	(d)		k	(g)	ʔ
Affricate					ts					
Fricative			f	v	s	z				h
Nasal		m				n				
Tap/trill						r				
Lateral						l				
Glide							j			

Table 2: *Fataluku's vowel phonemes, according to Heston (2015)*

	Front	Central	Back
High	i		u
Mid	e		o
Low		a	

The sounds I have previously analyzed as /z/ and /j/ present some challenge to analysis. The phoneme /z/, which occurs only in word-initial or intervocalic position, is realized variably as a coronal fricative or affricate. There is also variability in the precise place of articulation of this consonant: dental, alveolar, postalveolar, and palatal realizations have all been reported (Hull 2005, Heston 2015). No conditioning environments have been identified. Hull (2005: 7) analyzes this phoneme as a voiced palatal affricate, but says that it may be “realized dialectally as the voiced alveolar spirant [z].” I have taken the voiced alveolar fricative as underlying in past work, given the frequency of this realization in my data, though evidence for establishing its precise underlying place and manner is weak.

The phoneme /j/ has an even more limited distribution, occurring only in intervocalic position. An important question is whether the palatal glide should be analyzed as a phoneme distinct from /z/. For instance, van Engelenhoven (2010) claims that there is no phonemic contrast between the palatal glide and palatal fricative (which I label /z/). Hull claims that such a contrast does exist, but for him, the primary distinction is between affricate and fricative, rather than fricative and glide, respectively. My previous analysis of /z/ and /j/ as different phonemes was based on the presence of near-minimal pairs in the speech of some speakers, such as [aza] ‘rain’ and [paja] ‘liquid’. This contrast does not hold for all speakers, however, as some have a palatal glide in both [aja] ‘rain’ and [paja] ‘liquid’.

2.3 Variation between [z] and [j]

The work of previous analysts of the language, cited above, suggests that the realizations of /z/ and /j/ vary by region. The relevance of region to the analysis of /z/ and /j/ is also suggested by native speakers’ metalinguistic knowledge. In my experience, native speakers of Fataluku are quite aware of regional differences in their language. Several consultants have identified variation between [z] and [j] as a regional feature, though they may not know which forms are used in varieties other than their own.

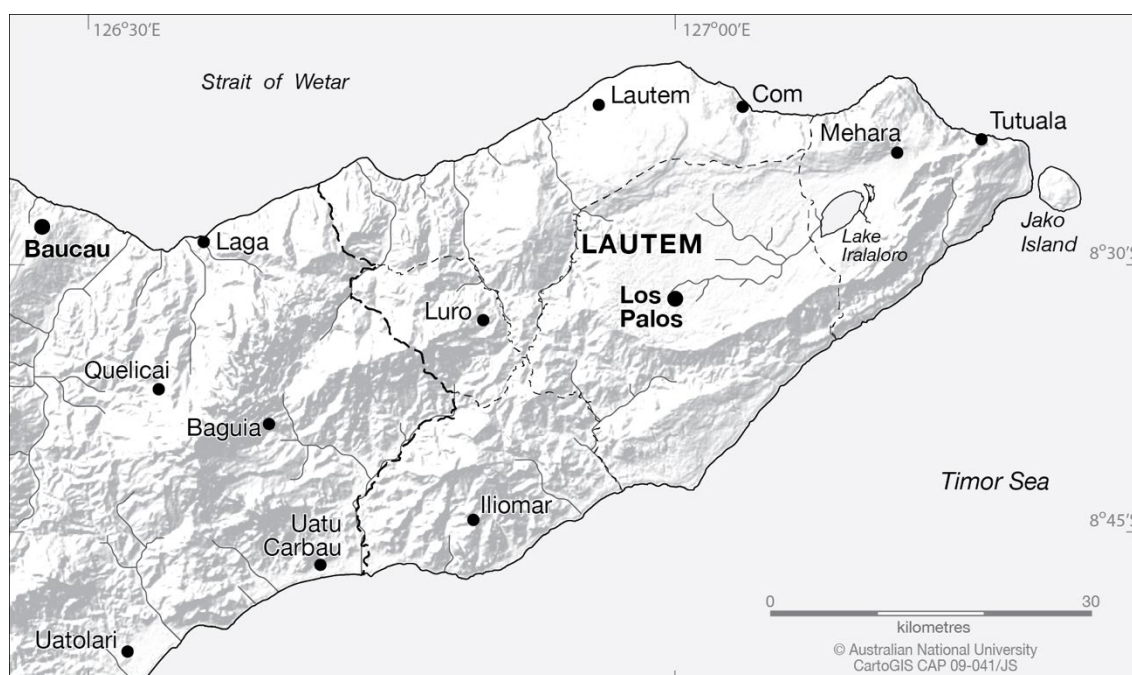
Hull’s (2001) identifies five major regional dialects of Fataluku, known commonly as North, Northwest, Central, South, and East. While extensive discussion of specific regional differences is outside of Hull’s (2001) scope, van Engelenhoven (2009) provides some additional discussion and data to support Hull’s claims. Van Engelenhoven distinguishes these dialect regions primarily on the basis of consonant variation, particularly [ʈ]~[d], [ʔ]~∅, and [z]~[j]. Table 3 shows the data provided by van Engelenhoven that bear on the variation between [z] and [j]. He identifies two primary correspondences. In initial position, the East region has [j] where other regions have [z]. In intervocalic position, East and South have [j] where other regions have [z].

Table 3: *Regional differences in between [z], [j], and related sounds according to van Engelenhoven (2009: 335)*

	Northwest	North	Central	South	East
‘wife’	zeu	zeu	zeu	zeu	jeu
‘sleep’	taza	taza	taza	taja	taja

The present study compares the main village from Hull and van Engelenhoven’s Central region, Lospalos, with the main village from the East region, Tutuala. These two villages are about 35km distant, though the journey encompasses a two-hour drive along a heavily worn road (see figure 2). Studying the speech of speakers from Lospalos is a natural starting point, since most phonological and lexicographic work on the language is based on this variety (e.g., Heston 2015, Hull 2005, Nácher 2003, 2004). Tutuala forms a good point of comparison, since it is a part of the dialect region identified by van Engelenhoven as particularly divergent. A number of native Fataluku speakers from Lospalos and neighboring regions have identified Tutuala to me as a place where the local variety of Fataluku differs from their own speech.

Figure 2: The Lautém district of Timor Leste, showing Lospalos and Tutuala



3 Methods

3.1 Materials

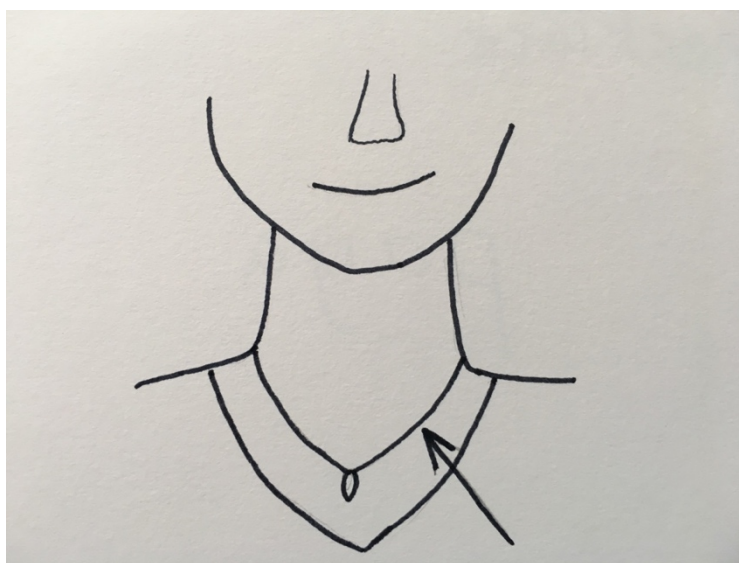
The data for this study were collected over one month as part of a larger project on regional variation in Fataluku. A list of 99 words was created to illustrate all phonemic contrasts in phonetically-controlled environments, with a particular focus on phones reported to vary across dialects. This wordlist was created based on Náchér's (2003, 2004) Fataluku-Portuguese dictionary of approximately 3,000 lexical items and Heston's (2015) Fataluku-English wordlist of approximately 1,100 items. The wordlist was limited to nouns—with the exception of a few nominal phrases and one reflexive pronoun—to facilitate elicitation by picture; the elicitation process is described below.

Since both /j/ and /z/ are infrequent in the lexicon of Fataluku, it was possible to include the majority of lexical items reported to contain one of these sounds. The final list contained eight instances of word-initial /z/, three instances of word-medial /z/, and eight instances of word medial /j/ (see table 4). This list thus includes examples of these two segments in all licit positions (Heston 2015). In order to facilitate elicitation, the full 99-word list was divided into two blocks. Blocking the elicitation materials helped prevent participant fatigue by providing a natural place for a break and allowed elicitation of the full list to be spread across multiple sessions if needed. The amount of time available for working with each speaker was highly variable; while most speakers were able to meet for several hours over multiple days, others had only a limited time between school, work, or family responsibilities. About half of the stimuli for this study appeared in block 1, including three instances of word-initial /z/, two instances of word-medial /z/, and three instances of word medial /j/; the other examples appeared in block 2 (see Appendix for full wordlist).

Table 4: *Target lexical items in phonemic transcription (following Heston 2015, Nácher 2003, 2004)*

	gloss	phonemic transcription
Initial /z/	‘ice’	zelu
	‘Jaco’	zako
	‘leg’	zia
	‘self’	zen hin
	‘wife’	zeu
	‘plane’	zatu
	‘road’	zampata
Medial /z/	‘plantain’	azan muʔu
	‘rain’	aza
	‘year’	azaʔira
Medial /j/	‘cockatoo’	kaja
	‘cousin’	vajan
	‘juice’	vaja
	‘mango’	pajah
	‘necklace’	paja
	‘net’	kajalau
	‘bedroom’	tajan alivana
	‘tears’	inavaja
	‘ship’	loojasu

Since there exists no widely-used writing system for Fataluku, the intended words were elicited by picture. Two decks of laminated index cards were created, one for each stimulus block. Each card contained a line drawing of the item to be elicited on one side of the card and a representation of the word in working orthography on the reverse, to help ensure that participants produced the intended word. These pictures proved a successful way to elicit the intended vocabulary from participants of a wide variety of backgrounds, including a number of monolingual speakers. A sample drawing is given in figure 3.

Figure 3: *A sample of the line drawings used to elicit vocabulary, this one for /paja/ ‘necklace’*

3.2 Procedure

The elicitation procedure was as follows. First, the researcher and participant would look together at each card in the first block, to familiarize participants with the intended words. If a participant was unable to think of the intended word, they would be prompted by the researcher with a description of the item in Fataluku, the intended word in transcription or speech, or a similar-sounding word. In cases in which two variants were previously attested (e.g. [aja] or [aza] ‘rain’), participants were prompted with both alternatives. Speakers were upfront about correcting any deviations they saw as mistakes, and were unwilling to produce tokens they did not find natural.

Participants were then asked to review the deck of pictures, uttering each target word in the frame /ana _ toto/ ‘I am looking at _’. Cards were presented in pseudorandom order, and on every other repetition, the order of the list was reversed. Speakers recorded one to three repetitions of a block of words; two repetitions was most common. If time permitted, the researcher would repeat the procedure for the second block, record a narrative text, and/or ask speakers about their own observations regarding regional differences in Fataluku. This procedure yielded a total of 480 tokens relevant for this analysis (224 tokens representing the Central region and 256 tokens representing the East region). A sociolinguistic background questionnaire was also administered to each speaker, the results of which are reported in tables 5 and 6.

3.3 Participants

Fourteen participants participated in this study. Because of this project’s emphasis on regional differences, rather than differences in age, gender, or other sociolinguistic variables, the focus was on recording speakers who were as comparable in other categories as possible, given available time and resources. It was decided to focus on young male native Fataluku speakers, since in the cultural context of East Timor, it is more appropriate for a male researcher to work with male speakers. Younger speakers also tend to perform better on abstract linguistic tasks and are more likely to have a full set of healthy teeth, unaffected by betel nut. Nevertheless, participants in the ideal demographic were not always available, and some participants fall outside the target population.

The demographic background of each of the participants in the present study is summarized in tables 5 and 6. Seven participants are from the village of Lospalos, while seven are from the village of Tutuala or its immediate environs. Ten participants are male, while four are female (one from Lospalos and three from Tutuala). Ten participants are between the ages of 18 and 39, while four are in their 40s or 50s. Each participant had at least one native Fataluku-speaking parent, and most had two; the exception to this is speaker LM6, a high proficiency Fataluku L2 speaker whose father was from Indonesia and whose mother was a Sa’ani speaker from Lūr (in the west of the Lospalos district). His data are included here, since he has lived in Lospalos for decades and his speech closely mirrors that of native speakers from the area.¹

The choice to focus on young male speakers has important implications for the interpretation of the results of this study. In the first place, these data do not allow straightforward generalization to speakers in other demographic categories. While some female speakers and some middle-aged speakers participated, participant numbers in these categories are not large enough to permit reliable generalizations to these demographics.

It is also notable that in the cultural context of East Timor, young male speakers tend to be the most geographically mobile, and are likely to have frequent interactions with speakers from other parts of the district. This effect is compounded by my choice to work with speakers from larger villages. Younger speakers are also more likely to be multilingual; many of the participants reported proficiency in Indonesian, Tetun Dili, or both, and some could speak the related language Makasai. The structured nature of the picture elicitation task may also be more likely to elicit a style of speech that is considered formal, neutral, or correct by speakers. It is thus very likely that the data collected here underrepresent existing variation. However, given the incredible complexity of sociolinguistic variation—especially in a place as multilingual as Timor Leste—and

¹ The only other speaker who did not claim Fataluku as their native language was LM1, who listed Bahasa (Indonesian) as “the language they spoke first.” However, there is some doubt as to the best way to interpret this response, as he listed Fataluku as the language he spoke best, as well as the native language of both of his parents and the language of his household throughout his childhood. The responses from LM1 were also included in the following analysis, as I found no other reasons to doubt his language ability. In a cultural context as multilingual as that of East Timor, the concept of “native language” is not always straightforward to apply, and it is possible that he did not interpret question as intended.

the paucity of previous research on this subject, these simplifications allow a good starting point on which more detailed future sociophonetic research can be based.

Table 5: *Personal metadata for participants (The first column indicates the label used to refer to the speaker (L=Lospalos, T=Tutuala, M=Male, F=Female). Blanks indicate unknown values.)*

	Age	Work	Education	Birthplace	Grew up	Current residence	L1	Other Lgs
LM1	20	Student	In high school	Fuiloro	Lospalos (Sawarika)	Lautem/Maina 1	Bahasa (?)	Tetun, Fataluku
LM2	31-32	Farming	Junior high school	Inik Pala (Lospalos)	Sawarika (Lospalos)	Sawarika (Lospalos)	Fataluku	Makasai
LM3	18-19	Student	In high school	Sawarika	Sawarika (Lospalos)	Sawarika (Lospalos)	Fataluku	
LM4	20	Student	In high school	Bemoris (Lospalos)	Bemoris (Lospalos)	Bemoris (Lospalos)	Fataluku	Dili
LM5	20-30 ²	Gov't admin.	Completed university	Sawarika (Lospalos)	Sawarika (Lospalos)	Dili	Fataluku	
LM6	39	Paralyzed, no work	Some primary school	Fuiloro	Sawarika (Lospalos)	Sawarika (Lospalos)	Tetun	Tetun, Makalero, Makasai, Bahasa
LF1	19	Student	In high School	Lereloho (Lospalos)	Lereloho (Lospalos)	Lereloho (Lospalos)	Fataluku	no
TM1	45-55	Hospitality		Tutuala	Tutuala	Walu (Tutuala)	Fataluku	
TM2	19	Fishing	none	Tutuala	Tutuala	Tutuala	Fataluku	Tetun, Portuguese
TM3	24	Fishing	8 years	Pitileti (by Tutuala)	Pitileti (by Tutuala)	Pitileti (by Tutuala)	Fataluku	Tetun, Makasai, Makalero
TM4	42	Fishing and farming	10 years	Hihoru (by Tutuala)	Hihoru (by Tutuala)	Hihoru (by Tutuala)	Fataluku	Tetun, Bahasa
TF1	50s	Hospitality		Tutuala	Tutuala	Walu (Tutuala)	Fataluku	
TF2	53	Hospitality	6 years	Tutuala	Tutuala	Walu (Tutuala)	Fataluku	no
TF3	53	Hospitality	5 years	Tutuala	Kota (Tutuala)	Walu (Tutuala)	Fataluku	

² Data from this speaker was recorded as part of a pilot for the larger project. For this reason, the frame used with this speaker was slightly different (/ana _ taʔa/ 'I say _' instead of /ana _ toto/ 'I look at _'), words were elicited through a contact language, rather than by picture, and the exact list differed somewhat.

Table 6: Parental metadata for participants (Blanks indicate unknown values.)

	Father's Birthplace	Father's L1	Lg Father used with Speaker	Mother's Birthplace	Mother's L1	Lg Mother used with speaker
LM1	Malahara (Muapitin)	Fataluku	Fataluku	Lospalos (Sawarika)	Fataluku	Fataluku
LM2	Sawarika	Makasai	Fataluku	Lūr	Sa'ani	Fataluku
LM3				Souru	Fataluku	Fataluku
LM4	Pairara	Fataluku	Fataluku, some Tetun	Com	Fataluku	Fataluku
LM5				Souru	Fataluku	Fataluku
LM6	Jawa	Indonesian	Tetun	Lūro	Sa'ani	Tetun
LF1	Lorehe	Fataluku	Fataluku	Souru	Fataluku	Fataluku
TM1						
TM2	Cailoro (by Tutuala)	Fataluku	Fataluku	Tutuala	Fataluku	Fataluku
TM3	Pitileti (by Tutuala)	Fataluku	Fataluku	Pitileti (by Tutuala)	Fataluku	Fataluku
TM4	Hihoru (by Tutuala)	Fataluku	Fataluku	Pitileti (Tutuala)	Fataluku	Fataluku
TF1						
TF2	Tutuala	Fataluku	Fataluku	Ira Lāfai (by Lospalos)	Fataluku	Fataluku
TF3	Tutuala	Fataluku	Fataluku	Tutuala	Fataluku	Fataluku

3.5 Equipment

Recordings were made using a Zoom H6 or Zoom H4n handheld solid-state audio recorder in 44.1kHz/16 bit uncompressed .wav format. Recordings used either the device's internal microphones or the Shure SM35 headworn condenser microphone, depending on speakers' preferences and comfort. Most participants consented to use the headworn microphone, which allowed superior rejection of background noise because of its proximity to the sound source and its unidirectional orientation. Overall, recording quality was quite satisfactory, yielding signal-to-noise ratios in the range of 40dB. All recordings from the project have been deposited with the Kaipulehone archive at the University of Hawai'i at Mānoa. Interested readers may request access through the archive to the full dataset on which this research is based.

3.5 Analysis

Each carrier phrase was manually tagged with its English gloss and extracted into a separate file using a Praat script. The target word in each file was then transcribed in a moderately broad phonetic transcription, consulting spectrograms and waveforms created in Praat as necessary (Boersma & Weenink 2018). These transcriptions are given in the results section below.

4 Results

4.1 Initial position

The wordlist included six lexical items that had a voiced coronal obstruent for at least some speakers.³ The 191 productions of these items, summarized in tables 7 and 8, differ substantially from previous reports. Recall that in initial position, van Engelenhoven (2009) finds a correspondence between Lospalos [z] and Tutuala [j]. Unlike van Engelenhoven (2009), I find no categorical phonological difference between speakers from Lospalos and those from Tutuala (with the exception of the word for ‘leg’, discussed below). Instead, I find variation across all speakers in the obstruent’s precise place (alveolar vs. post-alveolar), manner (fricative vs. affricate), and voicing (fully voiced vs. [partially] devoiced). Variation along these parameters does not show any clear relationship with either speaker demographics or individual lexical items. Figure 4 shows a fully voiced alveolar fricative from TM1 of Tutuala, contrary to the predicted palatal stop. Figures 5 and 6 illustrate intraspeaker variation: while both figures show the same word produced by the same speaker, in figure 5, there is a clear voiced fricative, while in figure 6 there is a partially devoiced affricate.

Table 7: Realizations of lexical items targeting initial [z] in Tutuala in broad phonetic transcription (I use the tilde to separate different articulations from different repetitions, and the pound sign to indicate a pause between the frame and the target word. I use the IPA voiceless diacritic (a subscripted or superscripted circle) for segments that are partially devoiced.)

	TM1	TM2	TM3	TM4	TF1	TF2	TF3
‘ice’		dʒelu	#dʒelu~zelu	dʒelu~#dʒelu	#dʒelu	#zelu	
‘Jaco’ (place name)	dʒako			dʒako			
‘leg’	i.a	i.a	i.a	i.a	j:a	i.a	i.ait ⁴
‘self’		dʒen	dʒen ⁵	dʒen	dʒɛ̃n	#ʒɛ̃n~zɛ̃n	
‘wife’	ze.u	(#)dʒeu	dʒe.u	(#)dʒeu	dʒeu~#ʒe.u	#dʒeu~ ʒ zeu	ze.u~dʒe.u
‘road’		iapata	iapata ~iapata	dʒampata~ iapata	#tʒãmpata~zãmpata~ japata	zãmpata~ i.apata	i.apata

Table 8: Realizations of lexical items targeting initial [z] in Lospalos in broad phonetic transcription

	LM1	LM2	LM3	LM4	LM5	LM6	LF1
‘ice’	(#)dʒelu	#dʒelu		dʒelu~zelu	zelu	zelu~zelu fatuk	
‘Jaco’	(#)dʒako	dʒako	dʒako	zako	dʒako~zako	dʒako~dʒako	(#)dʒako
‘leg’	dʒi.a	ni.a~#dʒi.a	#dʒi.a	ni.a	zi.a	dʒi.a~dʒi.a	i.a~dʒi.a
‘self’	#dʒen hin	zenin~#zen		dʒen hin~dʒen hin		dʒen hin	
‘wife’	dʒeu	dʒeu~zɛu~zeu	dʒeu	zeu~dʒeu	ze.u	dʒeu~dʒeu	dʒeu~(#dʒeu
‘road’	(#)dʒambata ~i.apata	zampata		zampata~ #dʒampata ~dzampata ~i.apata		dʒãmpata~ iʔapata	

³ A seventh item targeting the initial voiced coronal obstruent, /zatu/ ‘airplane’, was produced only by the high-proficiency L2 speaker LM6—[aviãũn zatu]~[aviãũn dʒatu] ‘airplane’—and so is not considered further here. Other participants gave the Portuguese loanword /aviaun/ ‘airplane’.

⁴ There is a morpheme /=it/ used to express focus in Fataluku, which is the likely source of the final [t] in this form.

⁵ The initial [d] was not always clear in the productions of this speaker.

Figure 4: An example of a fully voiced alveolar fricative in the word [zeu] ‘wife’ (This token was produced by TM1 from Tutuala in the frame [ana zeu toto] ‘I see the wife’.)

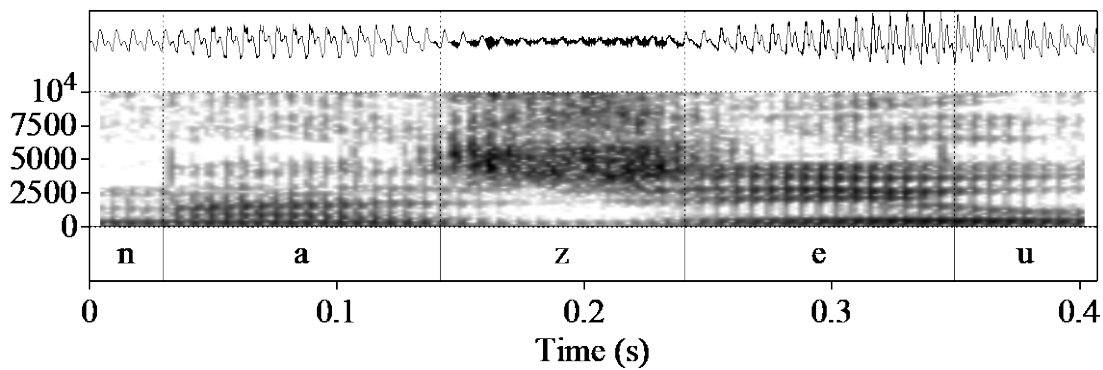


Figure 5: An example of a fully voiced alveolar fricative in the word [zeu] ‘wife’ (This token was produced by LM2 from Lospalos in the frame [ana zeu toto] ‘I see the wife’. Compare with figure 6, where the same speaker produced the same word with an affricate.)

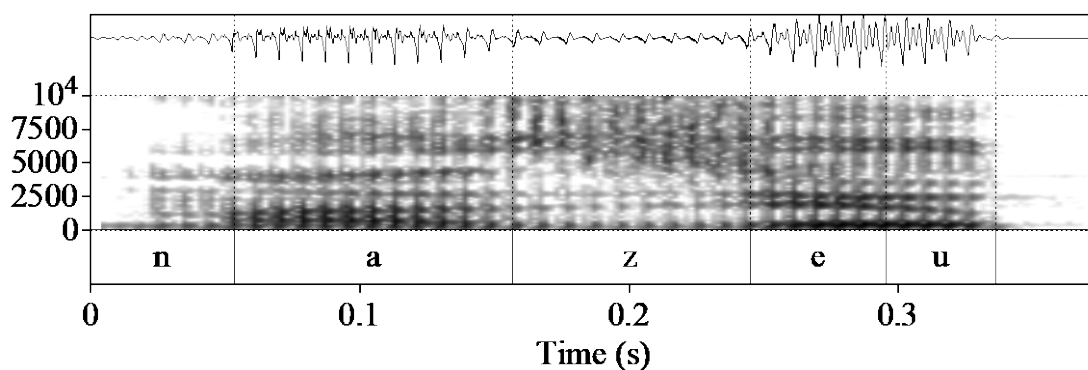
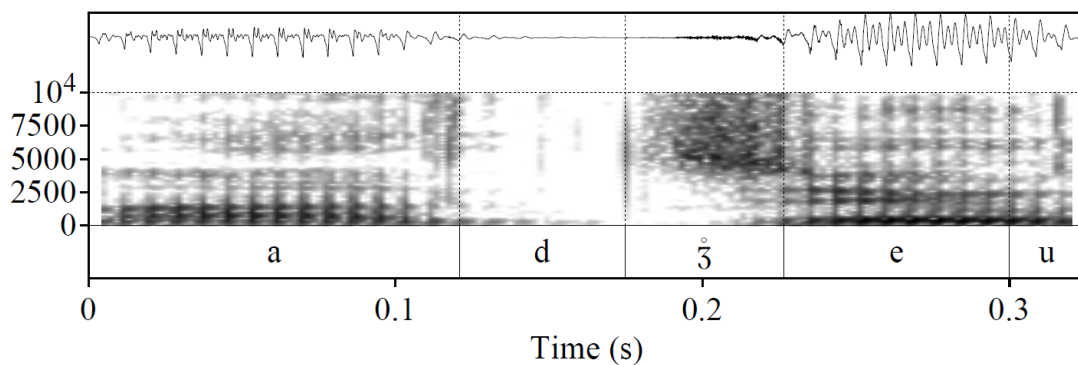


Figure 6: An example of an affricate in the word [d̥zeu] ‘wife’ (This token was produced by LM2 from Lospalos in the frame [ana d̥zeu toto] ‘I see the wife’. Compare with figure 5, where the same speaker produced the same word with a fricative. Note also the weakness of voicing in the transition between the stop and fricative portions of the affricate.)



The most common segment is the voiced postalveolar affricate [dʒ], which occurs in 56% of productions beginning with a voiced coronal obstruent. The next most common realizations are [z], which occurs in 24% of productions, and devoiced variants of [dʒ], which occur in 13%. Less frequently attested are [dz], [ʒ], [dʒ̥], and [z̥], as shown in figure 7. Devoicing was more common for some speakers than others (e.g., LM6 and TF1), but I find no clear demographic patterns. An example of a devoiced affricate is given in figure 8.

Figure 7: The distribution of different types of obstruents in initial position

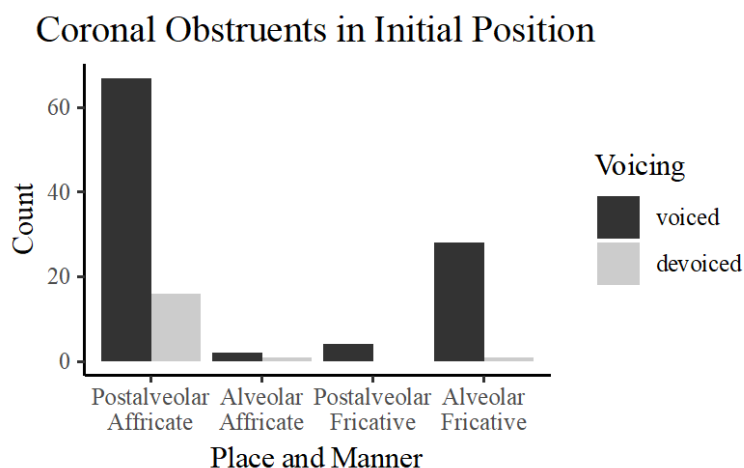
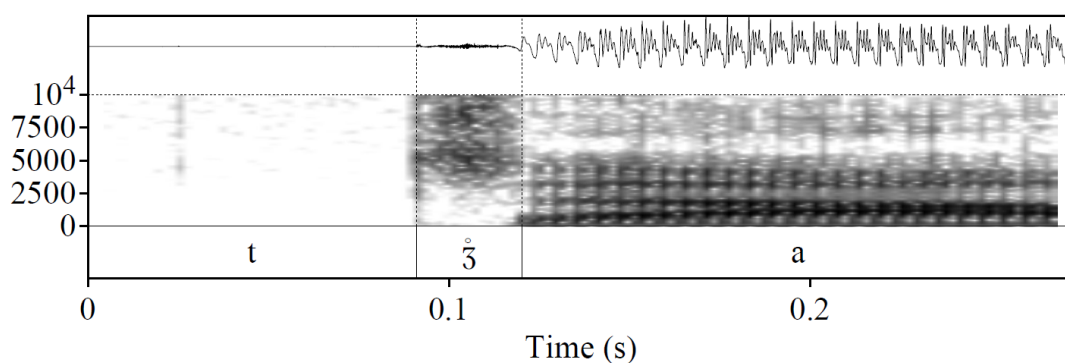


Figure 8: An example of a devoiced affricate produced by TF1 in the word [tʃampata] ‘road’ (Note that the thick voicing bar along the lower edge of the spectrogram begins only just before the end of frication.)



Though Fataluku does have both a voiceless affricate /tʃ/ and a voiceless fricative /s/, there is no evidence that any phonemic contrasts are collapsed. According to Heston (2015), Fataluku’s voiceless fricatives and affricates have on average 20-25ms of aspiration, but even the devoiced tokens of [z] or [dʒ] collected here show no aspiration. Devoicing has not been reported in previous descriptions of the language, and an acoustic comparison of phonologically voiced and voiceless affricates in Fataluku would make an interesting topic for future research.

Beyond these, few clear patterns emerge from the data. The individual word is a poor predictor of the type of obstruent that occurs, since both places and both manners occur in at least one token of each lexical item. The results do not follow any clear pattern based on speaker. Speakers are not consistent in their realizations, and may vary even across different realizations of the same word. For instance, in three repetitions of the list, LM2 has three different realizations for ‘wife’—[dʒ̥eu], [ʒeu], and [zeu] (see figures 5 and 6). A few speakers have only the postalveolar affricate realization in initial position (speakers LM1, LM3, LF1, TM2, and TM4), though no clear demographic patterns uniting these speakers emerge: these speakers differ in their ages, genders, and place of origin. At this point, I see no convincing evidence to treat this similarity as anything other than chance resemblance, especially given the low numbers of tokens involved.

Two words merit special attention, the word for ‘leg’ and for ‘road’, given in tables 9 and 10.

Table 9: Realizations of ‘leg’

	TM1	TM2	TM3	TM4	TF1	TF2	TF3
‘leg’	i.a	i.a	i.a	i.a	j:a	i.a	i.ait
	LM1	LM2	LM3	LM4	LM5	LM6	LF1
‘leg’	dʒi.a	ni.a~#dʒi.a	#dʒi.a	ni.a	zi.a	dʒi.a~dʒi.a	i.a~dʒi.a

Heston gives the phonemic transcription /zia/ for ‘leg’. Not all speakers produced an obstruent, however. All seven speakers from Tutuala have a realization like [i.a], which does not contain a voiced obstruent. Lospalos showed more variation; four speakers produced an obstruent realization in all repetitions [dʒi.a, zi.a, dʒi.a]; one speaker produced only [ni.a]; one speaker produced both [ni.a] and [dʒi.a]; and one speaker produced both [i.a] and [dʒi.a].⁶ The three participants from Lospalos who have non-obstruent realizations of ‘leg’ also behave most like Tutuala speakers in their productions of words with a medial voiced coronal, discussed below. Speaker TF1 also produced [j:a], a regular phonological reduction I found previously (Heston 2015).

Table 10: Realizations of ‘road’

	TM1	TM2	TM3	TM4	TF1	TF2	TF3
‘road’		iapata	iapata ~japata	dʒampata~ iapata	#tʒampata~ zampata~ japata	zampata~ i.apata	i.apata
	LM1	LM2	LM3	LM4	LM5	LM6	LF1
‘road’	(#)dʒambata~ i.apata	zampata		zampata~ #dʒampata ~dzampata ~i.apata		dʒāmpata~ iʔapata	

A final item meriting further comment is [zāmpata] ‘road.’ While around half of productions included an initial coronal obstruent ([z], [dʒ], or the like), the other half of productions have neither the expected initial obstruent nor the coda nasal, [iapata] ‘road’. Productions without an initial obstruent are not limited to a single subset of participants: realizations like [iapata] were attested from most participants from both Lospalos and Tutuala. As in [i.a]~[j:a] ‘leg’, reduction of the initial high vowel to a glide is also attested; cf. TM3 and TF1 [japata] ‘road’.

The best interpretation of these data is not clear. In previous work, I treated [zampata] and [iapata] as distinct lexical items with similar meanings (Heston 2015). Native speakers identify [zampata] ‘road’ as a loan word from Indonesian <jembatan> ‘bridge’,⁷ but the origin of [iapata] ‘road’ is not clear. The latter form may be related to the native word /iʔa/ ‘path’, ultimately from Proto-Timor *hika ‘path’ (Schapper et al. 2012). Alternatively, it is possible to see [iapata] as a form of [zampata] that has been more fully assimilated to Fataluku phonology by repairing the illicit nasal-stop sequence and replacing [z] with the more common /i/. The similarity between [iʔa], [i.apata], and [dʒampata] could also be a chance resemblance: more work on their historical relationships could help clarify this point.

4.2 Medial position

The data set included twelve lexical items with a voiced coronal obstruent or glide in a medial position, yielding 289 tokens relevant for analysis. Recall that both Hull (2005) and Heston (2015) report a phonemic contrast in Lospalos between /j/ and /z/ (or /dz/), while van Engelenhoven (2010) does not. Van Engelenhoven (2009) rather claims that medial [z] in Lospalos corresponds to [j] in Tutuala, suggesting that the distinction between [z] and [j] has more to do with sociolinguistic factors than lexical ones.

⁶ The [n] in [ni.a] likely has a morphological origin, since /-n-/ ‘INAL’ intervenes between possessive prefixes and vowel-initial inalienably possessed nouns (Heston 2015).

⁷ <http://www.kamus.net>, retrieved December 12, 2018.

The actual situation is much less simple than previous reports have suggested, especially for Lospalos. Tables 11 and 12 present the data for Tutuala; table 11 gives the realizations of words expected to have medial [j], while table 12 gives the realizations of words expected to have medial [z] (based on the lexicons of Heston [2015] and Nácher [2003, 2004]).

Table 11: Realizations of lexical items targeting medial [z] in Tutuala in broad phonetic transcription

	TM1	TM2	TM3	TM4	TF1	TF2	TF3
‘plantain’	ajan muʔu~mu	ajan mu	ajan mu	ajan mu	ajan mu:~ajan mu	m ajan mu~ajan mu	ajan mu porosina~ajan mu
‘rain’	aʒa~aja	aja	aja	aja	aja uta	aja uta~aja utan	aja
‘year’		ajira	aja.ira	ajira	ajaira	ajaira	

Table 12: Realizations of lexical items targeting medial [j] in Tutuala in broad phonetic transcription

	TM1	TM2	TM3	TM4	TF1	TF2	TF3
‘cockatoo’	kaja	kaja	kaja		kaja	kaja	kaja
‘cousin’		vajan	vajan	vajan	vajānũ	vajān	
‘juice’	vaja	vaja	vaja	vaja	vaja	vaja	vaja
‘mango’	pajah mana	pajah	pajah	pajah	pajah:	pajah:	pajah:
‘necklace’	paja	paja	paja mani	paja mani	pajā mani~paja	paja mani	paja i paja~paja
‘net’					kajale:~kajale	kajalivana	kajale:
‘place’							
‘tears’		inavaja	inavaja	inavaja	inavaja	inavaja	
‘boat’		lo.asu	lo:jasu	lo:jasu	lojasu~lqes	lojasu	

The data from Tutuala are remarkably consistent. Speakers from Tutuala have medial [j] for all tokens: this includes lexical items targeting medial [j], as well as those targeting medial [z]. There is a single exception: TM1 produced both [aja] and [aʒa] for ‘rain’. There is also some lexical variation in the word for ‘boat’. Most speakers had [lo:jasu], though TM2 gave [lo.asu] ‘boat’ and TF1 gave both [lojasu] and [lqes] ‘boat’.

The situation in Lospalos is much less straightforward. Based on preceding work on Fataluku, I hypothesized that some lexical items would have a glide realization for all speakers, and others would have an obstruent realization (such as [dʒ] or [z]). This is not the case, however. Table 13 shows data from lexical items expected to contain an obstruent realization, while table 14 shows those expected to have a glide realization.

Table 13: Realizations of lexical items targeting medial [z] in Lospalos in broad phonetic transcription

	LM1	LM2	LM3	LM4	LM5	LM6	LF1
‘plantain’	adʒan mu	ajan mu~aʒan mu		azan mu:	azān mũʔu	azan muu~aʒan muu	adʒān mũ:~aʒān mũ:
‘rain’	adza	aja~aja	adʒa	aja utan	aza	adʒa~aʒa~aza	aja
‘year’	adʒer~adʒira~adʒera	ajera		azaira	aza.ira	aza.ira~aʒa.ira	

Table 14: Realizations of lexical items targeting medial [ʃ] in Lospalos in broad phonetic transcription

	LM1	LM2	LM3	LM4	LM5	LM6	LF1
‘cockatoo’		kaja					
‘cousin’	vadžan~vadžan	vajan~wajan		vajan		βajan	
‘juice’	vadža	waja	vaza	vaja		βaja~vaja	vaja
‘mango’	padža	pajah	paza	pajah		pajah	pajahũ
‘necklace’	padža	paja			paja	paja	paja
‘net’							
‘place’				tajan alivana inavaja	taja	alivanat a: tʃaja	
‘tears’	inavaja	inavaja				inaβaja~inaβaja	
‘boat’	leɰ.asi	lo:jasu				loijasus	

Speakers do not follow the expected bipartite division. Instead, the distribution of glides and obstruents appears haphazard and differs substantially between speakers, as shown in figure 9. LM3 has obstruents in all instances, whereas LM2 has only one clear example of an obstruent, [aʒan mu] ‘plantain’. Other speakers produced a mix of glides and obstruents in varying ratios.

Obstruents were also more common than glides for certain lexical items. The three lexical items reported to have /z/ in the dictionary (/aʒan muʔu/ ‘plantain’, /aʒa/ ‘rain’, and /aʒaʔira/ ‘year’) had the highest percentage of obstruent realizations, though even these showed some variation. For instance, all but one of the 15 tokens of ‘plantain’ had an obstruent realization; on the other hand, ‘cockatoo’, ‘place’, and ‘boat’ showed only glide realizations. Figure 10 shows the proportion of obstruent realizations for each word. Speakers are usually consistent in using either an obstruent or a glide across repetitions, but there are instances of intraspeaker variation here as well (e.g., [aʒan mu]~[aʒan mu] ‘plantain’ from LM2).

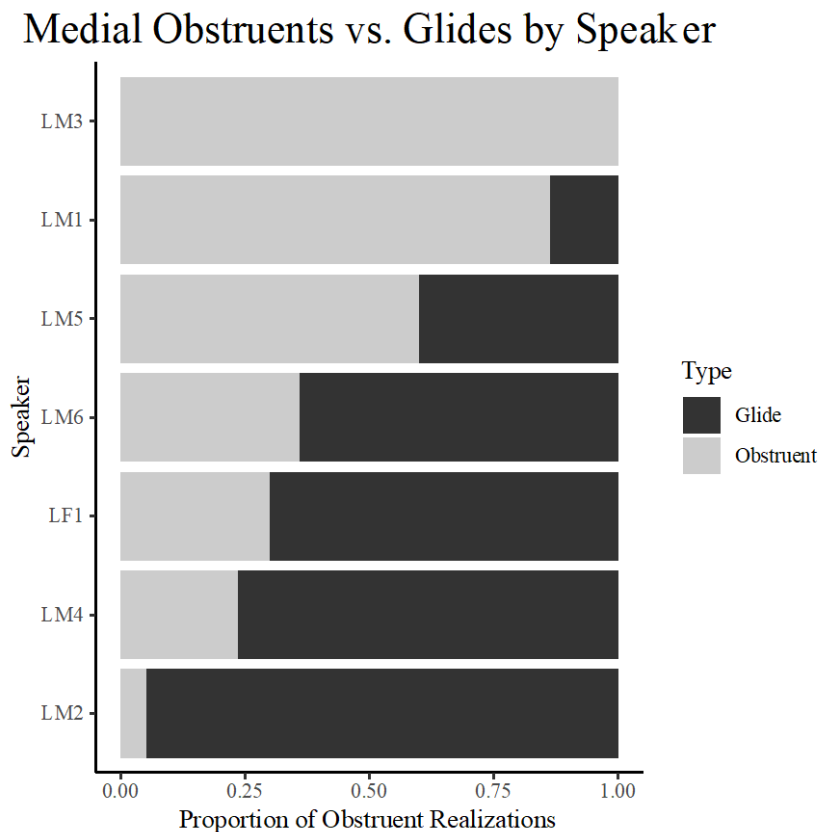
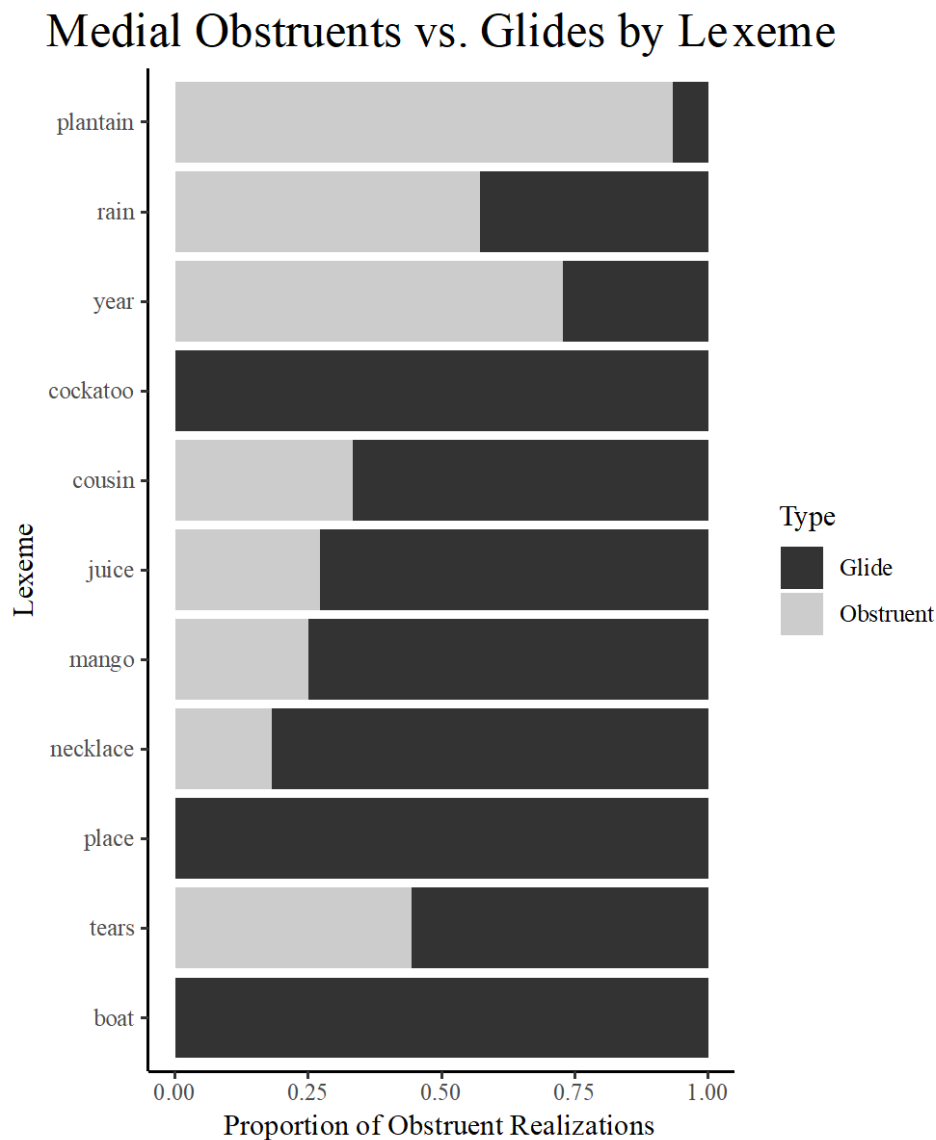
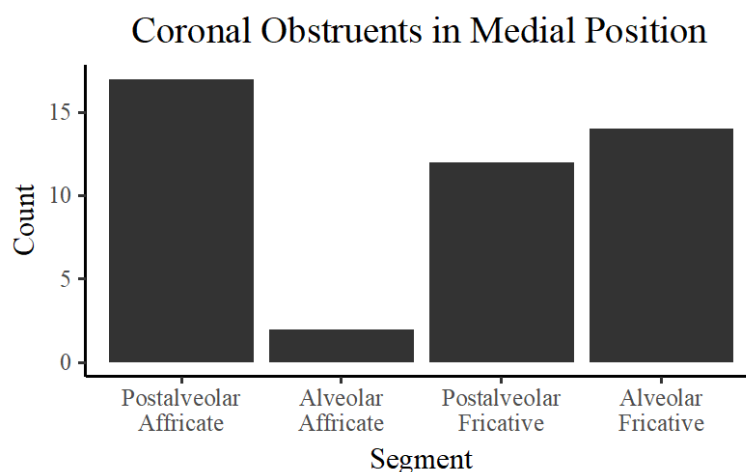
Figure 9: The proportion of obstruent realizations in medial position among participants from Lospalos, broken down by speaker

Figure 10: *The proportion of obstruent realizations in medial position among participants from Lospalos, broken down by lexeme*



Figures 9 and 10 group all obstruents together, though as in initial position, there is some variation in their precise phonetic realizations. As in initial position, [dʒ] is the most common voiced coronal obstruent in medial position (38%), followed by [z] (31%), as shown in figure 11. Unlike in initial position, I do not find devoiced tokens word-medially (though a devoiced [ʔ] was attested in the word [meʔa] ‘table’ during pilot research).

Figure 11: *The count of each type of coronal obstruent in medial position among participants from Lospalos*

5 Discussion

5.1 Summary

To sum up, we find several types of variation in the data. Tutuala Fataluku exhibits complementary distribution between voiced obstruents in initial position and glides in medial position. The data from Lospalos, however, are less clear cut. Lospalos also has obstruents in initial position, but exhibits more variation in medial position, where both obstruents and glides occur, depending on both the speaker and the word. While glides are more common in some words and for some speakers, there is no clear pattern. There is also a range of variation possible in the realization of obstruents, including [dʒ], [z], [dz], [ʒ], or devoiced versions.

5.2 The social interpretation of the data

The data collected here support van Engelenhoven's (2009) claim that speakers in Lospalos and Tutuala differ in their distribution of [j] and [z] medially. However, these data also differ in several ways from those given by van Engelenhoven (2009). Recall that van Engelenhoven reports a correspondence between Lospalos [z] and Tutuala [j] in initial position, and between Lospalos [z] and Tutuala [j] in medial position. While I do find a correspondence between medial [z] in Lospalos and medial [j] in Tutuala, I also find substantially more intra-region and intra-speaker variability than reported by van Engelenhoven, especially in the realizations of obstruents.

One of the most striking aspects of these data is the substantial difference in homogeneity between Lospalos and Tutuala. Data from Tutuala are highly consistent, while data from Lospalos exhibit a range of variation. The demographics of these populations shed light on the situation. While the participants in this study had each lived in the region in question for the majority of their lives, they differed significantly with regards to their parents' backgrounds. In general, the parents of Tutuala participants were also from Tutuala, while nearly all Lospalos participants had at least one parent from outside Lospalos; usually, their other parent was from another part of the Lautém district, though some participants had a parent who was not a native speaker of Fataluku.

Consider two speakers in Lospalos who showed substantial similarity to speakers from Tutuala, LM4 and LF1. LM4 had a large number of glide realizations word-medially, as well as having a non-obstruent realization for 'leg', like speakers from Tutuala. LM4's mother is from Com, a fishing village in the northeast. While no intensive work on the speech of this region has been done, in preliminary data from this village, palatal glides often occur intervocally where speakers from other villages have [dʒ] or [z]. The only female speaker from Lospalos, LF1, also had a higher percentage of glide tokens in medial position. This may be partly explained by the fact that LF1's father is from Lorehe, a town reported to be like Tutuala in its distribution of [z] and [j] (van Engelenhoven 2009). These data suggest that the background of participants' parents may have a substantial influence on their own speech.

The greater heterogeneity of participants from Lospalos is unlikely to be an artifact of the sample. Lospalos is the capital of the Lautém district, and therefore supports a larger number of monetary jobs than most other villages in the district. Most residents of Lospalos are native Fataluku speakers, though many come from different parts of the district. There are entire neighborhoods in Lospalos that are populated by newcomers. While individuals may move to the village of Tutuala from nearby, I do not see evidence for Tutuala exhibiting a comparable draw across the rest of the district.

The migrations that have taken place throughout Timor in the last several decades are central to understanding the language situation there. Because people have moved to Lospalos from all parts of the district, there is substantial diversity and variation in the speech of people from Lospalos. This is seen even in the speech of participants who have lived in Lospalos for their entire lives. While there undoubtedly also exist families who are long-term residents of Lospalos, even these speakers are likely to have a large amount of interaction with individuals originally from other regions.

5.3 *The phonological interpretation of the data*

A final question to be addressed is the phonological status of the segments examined here. Lospalos is reported to have a phonological contrast between /z/ and /j/ (Hull 2005, Heston 2015), while little has been written about the phonemic status of these sounds in Tutuala. Since this study has included most words containing either [z] or [j] which could be found in Nácher's (2003, 2004) dictionary or Heston's (2015) wordlist, I take the results obtained here as representative. In Tutuala, [z] and its variants are in complementary distribution with [j]. The most straightforward interpretation is that they are allophones of a single phoneme, conditioned by word-position (word-initial vs. word-medial). This analysis is strengthened by the fact that [dʒ] and [j] are similar phonetically, though it is not obvious whether this phoneme should be considered underlyingly an affricate, a fricative, or a glide.

The phonological interpretation of the data from Lospalos presents a more serious challenge. In my past work, I posited a phonemic contrast between /z/ and /j/ on the basis of consistent near-minimal pairs in the speech of participants like speaker LM5, e.g., /aza/ 'rain' and /paja/ 'liquid'. This contrast is also claimed to exist in the Lospalos variety by Hull (2005), though he provides no minimal pairs. While near-minimal pairs may be found in the speech of most participants from Lospalos, the seemingly haphazard distribution of glides and obstruents across data from different speakers calls into question the proposed phonemic contrast. The answer may lie in the fact that Lospalos Fataluku has been influenced by many different varieties of the language. If Lospalos forms a meeting ground between varieties that maintain a contrast between [j] and [z] and those that do not, this could go a significant way towards explaining their seemingly erratic distributions. Lospalos does not exist in isolation, and a broader understanding of variation in the Fataluku-speaking region would be particularly advantageous to understanding the language situation there.

6 Conclusion

To sum up, the distribution of [j], [z], and other voiced coronal obstruents differs between Tutuala and Lospalos, but not exactly in the ways previously reported. Tutuala has a voiced fricative or affricate in initial position and a glide in medial position, which I analyze as positional allophones of a single phoneme. Lospalos has a voiced obstruent in initial position, with variation between obstruent and glide realizations in medial position. Though many speakers have at least one near-minimal pair between voiced glides and obstruents medially, the distribution of these sounds varies significantly between speakers. Some speakers from Lospalos produced an obstruent in all tokens, while others' productions contained glides almost exclusively. Closer examination suggests that parents' place of origin may play a significant role. Today's Lospalos is heterogeneous, home to speakers from across the district. The data collected here suggest that varieties of Fataluku spoken in Lospalos may be affected by speech varieties that exhibit a distinction between medial coronal obstruents and glides, as well as those that do not.

There is an acute need for further work on variation in Fataluku across the district. Relatively little is known about Fataluku varieties spoken outside of Lospalos and Tutuala. In addition to the intrinsic value of broadening the research scope, a better understanding of the Fataluku varieties spoken in participants' parents' villages could greatly illuminate patterns of language usage within Lospalos. Closer examination of the other phonetic variables reported to vary by van Engelenhoven would also help to develop a more complete picture of the language situation. Future work should also expand beyond phonetically-controlled speech to examine more naturalistic data. A broader data set would allow evaluation of variation in other components of the

grammar, including morphology, syntax, and lexicon, as well as allowing exploration of how speakers of Fataluku use variation to portray regional, ethnic, gender, and national identity.

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Appendix – Wordlist

This appendix gives the lexical item targeted by each picture in this study, along with an English gloss, by the block in which they were elicited. Words were presented in pseudorandom order within each block. Targeted forms are given here in phonemic transcription (based on the written source they were drawn from).

Block 1

aza	‘rain’
azan muʔu	‘plantain’

ala	‘wild sweet potato’
alar	‘species of acacia’
apa	‘mountain’
ara	‘plant’
bola	‘ball’
tsaʔa	‘fish poison’
tsaa	‘tea’
tsee	‘parable’
tsii	‘thunderstorm, lighting’
tipitsipi	‘flower’
tsoo	‘distant’
tsoro	‘spear’
tsura	‘rat’
tsuu	‘hut’
dosi	‘cake’
gojabas	‘guava’
hafa	‘bone’
hama	‘banyon’
hasa	‘leaf’
huula	‘spoon’
zako	‘Jaco (name of well-known island in the Fataluku-speaking region)’
zeu	‘wife’
zia	‘leg’
kaja	‘cockatoo’
kajalau	‘mosquito net’
kaka	‘older brother’
kolo	‘mute person’
lau	‘cloth’
leʔu	‘fur’
leu	‘basket’
matsamatsa	‘butterfly’
motso	‘child’
modo	‘vegetables’
nana	‘snake’
oʔo	‘mouth’
paza	‘liquid’
pala	‘farm’
paja	‘necklace’
pajah	‘mango’
petun hahal	‘young bamboo shoot’
posi	‘cat’
raʔu	‘plate’
roso	‘fish trap’
savan	‘soap’
vata	‘coconut’
vaja	‘juice’

Block 2

atsa	‘chicken’
azaʔira	‘year’
akatana	‘burped up food’
asi taʔu	‘lobster, octopus’
aur tsatsar	‘coral’
tsaʔu tapun	‘head’

tsapuk	‘crab’
tsetsen	‘pineapple fruit, screw pine fruit’
tsele	‘corn’
tsila	‘frog’
tsoitsoihana	‘mortar’
dili	‘Dili (the capital of Timor; a non-native word in Fataluku)’
doutor	‘doctor’
erekana	‘vine’
fanavana	‘teaching’
fanu	‘face’
feel kaʔu	‘arrow’
hootsava	‘God’
iʔir	‘whetstone’
iʔa	‘path’
inavaja	‘tears’
zampata	‘road’
zatu	‘airplane’
zelu	‘ice’
zen hin	‘self’
kadera	‘chair’
keʔer	‘ladder’
kutsa	‘horse’
lava	‘insect that attacks cotton’
loho	‘animal pen’
loojasu	‘canoe’
maʔar	‘person’
matsa	‘bat’
matsematsen	‘food’
muʔu	‘banana’
muʔa	‘soil’
pata	‘log’
rapu	‘spinach’
ria	‘mother's brother's son’
riki	‘a type of large round basket with a lid’
saka	‘abalone’
tazan-alivana	‘bedroom (lit. sleeping place)’
tapalana	‘saddle’
tava	‘him/her (generic third person pronoun)’
too	‘cup’
uʔan	‘heart’
ufutana	‘froth’
vahu	‘eel’
vali	‘ear’
vili	‘bell’
viti	‘carpet’

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