THE SEGMENTAL AND SUPRASEGMENTAL PHONOLOGY OF FATALUKU

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE UNIVERSITY OF HAWAI‘I AT MĀNOA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

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ABSTRACT

This dissertation describes the segmental and prosodic phonology of Fataluku (IPA [fataluku], ISO 639-3 ddg), a highly underdocumented Papuan language in East Timor (island Southeast Asia). Fataluku is classified as a member of the Timor-Alor-Pantar language (TAP) family, which currently includes approximately 25 members spread across Timor and nearby islands (Klamer, 2014; Schapper et al., 2014). Topics discussed include Fataluku’s phoneme inventory, its segmental and prosodic phonological substitutions, its prosodic structure, its word-level prosody and its sentence-level intonation. A grammar overview, wordlist and glossed text are also included.

Fataluku has SOV word order and makes extensive use of verb serialization and switch reference. The phoneme inventory includes 5 vowels and 15 consonants, in addition to three loan phonemes (the voiced stops /b/, /d/ and /ɡ/). Surface long vowels and diphthongs also occur, though both are represented underlyingly as vowel sequences (identical in the case of long vowels, nonidentical in the case of diphthongs).

As for prosody, I find no convincing evidence for stress in Fataluku, although bimoraic feet play an important role in several aspects of the phonology. Prosody at the word level is governed by accentual phrases (APs), prosodic units containing a single word or a few syntactically close words. APs are organized into intonational phrases (IPs), prosodic units which bear a complete intonational contour and which can occur bounded by silence.

This dissertation has implications for historical-comparative work in the region, as well as for the study of prosodic theory and typology more generally. This work also contributes to the Timorese Ministry of Education’s vision to establish mother tongue literacy among the Fataluku people and each of the country’s other indigenous linguistic groups.
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<tr>
<td>1,2,3</td>
<td>first, second, third person</td>
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<tr>
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<td>indefinite article</td>
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<td>numeral classifier for humans</td>
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<td>copula</td>
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<td>demonstrative</td>
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<td>distal</td>
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<td>different subject</td>
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<td>FUT</td>
<td>future</td>
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1 INTRODUCTION

This dissertation presents a grammar sketch and detailed description of the segmental and prosodic phonology of Fataluku (IPA [fataluku], ISO 639-3 ddg), a highly underdocumented Papuan language of island Southeast Asia. Fataluku is spoken by approximately 37,000 individuals on the eastern end of the nation of East Timor, an independent island-nation in the southeastern part of the Indonesian archipelago (Lewis et al., 2013). This work aims to contribute to the great need for documentation of understudied languages, with particular significance for prosodic theory and typology and the reconstruction of language history in island Southeast Asia. A complementary aim is to establish a robust linguistic base for the mother tongue literacy program currently being piloted by East Timor’s Ministry of Education.

This chapter introduces the language context and describes research methodology and conventions. Section 1.1 provides a general background on the geographic, historical and linguistic context of Fataluku. Sections 1.2.1 and 1.2.2 discuss the goals and theoretical framework of this work, respectively. Section 1.2.3 describes the data on which this dissertation is based, while section 1.2.4 describes conventions for the citation of examples and statistical data. The chapter concludes with an overview of the content of following chapters.

1.1 Language Background

1.1.1 Geography and History

Fataluku is a language indigenous to the island of Timor, in island Southeast Asia. The island is located north of Australia, between the islands of Java and Bali in the west and New Guinea to the east, as shown in figure 1.1. It is located 8 degrees south of the equator, and has a tropical climate with both a rainy season and a dry season. The rainy season is during the southern hemisphere summer, and the dry season is during the southern hemisphere winter.

The island of Timor is divided politically into West Timor (governed by Indonesia) and East Timor (which gained independence from Indonesia in 2002). The delineation between East and West Timor dates to the early colonial period, when West Timor was a Dutch colony. East Timor, on the other hand, was colonized by the Portuguese, and remained an official colony from the 1500s to 1975. Even though East Timor was officially a colony of the Portuguese for nearly 500 years, Portuguese influence was relatively small for most of that time, especially outside of the major cities (Hajek, 2000).
In 1975, Timorese political leaders declared independence from Portugal. This declaration was met with political unrest, and during the ensuing turmoil, the Indonesian government took power. The Indonesian government remained in full power until 1999, when the Indonesian government gave the Timorese the option to vote about independence. The vast majority of the population voted for independence, but independence was not actualized until three years later. During the time from 1999-2002, there was extreme turmoil in East Timor. Militia in favor of Indonesian rule killed many Timorese during this time. Eventually, the United Nations intervened, sending military forces to restore order and establish East Timor’s independence. East Timor regained independence officially on May 20, 2002 (Hajek, 2000, 2006; Government of Timor-Leste, 2015).

1.1.2 Language Situation in Timor

When the new government was established, it was determined that the official languages should be Portuguese and Tetun Dili (Language in Education Working Group, 2010). During my time in Timor (July 6-27, 2014), I observed that there were generally quite positive feelings toward the Portuguese people and their language. I saw many Portuguese and Brazilian flags, and these two
teams were undisputed national favorites during the World Cup (which took place during my stay). Native-like proficiency in Portuguese was rare, but most people I interacted with had positive feelings towards the language and knew at least some Portuguese.

Proficiency in the other official language, Tetun Dili, is much more common. Tetun Dili (sometimes known simply as “Tetun”) is a contact language spoken natively in the capital, Dili, and used as a lingua franca throughout the rest of the country. Tetun Dili takes a significant portion of its lexicon from Portuguese, as well as the indigenous Austronesian language Tetun Terik. Williams-van Klinken (2011) explains that Tetun Terik has been much less influenced by contact, and is generally spoken only by the people from the Tetun Terik cultural group. Tetun Dili, on the other hand, has been heavily influenced by Portuguese contact, and has become much more simplified in its morphology. The two are probably no longer mutually intelligible (Lewis et al, 2013).

The Timorese constitution also designates English and Indonesian as “working languages,” an official recognition of their importance in various domains (Language in Education Working Group, 2010). From my observations, fluency in English is relatively rare, although I did meet a number of young people with varying degrees of proficiency in English. On the other hand, many Timorese are fluent in speaking as well as reading Indonesian, as a result of Indonesian occupation. The term “Indonesian” itself is worthy of special comment, since it may carry negative connotations for Timorese as a result of the period of occupation. The dialect of Malay spoken in Indonesia was first called “Indonesian” by young political activists in 1928, towards the end of the Dutch colonial period, and has been associated closely with Indonesian nationalism (Quinn, 2001). As a matter of political correctness and deference to the Timorese, I have chosen to use the term “Malay” throughout the body of this work, though the term should be taken here to refer to no other than the Indonesian dialect of Malay.

In addition to Portuguese, Tetun Dili, English and Indonesian Malay, East Timor is home to approximately 20 indigenous languages (although an exact count has yet to be agreed upon; see Hajek, 2000, 2006; Lewis et al, 2013). Figure 1.2 shows the geographic domains of East Timor’s indigenous languages. Of these, four are Papuan languages, namely Fataluku, Makalero, Makasae and Bunak, and the rest are classified as Austronesian. The Ethnologue lists a fifth Papuan language, “Adabe” (Lewis et al, 2013), though Hull (2004) calls into question the existence of this language, and I have not been able to find any conclusive evidence for its existence. The Papuan languages Fataluku, Makalero, Makasae and Bunak, however, have recently been convincingly argued to be related to one another and to about 20 other Papuan languages spoken on the nearby Indonesian islands of Alor and Pantar, in a language family called Timor-Alor-Pantar (TAP) (Klamer, 2014; Schapper et al, 2014). Schapper et al. 2014 presents a
preliminary reconstruction of the consonants of Proto-Timor-Alor-Pantar (PTAP), a groundbreaking paper which has laid the groundwork for continued reconstruction.

Of the Papuan languages spoken on Timor, Bunak is spoken roughly in the center of the island, straddling the border between East Timor and Indonesian West Timor, while the other three languages are spoken towards the eastern end of the island (Lewis et al., 2013). Fataluku is spoken in the easternmost district of East Timor, known as Lautém (or, as it is most commonly referred to by its inhabitants, Lospalos). Lospalos is also the name of the village that serves as the capital of the district. There is a fairly good correspondence between the Fataluku-speaking region and the Lospalos district, although in some villages in the southwestern corner of the district the related language Makalero is spoken.
1.1.3 Linguistic Ecology: Level of Vitality

In my estimation, Fataluku is a vital, viable language at present, but is at risk from language shift to Tetun in the future. Estimates of the number of Fataluku speakers range from 30,000 to 37,000 (van Engelenhoven, 2009; Lewis et al, 2013). During my time in Lospalos, most speakers I interacted with were also fluent in Tetun, Malay or both. In spite of this widespread multilingualism, Fataluku is the preferred means of communication for most domains of life. Fataluku is in wide general use in the home, on the school yard and in the markets. Schooling has not traditionally taken place in Fataluku, but the department of education is piloting a mother-tongue literacy program to introduce literacy in Fataluku into early primary education (Language in Education Working Group, 2010). The school-aged children I met all spoke Fataluku; although I am not proficient enough in the language to judge their level of fluency, I assume they all spoke Fataluku natively. The Protestant church I visited used an eclectic mixture of Malay (for Bible reading), Tetun Dili (for singing) and Fataluku (for announcements and the sermon; the pastor also gave extemporaneous translations of Malay Bible verses in Fataluku for the congregation). I assume the main reasons for the use of Malay and Tetun were the lack of a Bible or song book in Fataluku.

Based on these observations, I would say that Fataluku is vital, and appears safe in the short term. However, there are signs of risk for the future. The high levels of multilingualism could be seen...
as a threat to the language’s vitality, since a complete shift to Tetun would be very easy logistically. There is also a general trend to move away from agriculture to a more Western, cash-based economy, and many young people are moving to the nation’s capital, Dili, to find jobs.

The journey between Lospalos and Dili takes approximately 8 hours by one of the local buses, which make the route daily along the north coast of the island. While these young people still speak Fataluku, it is concerning that their children might not. As far as intergenerational transmission within Lospalos, one of the few preschool-aged children with whom I had the opportunity to interact refused to speak Fataluku, and chose to speak Tetun with everyone, in spite of being raised in a Fataluku-speaking household. While at present, there exists no way for me to gauge the level to which this child’s behavior is representative, this example does illustrate the fragility of minority languages. Thus, Fataluku is vital at present, but there is risk to switch to Tetun Dili in the future.

1.1.4 Language Documentation and Description

As a whole, the Timor-Alor-Pantar (TAP) language family is rather underdocumented, though some excellent strides towards the documentation of these languages have been made in recent years. At present, Fataluku is the least documented of the TAP languages on Timor. Grammars currently exist for Makalero (Huber, 2011), Makasae (Correia, 2011) and Bunak (Schapper, 2009). There was a short ethnography, text collection, grammar sketch and wordlist completed in the 1930s on Oirata, a close relative of Fataluku spoken on the nearby Indonesian island of Kisar (de Jong, 1937).

Fataluku has been the focus of only a few scholarly publications, and the language remains very poorly understood. The first major work on Fataluku was a French dissertation written by Henri Campagnolo in 1973; however, unfortunately, because of questionable analyses and an unclear theoretical framework, this work is of limited usefulness. More recently, there was a short booklet on Fataluku morphosyntax written by Geoffrey Hull (2005), which gives translated (but unglossed) examples of various syntactic categories and phrase types, together with some analytic statements.

The documentation of the lexicon has proceeded somewhat better. There exists a one-way Fataluku-Portuguese dictionary, compiled by a priest, published in two parts (Nácher, 2003, 2004). There are reports of a quadrilingual Fataluku-Portuguese-Tetun-English version of this dictionary, but I have been unable to locate a copy. Nácher’s dictionary has also been made into an electronic dictionary (with some additions), searchable at [www.fataluku.com/dictionary/]. This electronic dictionary provides translations between Fataluku, English, Tetun, Malay and Portuguese. A downside of this dictionary is that there is no apparent way to browse entries,
which also makes it difficult to approximate the number of entries. There is also some variation between the data in the dictionary and the lexical items used by my language consultants, indicating that the dictionary may have been based on a different dialect than that reported here.

There have also been a few articles on various aspects of the language. Stoel has published a conference paper and given a few other presentations about the prosody of the language (Stoel, 2007a,b, 2008). One of his primary claims is that Fataluku has phonemic tone. While he does make some insightful observations about the data, I propose that this data can be better explained through reference to intonation (an analysis I develop in detail in chapter 5). Another author, Aone van Engelenhoven (2009, 2010), has published two articles on the morphosyntax, one paper on derivational morphology and another on several related verbal phenomena, which he subsumes under the label of “verb serialization.”

1.2 The Present Dissertation

1.2.1 Goals and Contributions
The primary goal of this dissertation is to give a detailed account of the phonological system of Fataluku, as well as a sketch of its grammar. The scope of this dissertation includes Fataluku’s phoneme inventory, phonological rules and processes, word-level prosody, hierarchical prosodic structure and intonational grammar, along with brief discussions of morphology, sentence structure and several of the most common syntactic phenomena. This work contributes to the study of intonational theory and typology by describing the prosody of a language that is very different genetically, geographically and typologically from most well-described languages, as well as providing a more robust foundation for work on the diachronic phonology of the TAP family. It also contributes to fieldwork methodology by illustrating the use of a number of complementary strategies for deducing the prosodic structure of an understudied language. Another aim of this dissertation is to inform the development of literacy and native-language education among Fataluku speakers.

1.2.2 Theoretical Framework
In my analysis, I draw insight from Natural Phonology (Donegan & Stampe, 1979). A key feature of Natural Phonology (NP) is that it highlights the distinction between natural, phonetically motivated phonological “processes,” and “rules,” which do not have direct phonetic motivation, but are simply applied by speakers by convention. NP is a useful tool for the examination of Fataluku, since there exists a clear distinction between processes and rules.
My discussion of prosody and intonation is situated within the “autosegmental-metrical” (AM) theory of intonation (e.g., Pierrehumbert, 1980; Ladd, 1996, 2008). The theory is “autosegmental,” since it assumes that intonational tones exist on their own tier underlyingly (a theoretical construct drawn from the autosegmental analysis of lexical tone in African languages), and “metrical” since it makes reference to a hierarchy of prosodic constituents (such as the phonological word or intonational phrase) in the association of intonation to the segmental material.

In the AM model, the phonological structure of intonation is represented underlyingly as a sequence of intonational tones. These intonational tones are very different from the systems of lexical tone present in languages like Mandarin or Thai, or African tonal languages, since they are not associated with individual lexical items underlyingly, nor do they distinguish morphemes from one another. Instead, each intonational tone is associated at the postlexical level either with a prominent syllable (a “pitch accent”) or with the edge of some prosodic constituent (a “boundary tone”).

The “surface form” of intonation, the intonational contour, is a result of continuous interpolation between discrete tones. The inventory of intonational tones and the rules for associating these tones with prosodic phrases and segmental content are language-specific. Using the AM framework for the study of intonation is a clear choice, because it is simple, elegant, and is the standard for intonation research. Using this framework also allows Fataluku to be directly compared to the growing number of languages that have been described in this framework.

1.2.3 Data and Software
The primary empirical foundation of this dissertation is a corpus of recordings of wordlists, sentences and larger discourses, which are currently being archived in the Kaipuleohone archive housed at the University of Hawai‘i at Mānoa. Recordings were made with solid-state digital recording equipment (especially the Zoom H4n and Zoom H6 handheld recorders) in the quietest locations possible. Most recordings were made in a quiet room or on a quiet porch. Whenever practicable, a unidirectional headset condenser microphone (the Shure WH30 or Shure SM35) was used to attenuate background noise. Recording quality has been overall quite good for recordings made outside of the laboratory, and most recordings are useful even for fairly detailed phonetic analyses. Phonetic analysis was performed using the computer program Praat (Boersma & Weenink, 2013), and all spectra, spectrograms, waveforms and pitch tracks were created in Praat, using a modified version of a Praat script created by Pauline Welby. Statistical analysis were performed in the R software environment (R Core Team, 2014), using especially the
packages nlme (Pinheiro et al., 2014), lme4 (Bates et al., 2014) and gmodels (Warnes, 2013). Graphs were created in R using the package ggplot2 (Wickham, 2009).

Recordings were collected from a number of native speakers of Fataluku. The majority of the data are from male speakers in their twenties or thirties from Lospalos or Com, although three of the speakers were female (two in this age range, and one in her fifties) and several speakers were older males. Geographically, the majority of the data are from speakers who grew up in Lospalos or Com, but the villages Muapitin and Lorehe are also represented. In spite of previous reports of substantial dialect variation (see especially Lewis et al., 2013; van Engelenhoven, 2009), the language varieties recorded here were in general quite similar, with much less variation than reported. It is probable that there was dialect variation which I had no opportunity to observe (as a result of logistic limitations), though the present data suggest that dialect variation is less significant than was previously reported.

Examples in this dissertation bear a code indicating the speaker who uttered the example. Table 1.1 summarizes basic demographic information for the primary consultants for this project.

<table>
<thead>
<tr>
<th>Code</th>
<th>Gender</th>
<th>Age</th>
<th>Home Village</th>
</tr>
</thead>
<tbody>
<tr>
<td>LE</td>
<td>M</td>
<td>mid 20s</td>
<td>Lospalos</td>
</tr>
<tr>
<td>JL</td>
<td>M</td>
<td>early 20s</td>
<td>Com</td>
</tr>
<tr>
<td>PL</td>
<td>M</td>
<td>early 20s</td>
<td>Com</td>
</tr>
<tr>
<td>JD</td>
<td>M</td>
<td>low 30s</td>
<td>Com</td>
</tr>
<tr>
<td>LI</td>
<td>F</td>
<td>early 30s</td>
<td>Com</td>
</tr>
<tr>
<td>NP</td>
<td>M</td>
<td>early 30s</td>
<td>Lospalos</td>
</tr>
<tr>
<td>LJ</td>
<td>M</td>
<td>late 20s</td>
<td>Muapitin</td>
</tr>
<tr>
<td>AJ</td>
<td>M</td>
<td>early 20s</td>
<td>Muapitin</td>
</tr>
<tr>
<td>Ld</td>
<td>F</td>
<td>20s</td>
<td>Lorehe</td>
</tr>
<tr>
<td>P</td>
<td>M</td>
<td>50s</td>
<td>Lospalos</td>
</tr>
<tr>
<td>N</td>
<td>F</td>
<td>50s</td>
<td>Lospalos</td>
</tr>
</tbody>
</table>

Table 1.1: Speaker metadata

In addition to being tagged for the speaker, syntactic examples are tagged with a code indicating the text from which they are drawn, summarized in table 1.2. If an example was translated from English or another language, rather than arising as a natural language example, the code “Elicit” is used.

My experience with Fataluku began in a year-long Field Methods course at the University of Hawai‘i at Mānoa. Some of the basic facts about the nature of the language, such as its phoneme inventory and the essential principles of its grammatical organization, were discovered collaboratively through the course of this class. I am grateful to my classmates Tobias Bloyd,
Table 1.2: Metadata for texts from which examples have been drawn. Genre types include traditional narratives (trad. narrative), modern narratives (mod. narrative), instructional texts (procedural) and one text that was elicited from a blank picture book, “Frog, Where are You?” written by Mercer Mayer (2003).

Victoria Chen, Tom Dougherty, David Iannucci, Paula Kiesling, Stephanie Locke, Colleen O’Brian and Sean Simpson for their willingness to work together and share ideas. I cite the source of all conclusions for which a clear source is distinguishable, though I also wish to note the beneficial influence of their collaboration on my approach to Fataluku as a whole.

1.2.4 User Guide

Anatomy of an Example

This dissertation follows disciplinary conventions in the presentation of data. Underlying forms are enclosed in slanted brackets (/. . . /), phonetic forms are enclosed in square brackets ([. . . ]), orthographic forms are set in italics (see section 3.5 for more on orthography) and glosses are in single quotes. Phrase or sentence examples are presented following the Leipzig glossing rules (Comrie et al., 2008). A space indicates a word boundary, a hyphen indicates a word-internal morpheme boundary and an equals sign indicates a clitic boundary. Examples typically give only orthographic forms, though in some cases, both an orthographic and a phonemic level are shown. Example (1) shows a typical glossed example. The code (JD:Cura) indicates that this sentence was uttered by the speaker JD in the story *Cura*. Consultation of tables 1.1 and 1.2 reveals that JD is a speaker from Com village in his 30s, and the full name of the story is *Cura ho kuca* “The Rat and the Horse,” a traditional narrative. Glossing abbreviations are given on page xvi.

\[
\begin{align*}
\bar{a} & \quad \text{emer moh-e} \\
2.SG.SBJ & \quad \text{first run-VB}
\end{align*}
\]

‘You run first’ (JD:Cura)
Guide to Statistics
Throughout this work, I make frequent use of statistical analyses of phonetic data. The type of statistical test I use most frequently is known as a linear mixed-effects model (see Field et al., 2012). The linear mixed-effects model is in the same family of statistical tests as the analysis of variance (ANOVA), but allows easier comparison of multiple factors and handles interspeaker variation in a statistically more robust way.

A linear model measures the effect of one or more predictor variables on an outcome variable. The model reports the numeric impact (the \( b \)-value) of each predictor on the outcome variable and the likelihood the effect is due to chance (the \( p \)-value). The most basic case is chosen as the “reference category” (also called the “Intercept”), and other conditions are compared with this most basic case to determine the size of their effect.

It is instructive to look at an example. Table 1.3 reports the results of a mixed-effects model examining the effects of place of articulation and word-position (initial vs. medial) on stop voice onset time (measured in milliseconds, where a millisecond is \( \frac{1}{1000} \) of a second). In this example, as in most examples in this dissertation, the predictor variables are binary categorial variables (though continuous predictor variables are also possible). The first predictor variable is a binary value for labiality (0=nonlabial, 1=labial), the second is a binary value for velarity (0=nonvelar, 1=velar) and the third predictor variable is a binary value for word-position (0=word-initial, 1=word-medial). The intercept is the condition in which all predictor variables are zero, that is, the value for nonlabial, nonvelar, initial stops (i.e., word-initial alveolar stops).

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>( b )</th>
<th>SE</th>
<th>95% CI</th>
<th>( p )-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept (initial alveolar)</td>
<td>16.21</td>
<td>1.59</td>
<td>13.11, 19.31</td>
<td>( p &lt; .0001 )</td>
</tr>
<tr>
<td>Labial (0=nonlabial, 1=labial)</td>
<td>3.04</td>
<td>1.89</td>
<td>-0.64, 6.72</td>
<td>( p = .11 )</td>
</tr>
<tr>
<td>Velar (0=nonvelar, 1=velar)</td>
<td>25.09</td>
<td>1.75</td>
<td>21.68, 28.51</td>
<td>( p &lt; .0001 )</td>
</tr>
<tr>
<td>Position (0=initial, 1=medial)</td>
<td>1.18</td>
<td>1.56</td>
<td>-1.87, 4.22</td>
<td>( p = .45 )</td>
</tr>
</tbody>
</table>

Table 1.3: Linear mixed-effects model of the effects of place of articulation and word position on VOT (in ms)

The first line of each table reports the value of the intercept, or reference category, which in this case represents the typical VOT of an initial alveolar stop. The \( b \) value is 16.21, which indicates that initial alveolars are expected to have voice onset times of around 16.21 ms. The \( p \)-value is less than .0001, meaning the likelihood that this effect is due to chance is less than .0001, or .01%. By convention, any \( p \)-value less than .05 is taken to be significant. I use boldface to highlight rows that are significant.
The next row, “Labial”, shows the effect of labiality on VOT. The $b$ value is very small, 3.04, indicating that a labial stop is only expected to be about 3ms longer than a comparable alveolar stop. Additionally, the $p$-value is .11, meaning there is an 11% chance this effect is simply a result of chance. Velars, on the other hand, are about 25ms longer than alveolars on average ($b = 25.09$), a highly significant effect ($p < .0001$). $SE b$ represents the standard error of the effect, or the amount the mean effect could be expected to vary across samples. The confidence interval (95% CI) gives the expected minimum and maximum values of the effect: 95% of cases are expected to fall between these minimum and maximum values.

### 1.2.5 Dissertation Overview

Chapter 2 provides a general overview of the phonology, morphology, syntax and historical relationships of the language. Chapter 3 presents a detailed investigation of the phoneme inventory, providing acoustic analysis of certain properties, such as stop voice onset time and fricative spectral characteristics. Special attention is given to the phonological analysis of complex segments, such as the affricate [ts], long vowels and diphthongs. Chapter 4 catalogs key phonological processes and rules, many of which are also relevant for other parts of the description.

Chapter 5 deals with the question of word-level prosody, concluding that there is no support for stress, lexical tone or lexical pitch accent in Fataluku. Rather, word-level prosody consists of a high intonational tone whose placement depends on both foot structure and the syntactic and semantic cohesion between adjacent words. Chapter 6 deals with sentence-level intonational patterns, focusing on the effect of sentence type (declarative, polar question, $wh$-question, etc.) on intonation. The dissertation is rounded off with several appendices. Appendix A gives a text transcribed and glossed according to the Leipzig glossing conventions (see Comrie et al., 2008). Appendix B is a Fataluku-English wordlist, and Appendix C gives an English-Fataluku finderlist.
2 GRAMMAR OVERVIEW

Because of the general scarcity of information about Fataluku, this chapter gives a broad overview of its phonology, morphology and syntax. Section 2.1 gives a terse summary of my analysis of the phonological structure of Fataluku, which is substantiated in much greater detail in later chapters. Section 2.2 gives a brief overview of basic word order patterns, while section 2.3 describes Fataluku’s basic syntactic categories (parts of speech) and the patterns of bound morphology that occur with each. Section 2.4 describes noun phrases, including possession and the ordering of elements within the noun phrase.

Section 2.5 turns to verb phrases and the formation of simple clauses. One particularly interesting aspect of Fataluku syntax is its pervasive use of verb serialization and switch reference for a wide variety of functions. Section 2.6 describes the grammar of more complex verbal sequences and surveys several constructions related to serialization and switch reference, including causativization, topicalization, give-constructions and relative clauses. Section 2.7 describes common non-declarative clause types, including polar questions, wh-questions and imperatives. Section 2.8 concludes the chapter with historical perspective on the language, comparing it to other languages in the Timor-Alor-Pantar (TAP) language family and summarizing a few of the changes inferred to have taken place between Proto-TAP and Fataluku.

2.1 Phonology

2.1.1 Phonemes

Tables 2.1 and 2.2 show my analysis of the phoneme inventory of Fataluku. The voiced stops /b/, /d/ and /g/ listed in parentheses below occur only in loan words (primarily from Malay or Tetun Dili). The phonemes /?/ and /j/ only occur intervocally.

<table>
<thead>
<tr>
<th></th>
<th>Bilabial</th>
<th>Labdent</th>
<th>Alveolar</th>
<th>Palatal</th>
<th>Velar</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop</td>
<td>p (b)</td>
<td>t (d)</td>
<td>k (g)</td>
<td>?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affricate</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
</tr>
<tr>
<td>Fricative</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
</tr>
<tr>
<td>Nasal</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
</tr>
<tr>
<td>Tap/trill</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
</tr>
<tr>
<td>Lateral</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
</tr>
<tr>
<td>Glide</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
<td>ňs</td>
</tr>
</tbody>
</table>

Table 2.1: Consonant phonemes
Phonotactics

Syllable structure is (C)V(V)(C). Consonant clusters are rare, though they do occur sometimes across morpheme boundaries or in borrowed words. Vowel length is contrastive, though it carries a low functional load. Both surface long vowels and diphthongs are represented underlyingly as sequences of vowels. (See chapter 3 for minimal pairs, phonetic descriptions and further discussion of phonotactics.)

Metrical Structure

Though there is no compelling evidence for stress, Fataluku does have feet. Feet are bimoraic, and a content word must have a foot aligned with its left edge. Vowels count for a single mora each, and consonants do not count for a mora, so Fataluku lengthens a short vowel if it is the only vowel in the foot. These characteristics result in a two-mora word minimum for content words (which may be satisfied in monosyllables with either a long vowel or a diphthong).

Word-Level Prosody

There is no compelling evidence for tone, lexical pitch accent or any type of lexically-specified word-level prosodic system; rather, pitch contours at the word level depend solely on the intonation. The prosodic system is built around Accentual Phrases (APs), which may contain either a single word or a few words which are close semantically or syntactically. An AP typically has a rising-falling contour over its length, which peaks on a high intonational tone attached to the right boundary of the first foot of the AP.¹ Phonetically, this results in a pitch peak over the first syllable if it is heavy, or the second syllable if the first is light (with a tendency for peaks to come later as speech rate increases). (See chapter 5 for a sustained discussion of word-level prosody and metrical structure.)

¹These “intonational tones” are not represented in the underlying form of morphemes, nor do they serve to distinguish morphemes from one another, as lexical tones are used. I use the term “tone” in this context to refer to an intonational target, following use of the term in the literature on autosegmental-metrical phonology (e.g., Ladd, 1996; Jun, 2005b).

<table>
<thead>
<tr>
<th></th>
<th>Front</th>
<th>Central</th>
<th>Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>i</td>
<td>u</td>
<td></td>
</tr>
<tr>
<td>Mid</td>
<td>e</td>
<td>o</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td></td>
<td>a</td>
</tr>
</tbody>
</table>

Table 2.2: Vowel phonemes
Sentence-Level Prosody
The largest prosodic unit I recognize in Fataluku intonation is the Intonational Phrase (IP), which contains one or more APs and may be bounded by silence on either side. The IP-final boundary tone is an important indicator of sentence type. For instance, declarative sentences in isolation typically have a low final boundary tone (L%), while both polar and wh-questions have a low-high-falling boundary tone (L+HL%), which is accompanied by prosodic lengthening of the final syllable to accommodate the more complex series of tonal targets. Since polar questions and declaratives may be identical morphosyntactically, this difference in boundary tones is a crucial characteristic of the distinction between a declarative and a question. I do not recognize any prosodic phrases intermediate between the AP and the IP at this time. (See chapter 6 for further discussion of sentence-level prosody.)

2.1.2 Orthography
In the examples below, I use an essentially phonemic working orthography. The working orthography I use here mirrors current orthographic practice in the community, with two small exceptions. In the first place, I use the symbol y for the phoneme /j/, where speakers typically use i, in order to represent my own phonological analysis more clearly. In section 3.4.3, I argue that some instances of [j] are from /i/, while others are from /j/. This motivates the use of a separate symbol for /j/, in order that the two may be clearly distinguished in the present exposition (a concern of little importance to native speakers). I also represent vowel length (using a macron), though native speakers rarely do. This decision is also motivated by expositional clarity, since vowel length plays an important role in several aspects of my analysis. Because of its low functional load, however, there is no real need to represent vowel length in a working orthography intended for fluent native speakers.

Orthographic symbols which differ from IPA-based phonemic symbols are shown in table 2.3. Chapter 5 provides more details on phonetic realizations.

<table>
<thead>
<tr>
<th>Orthography</th>
<th>Phonemes</th>
</tr>
</thead>
<tbody>
<tr>
<td>c</td>
<td>/tʃ/</td>
</tr>
<tr>
<td>j</td>
<td>/z/</td>
</tr>
<tr>
<td>w</td>
<td>/v/</td>
</tr>
<tr>
<td>y</td>
<td>/j/</td>
</tr>
<tr>
<td>’</td>
<td>/ʔ/</td>
</tr>
<tr>
<td>ŏ, ē, etc.</td>
<td>/aa/, /ee/, etc.</td>
</tr>
</tbody>
</table>

Table 2.3: Working orthography
2.2 Summary of Word Order Correlates

Fataluku is an OV language, and follows a generally left-branching constituent order (the main exceptions being relative clauses). At this point, evidence for adjectives or prepositions/postpositions in Fataluku is limited; both attributes and spatio-temporal relationships are usually expressed by verbs. Table 2.4 summarizes the word order patterns of Fataluku.

<table>
<thead>
<tr>
<th>Construction</th>
<th>Left-branching</th>
<th>Right-branching</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOV</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Possesor-Possessed Noun</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Noun-Determiner</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Noun-Relative Clause</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Prepositions/Postpositions</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Adjectives</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>

Table 2.4: Summary of word-order patterns

SOV

The basic word order for transitive sentences with two full noun phrase participants is SOV. This ordering of the subject, object and verb is quite fixed. Aspect is marked with a separate word preceding the verb.  

(1) *Jerai cecen nawa*
    Jerai pineapple eat
    ‘Jerai ate the pineapple’ (JD:Elicit)

(2) *acur ete hi’amoi*
    cuscus tree climb
    ‘The cuscus climbed the tree’ (JD:Elicit)

(3) *ipar a ira ina hai naci*
    dog SBJ water eye PRF see
    ‘The dog found a spring of water.’ (lit. ‘water eye’) (LE:Papapa)

Possessor-Possessed Noun

The possessor precedes the possessed noun, following expectations for OV languages. The possessive marker *ɪ* intervenes between the two noun phrases, indicating the possessive relationship.

---

Interlinear glosses follow the Leipzig conventions. A list of abbreviations is given on page xv.

---

2Interlinear glosses follow the Leipzig conventions. A list of abbreviations is given on page xv.
(4) Jerai ī payah
   Jerai POSS mango
   ‘Jerai’s mango.’  (LE:Elicit)

(5) malai ī pasta
    foreigner POSS bag
    ‘The foreigner’s bag.’  (Observation)

(6) wani ī wari
    bee POSS nest
    ‘Beehive (lit. bee’s nest)’  (LE:Frog)

Noun-Determiner
The most common determiners are un(u) ‘a, one, some’ and the deictics, such as en ‘this’ and iwi ‘that’, all of which follow the noun the modify. (See section 2.3.1 for more on demonstratives.)

(7) wacin unu na-’e
    day ART at-VB
    ‘On one day’ (used often in story telling)  (LE:Papapa)

(8) ma’ar nami unu hai naci
    person male ART PRF see
    ‘She saw a man’ (First time the man is introduced)  (LE:Papapa)

(9) Ma’ar nami en ira ina nā mire=n
    person male DEM.PRX water eye at sit=SS
    ‘This man was sitting at the spring’ (After the man has been introduced)  (LE:Papapa)

Noun-Relative Clause
Relative clauses follow the noun they modify. While this pattern runs contrary to Fataluku’s general preference for left-branching constituent structure, it is consistent with the processing-motivated tendency to place heavier constituents to the right (Hawkins, 1990). Fataluku uses the gap strategy for relativization, with the modified noun followed by the clitic =itu (=tu after vowels). The final vowel /u/ of the relativizing clitic is typically realized only in careful speech. (See section 2.6.7 for more details).

(10) tour=itu arapou wale
     people=REL buffalo have
     ‘People who have a water buffalo’  (JL:New Year)
The birds that are in the forest are singing.'

(I:JL) (12) ana ipar=it tawa neure paha
I.SG.SBJ dog=REL 3.SG chase hit
‘I hit the dog that is chasing him.’

(LE:Elicit)

2.3 Syntactic Categories and Morphology

2.3.1 Pronouns

Personal Pronouns

<table>
<thead>
<tr>
<th>Citation</th>
<th>Subject</th>
<th>Non-Subj.</th>
<th>Nom. Poss.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.SG</td>
<td>anir</td>
<td>ana</td>
<td>a</td>
</tr>
<tr>
<td>2.SG</td>
<td>èr</td>
<td>à</td>
<td>e</td>
</tr>
<tr>
<td>3.SG</td>
<td>tawa</td>
<td>tawa</td>
<td>tawa</td>
</tr>
<tr>
<td>1.PL.1</td>
<td>afiri</td>
<td>afa</td>
<td>afi</td>
</tr>
<tr>
<td>1.PL.X</td>
<td>inir</td>
<td>ina</td>
<td>ini</td>
</tr>
<tr>
<td>2.PL</td>
<td>ir</td>
<td>ta</td>
<td>i</td>
</tr>
<tr>
<td>3.PL</td>
<td>tawar</td>
<td>tawar</td>
<td>tawar</td>
</tr>
</tbody>
</table>

Table 2.5: Personal pronouns

Fataluku has four primary sets of personal pronouns, a citation form, a subject form, a non-subject form and a nominalized possessive form (e.g., ‘mine’, ‘yours’). Fataluku makes a distinction between inclusive and exclusive in the first person plural, a feature Klamer (2004) reports to be common in the area, but there is no gender distinction.

The same subject pronouns are used for both transitive and intransitive verbs, as Fataluku has nominative-accusative alignment. The non-subject pronouns are used for the objects of transitive verbs and possessors. The citation forms can occur utterance-initially with the topicalization clitic =/(i)tu ‘TOP’ when a speaker wishes to emphasize the pronoun.

Based on the form of the pronominal paradigm, one may make some preliminary speculations about their history. First, it is notable that the only distinction between the 3.SG and 3.PL pronouns is the final /r/. The phoneme /r/ also occurs in the regular plural morpheme /ere/ ‘PL’ and a few other irregular plurals (most of which refer to people), e.g., namirara ‘males’, plural of nami ‘male’, and lanura ‘friends’, plural of lǎn ‘friend’. It is likely that the final /r/ of tawar is a remnant of an earlier plural morpheme. However, since the use of /r/ alone to indicate plurality is not productive, I treat tawar as a single morpheme synchronically.
It is also notable that, with the exception of *tawar,* just discussed, all the subject pronouns end in /\(a\)/. This is interesting, since \(a\) is a subject-marking particle. Tom Dougherty has suggested that these subject pronouns are the result of a historical fusion between the original pronouns and the subject-marking particle \(a\) (personal communication). This proposition is further supported by the fact that the pronouns in related languages often do not end in /\(a\)/, and the final /\(a\)/ is not reconstructable to Proto-TAP. For instance, the second person plural subject pronoun is \(i\) in Makasae, \(i\) in Makalero and \(i\) in Oirata, Fataluku’s three closest relatives, but \(ia\) in Fataluku (cf. PTAP *ji, Heston, 2015). Similarly, the first person plural exclusive subject pronoun is \(ini\) in Makasae and Makalero, \(in\)- in Oirata, but \(ina\) in Fataluku (cf. PTAP *ni, Heston, 2015). For this reason I hold that Fataluku subject pronouns are historically fused with the subject marker \(a\), though synchronically I analyze them as single morphemes.

**Demonstrative Pronouns**

<table>
<thead>
<tr>
<th></th>
<th>Full forms</th>
<th>Short forms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PROXIMAL</strong></td>
<td>eni’i</td>
<td>en</td>
</tr>
<tr>
<td><strong>MESAL</strong></td>
<td>iwinivi’i</td>
<td>iwi</td>
</tr>
<tr>
<td><strong>DISTAL</strong></td>
<td>fonini’i ~ fanivi’i ~ fanini’i</td>
<td>foni ~ fan</td>
</tr>
</tbody>
</table>

Table 2.6: Demonstrative pronouns

There is a three-way distance distinction among the demonstrative pronouns, between things that are close to the speaker (proximal), things that are far from the speaker (distal) and things that are between these two extremes (mesal). In conversational speech, these forms are generally reduced phonologically. For instance, eni’i ‘DEM.PROX’ may be pronounced as [eni?i], [eni], [en] or [e], with no apparent difference in meaning. The second column of table 2.6 shows the short forms typically used in conversational speech.

**Emphatic Subject Pronouns**

Emphatic subject pronouns are formed by appending the topic marker \(=\(i\)tu\) to the citation forms of the pronouns. In the case of the speech act participants (1st and 2nd person), the emphatic pronoun is followed by the usual subject pronoun, as in example 13. Table 2.7 lists the emphatic subject pronouns, as they would appear in subject position.

(13) \[\bar{E}ri=t(u) ~ a ~ fa’i\]

2.SG=TOP 2.SG.SBJ do

‘You did (it)!’

(JL:Elicit)
### Table 2.7: Emphatic subject personal pronouns

<table>
<thead>
<tr>
<th>Case</th>
<th>Pronoun</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.SG</td>
<td>anir=it/an=t ana</td>
</tr>
<tr>
<td>2.SG</td>
<td>ĕr=itu ā</td>
</tr>
<tr>
<td>3.SG</td>
<td>tawa=tu</td>
</tr>
<tr>
<td>1.PL.INCL</td>
<td>afir=itu afa</td>
</tr>
<tr>
<td>1.PL.EXCL</td>
<td>inir=itu ina</td>
</tr>
<tr>
<td>2.PL</td>
<td>ir=itu ia</td>
</tr>
<tr>
<td>3.PL</td>
<td>tawar=itu</td>
</tr>
</tbody>
</table>

### 2.3.2 Nouns

Nouns form a large open class. I define nouns as words which signify an entity and which can cooccur with a determiner (following O’Grady, 2011).³

#### Determiner

There are two types of determiners, the indefinite article *un(u)* ‘a, one, some’ and the demonstratives. Both come after the noun (phrase) they modify.

**Nouns with the indefinite article *un(u)***

(14)  
| wacin unu na-’e |
| day      ART at-VB |

‘On one day’ (used often in story telling)  
(LE:Papapa)

(15)  
| kuca wahilan un, tifar-e=n tali moh-e |
| horse male ART, run-VB=SS beyond pass-VB |

‘A male horse came running through.’  
(JD:Cura)

(16)  
| ma’ar nami unu hai naci |
| person male ART PRF see |

‘She saw a man’  
(LE:Papapa)

**Nouns with demonstratives**

(17)  
| ma’ar nami en ira ina nā mire=n |
| person male DEM.PRX water eye on sit=SS |

‘This man was sitting at the spring’  
(LE:Papapa)

³Note that proper nouns are a possible exception, since they behave like nouns syntactically in other respects, but I have no examples that they may occur with a determiner in Fataluku.
Pluralization

Plurals are formed by placing the plural morpheme *ere* after the noun phrase.

(19)  
\[ olo=ere \]
\[ \text{bird=PL} \]
\[ \text{‘birds’} \]

(LE:Elicit)

(20)  
\[ ana \; kolega=ere \; apor \; la’a \; cicira’i \]
\[ \text{1.SG.SBJ friend=PL with go play} \]
\[ \text{‘I hung out with my friends’} \]

(LE:Xmas)

It is possible for other noun modifiers to intervene between the noun and the plural marker, which implies that the plural marker is attaching to a phrase, rather than to the noun itself. For this reason, *ere* must be analyzed as a clitic (or possibly a separate word), rather than a suffix.

(21)  
\[ ipar \; lāfai=ere \]
\[ \text{dog big=PL} \]
\[ \text{‘the big dogs’} \]

(LE:Elicit)

There are a very few words which form irregular plurals. To my knowledge, all of these involve words relating to human beings.

<table>
<thead>
<tr>
<th>Gloss</th>
<th>Singular</th>
<th>Plural</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘3.SG’</td>
<td>tawa</td>
<td>tawar</td>
</tr>
<tr>
<td>‘female’</td>
<td>tupur</td>
<td>tupurara</td>
</tr>
<tr>
<td>‘male’</td>
<td>nami</td>
<td>namirara</td>
</tr>
<tr>
<td>‘old men’</td>
<td>katuas</td>
<td>katuas rar</td>
</tr>
<tr>
<td>‘child’</td>
<td>moko</td>
<td>mokor</td>
</tr>
<tr>
<td>‘friend’</td>
<td>lān</td>
<td>lānura</td>
</tr>
</tbody>
</table>

Table 2.8: Irregular plurals

Derivation of Nouns

Aone van Engelenhoven (2009), who has written two papers on Fataluku morphosyntax, discusses two derivational suffixes which can apply to verbs in Fataluku, *-n* (sometimes *-nu*) and *-ana/-ina*. He analyzes the first as creating nouns, and the second as creating adjectives. I propose
a somewhat different system of grammatical relations than that assumed by van Engelenhoven, however. At present, I find limited evidence for supporting a separate class of adjectives in Fataluku (as discussed in section 2.3.3). Because of the lack of support for adjectives, and the fact that forms derived with this suffix generally denote abstract entities, I analyze the -ana/-ina suffix as a nominalizer here.

Whether speakers use -ana or -ina varies across individuals and dialects. In my data, speakers from Lospalos generally use -ana, while speakers from Com generally use -ina. A glottal stop is generally inserted between the root and the base if the base ends in a vowel, a regular phonological process applying at all morpheme boundaries (see section 4.2.2). The distinction between -ana/-ina and -n is not yet clear, and at present, I gloss both as ‘NMLZ’. The suffix -n appears directly after the verbal suffix -e ‘VB’, while -ana/-ina attaches to the root of the verb.

Table 2.9 shows several examples of -n, while table 2.10 shows examples of -ana.

Table 2.9: Derivation of nouns from verbs with -n ‘NMLZ’

<table>
<thead>
<tr>
<th>Verb</th>
<th>Gloss</th>
<th>Derived Noun</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>mac-e</td>
<td>‘to eat’</td>
<td>mac-e-n</td>
<td>‘food’</td>
</tr>
<tr>
<td>luku</td>
<td>‘to speak’</td>
<td>luku-n</td>
<td>‘language’</td>
</tr>
<tr>
<td>ceru</td>
<td>‘to call’</td>
<td>ceru-n</td>
<td>‘calling, destiny’</td>
</tr>
<tr>
<td>ma’u</td>
<td>‘come’</td>
<td>ma’u-nu</td>
<td>‘arrival, coming’</td>
</tr>
</tbody>
</table>

Table 2.10: Derivation of nouns from verbs with -ana/-ina ‘NMLZ’ (from Lospalos dialect)

<table>
<thead>
<tr>
<th>Verb</th>
<th>Gloss</th>
<th>Derived Noun</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>fanaw-e</td>
<td>‘to teach’</td>
<td>fanaw-ana</td>
<td>‘teaching’</td>
</tr>
<tr>
<td>mais-e</td>
<td>‘to be straight, correct’</td>
<td>mais-ana</td>
<td>‘the correct one, the truth’</td>
</tr>
<tr>
<td>kail-e</td>
<td>‘to be bent, sin’</td>
<td>kail-ana</td>
<td>‘sinfulness’</td>
</tr>
<tr>
<td>kayar-e</td>
<td>‘to be tired’</td>
<td>kayar-ana</td>
<td>‘tiredness’</td>
</tr>
</tbody>
</table>

2.3.3 Adjectives?

Evidence for a positing an open grammatical class of adjectives in Fataluku is inconclusive at present, since property-denoting words in general behave like verbs. For instance, many property-denoting words can occur with aspectual marking (e.g., the perfective marker hai), as do event-denoting words.
Property-denoting words with perfective aspect

(22) *kinamoko hai lāfai*
child PRF big
‘The child is big (grown) already.’ (JL:Elicit)

(23) *a moco hai ec-e*
1.SG.NSBJ child PRF two-VB
‘I already have two kids.’ (lit. My kids are already two) (JL:Elicit)

Many property-denoting words also take verbal morphology, such as the verbal suffix *-e*, and they can be changed into abstract nouns with the suffix *-ina/-ana*, which usually derives nouns from verbs (cf. e.g. *kayar-e* ‘be tired’ > *kayar-ana* ‘tiredness’, *kail-e* ‘to sin’ > *kail-ana* ‘sinfulness’).

The distribution of degree words—a simple test for distinguishing between syntactic categories (see O’Grady, 2011)—gives sporadic results, and does not appear to be useful for distinguishing a separate class of adjectives. For instance, *ewen* ‘very’ occurs with most property words, such as *ci’ire* ‘to be heavy’, *he’e* ‘to be difficult’ and *rau* ‘to be good’. It also occurs with some event words, such as *pura* ‘to sell’ (meaning ‘to sell everything’) and *haware* ‘to hunt’ (‘to be a brave hunter’), though not with others, such as *cūre* ‘to wake up’ or *paha* ‘to hit’. The distribution of other degree words is likewise sporadic.

At present, the status of “adjectives” in Fataluku remains inconclusive. Generally, the Fataluku words that would be used to translate adjectives in English behave like verbs, at least superficially, taking aspect marking and verbal morphology. Future research will be needed to determine whether there exists a formal difference between these property-denoting words and verbs in Fataluku, and if so, what that difference may be.

2.3.4 Verbs

Verbs form a large open class including event-denoting and state-denoting words that can occur with aspect marking.

Verbal Morphology

There is little inflectional verbal morphology. Verbs do not agree with their subjects or objects (as shown in examples 24–27), nor do they inflect for tense or aspect (which are indicated by separate words; see section 2.5.2).
The most common piece of verbal morphology is the verbal suffix -e ‘VB’. This suffix occurs in the citation form of a large proportion of verbs (e.g., mac-e ‘to eat’, ulur-e ‘to sweep’, na-e ‘be at’, asis-e ‘to be firm’, etc.). Verbs which take the suffix rarely occur without it. The main exception is serial verb constructions, in which only the final verb may have the verbal suffix.

This same suffix can also be used to derive verbs from nouns, as shown in table 2.11.

<table>
<thead>
<tr>
<th>Verb</th>
<th>Gloss</th>
<th>Derived Noun</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>ira</td>
<td>‘water’</td>
<td>ira-’e</td>
<td>‘to add water’</td>
</tr>
<tr>
<td>asir</td>
<td>‘salt’</td>
<td>asir-e</td>
<td>‘to add salt’</td>
</tr>
<tr>
<td>aur</td>
<td>‘lime (the mineral)’</td>
<td>aur-e</td>
<td>‘to add lime’</td>
</tr>
</tbody>
</table>

Table 2.11: Derivation of verbs from nouns with -e ‘VB’

There are a few pairs of words in which the base form is transitive, but there exists a reduplicated form which is intransitive. For instance, pohe ‘cook (trans.)’, pohepohe ‘cook (intrans.)’. However, this use of reduplication is not productive, and is quite rare.

**Positional Verbs**

I find no persuasive evidence for the existence of a distinct set of prepositions or postpositions in Fataluku. I analyze the words which express temporal and spatial relations as verbs, since they take verbal morphology and occur in the same syntactic positions as verbs. For instance, they commonly take the verbal suffix -e ‘VB’, and may even be nominalized (cf. cō-n-e ‘to be far’, cō-n-ana ‘the farthest one’). They can also occur in serial verb constructions (see section 2.6.3).
There are two suffixes which commonly occur with these locational morphemes. The first is -n ‘LOC’, which indicates presence at the specified location, while the second is -p, indicating movement towards the location. These suffixes occur between the base and the verbal morpheme -e ‘VB’. I use the term “positional verb” informally to refer to those verbs which refer to positions or relations and which can take the suffixes -n or -p.

Examples are given in table 2.12.

<table>
<thead>
<tr>
<th>Root</th>
<th>With -n</th>
<th>With -p</th>
</tr>
</thead>
<tbody>
<tr>
<td>a’a</td>
<td>‘on’</td>
<td>a’ane</td>
</tr>
<tr>
<td>cō</td>
<td>‘far’</td>
<td>cōne</td>
</tr>
<tr>
<td>hi’a</td>
<td>‘over’</td>
<td>hi’ane</td>
</tr>
<tr>
<td>hici</td>
<td>‘located’</td>
<td>hicine</td>
</tr>
<tr>
<td>mucu</td>
<td>‘inside’</td>
<td>mucune</td>
</tr>
<tr>
<td>utu</td>
<td>‘blocking’</td>
<td>utune</td>
</tr>
</tbody>
</table>

Table 2.12: Common positional verbs and their meanings

2.3.5 Numerals

Fataluku has a decimal numeral system. I tentatively analyze Fataluku numerals as a subclass of verb, since they can occur with the perfective aspect marker hai ‘PRF’, and the majority (the numerals 2–6 and 10) take the verbal morpheme -e ‘VB’.

(28) a moco hai ec-e
    2.SG child PRF two-VB
    ‘I already have two kids.’ (lit. My kids are already two) (JL:Elicit)

The numbers 1-10 are monomorphemic (apart from the presence of the verbal suffix). The numbers 11-99 are formed using the following pattern:

\[ \text{ta’an} + [\text{tens digit}] + [\text{ones digit}] \]

For instance, 18 is \( \text{ta’an} ‘\text{ten’} + \text{ūkanī ‘one’} + \text{kafa ‘eight’} \), literally ‘ten one eight’. The number 76 is \( \text{ta’an ‘ten’} + \text{fitu ‘seven’} + \text{nēme ‘six’} \), lit. ‘ten seven six’. More generally, the power of ten precedes the number by which it should be multiplied. The pattern for numbers less than 100,000 is as follows:

\[ \text{rehun ta’an} + [\text{ten thousands digit}] + \text{rehun} + [\text{thousands digit}] + \text{rah} + [\text{hundreds digit}] + \text{ta’an} + [\text{tens digit}] + [\text{ones digit}] \]

This analysis of these morphemes was proposed by Tom Dougherty (personal communication). See also van Engelenhoven (2010), who treats -pe as a unit.
Table 2.13 illustrates the numeral system up to 100, while 2.14 shows the formation of larger numbers.

<table>
<thead>
<tr>
<th>#</th>
<th>1-10</th>
<th>11-20</th>
<th>21-100</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>âkani</td>
<td>ta’an âkani âkani</td>
<td>ta’an ece âkani</td>
</tr>
<tr>
<td>2</td>
<td>ece</td>
<td>ta’an âkani ece</td>
<td>ta’an ece ece</td>
</tr>
<tr>
<td>3</td>
<td>utu’e</td>
<td>ta’an âkani utu’e</td>
<td>ta’an utu’e</td>
</tr>
<tr>
<td>4</td>
<td>fâte</td>
<td>ta’an âkani fâte</td>
<td>ta’an fâte</td>
</tr>
<tr>
<td>5</td>
<td>lime</td>
<td>ta’an âkani lîme</td>
<td>ta’an lîme</td>
</tr>
<tr>
<td>6</td>
<td>nême</td>
<td>ta’an âkani nême</td>
<td>ta’an nême</td>
</tr>
<tr>
<td>7</td>
<td>fitu</td>
<td>ta’an âkani fitu</td>
<td>ta’an fitu</td>
</tr>
<tr>
<td>8</td>
<td>kafa</td>
<td>ta’an âkani kafa</td>
<td>ta’an kafa</td>
</tr>
<tr>
<td>9</td>
<td>sîwa</td>
<td>ta’an âkani sîwa</td>
<td>ta’an sîwa</td>
</tr>
<tr>
<td>10</td>
<td>ta’ane</td>
<td>ta’an ece</td>
<td>100 rah âkani</td>
</tr>
</tbody>
</table>

Table 2.13: Numbers up to 100

<table>
<thead>
<tr>
<th>#</th>
<th>Expression</th>
<th>Literal Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>rah âkani âkani</td>
<td>‘hundred one one’</td>
</tr>
<tr>
<td>110</td>
<td>rah âkani ta’ane</td>
<td>‘hundred one ten’</td>
</tr>
<tr>
<td>111</td>
<td>rah âkani ta’an âkani âkani</td>
<td>‘hundred one ten one one’</td>
</tr>
<tr>
<td>200</td>
<td>rah ece</td>
<td>‘hundred two’</td>
</tr>
<tr>
<td>777</td>
<td>rah fitu ta’an fitu fitu</td>
<td>‘hundred seven ten seven seven’</td>
</tr>
<tr>
<td>1,000</td>
<td>rehun âkani</td>
<td>‘thousand one’</td>
</tr>
<tr>
<td>10,000</td>
<td>rehun ta’ane</td>
<td>‘thousand ten’</td>
</tr>
<tr>
<td>23,476</td>
<td>rehun ta’an ece rehun utu’e</td>
<td>‘thousand ten two thousand three</td>
</tr>
<tr>
<td></td>
<td>rah fâte ta’an fitu nême</td>
<td>‘hundred four ten seven six’</td>
</tr>
</tbody>
</table>

Table 2.14: Numbers over 100

2.3.6 Conjunctions

Fataluku uses a mix of native and borrowed conjunctions. Non-native conjunctions are primarily from Tetun or Portuguese (likely via Tetun).

One of the most common native conjunctions is na’uwara ‘and’, sometimes shortened to nar.

This conjunction is often used in narrative to connect a sentence with the previous one (“And then. . .”), but it can also conjoin smaller units.

(29) na’uwara tawa em nita aci ta’a para manan-e
    and 3.SG VAL RECP see talk for win-VB
    ‘And they talked to each other about how to win.’ (JD:Cura)
Another common native conjunction is *ana* ‘or’, sometimes shortened to *ā*.

(31) *ā mimirek-e eluh-e=n ā, u’ureke eluh-e?*
    2.SG.SBJ red-VB want-VB=SS or, green want-VB?
    ‘Do you like red or green?’  (LJ:Elicit)

The conjunction *ana/ā* is also used as a question tag.

(32) *kinamoko a maca mahane ā*
    child SBJ bat fear Q
    ‘Was the child afraid of the bat?’

Another common conjunction is *ho* ‘and’, possibly a loan from Tetun. This conjunction is typically used for conjoining noun phrases.

(33) *kuca ho ū lanura=ere*
    horse and POSS friend.PL=PL
    ‘The horse and his friends’  (JD:Cura)

(34) *tahi ho nēl u’ureke*
    ocean and sky blue
    ‘The ocean and the sky are blue’  (LJ:Elicit)

Another extremely common loaned conjunction is *mais* ‘but, however’, originally from Portuguese (possibly via Tetun).

(35) *mais i acak-n-e*
    but DEM.MES aligned-LOC-VB
    ‘But, at that time . . . ’ (introducing a story’s turning point)  (JD:Cura)

(36) *Iwi=’it tawa wari sune mais ma’ar ia aka nawar hin lau muralaku*
    This=TOP 3.SG always blow but man that NEG know REFL clothes remove
    ‘And then, he keeps blowing, but the man never takes off his clothes.’  (LE:North Wind)
2.4 Noun Phrases

2.4.1 Possession

Full Noun Phrase Possession

Full noun phrase possession is expressed with the possessive marker \( \bar{i} \) ‘POSS’, which follows the possessor and precedes the possession.

(37)  \( \text{Jerai} \ \bar{i} \ \text{payah} \)
      \( \text{Jerai POSS mango} \)
      \( \text{Jerai’s mango.} \) \hspace{1cm} \text{(LE:Elicit)}

(38)  \( \text{malai} \ \bar{i} \ \text{pasta} \)
      foreigner POSS bag
      ‘The foreigner’s bag.’ \hspace{1cm} \text{(Observation)}

(39)  \( \text{wani} \ \bar{i} \ \text{warī} \)
      bee POSS nest
      ‘Beehive (lit. bee’s nest)’ \hspace{1cm} \text{(LE:Frog)}

Pronoun Possession

Possession in which a third person pronoun is the possessor is expressed in the same way as full noun phrase possession. The pronoun (either \( \text{tawa} \) for singular or \( \text{tawar} \) for plural) is followed by \( \bar{i} \) ‘POSS’, which is then followed by the possession.

(40)  \( \text{tawa} \ \bar{i} \ \text{familia} \)
      3.SG POSS family
      ‘His family’ \hspace{1cm} \text{(LE:Xmas)}

The possessor need not be present if it is clear from context.

(41)  \( \text{Iwini’i}=t \ \bar{i} \ nāl \ \bar{i} \ \text{pāl la’a} \)
      DEM.MES=TOP POSS mother POSS father go
      ‘Then her mother and father went’ \hspace{1cm} \text{(LE:Papapa)}

A different strategy is used with a first or second person pronominal possessor, however. In this case, the non-subject form of the pronoun directly precedes the possessed noun phrase.

(42)  \( a \ \bar{i} \ \text{posi} \)
      1.SG.NSBJ cat
      ‘My cat’ \hspace{1cm} \text{(LE:Elicit)}
Both alienable and inalienable possession are expressed in essentially the same way. There remains, however, a small difference when the possessed noun begins with a vowel. For nouns that are inalienably possessed (e.g., body parts), /h/ may occur between the possessive pronoun and the noun, as in examples (44–46), whereas for alienably possessed nouns, /h/ may occur, as in examples (47–48). The inserted consonant, /n/ or /h/, is optional, and in the event it is absent, a glottal stop is inserted instead, a productive phonological process (see sec. 4.2.2).

### Inalienable Possession

(44) \[ a \text{n-ina} \sim a \text{ina} \sim *a \text{h-ina} \]
1.SG.NSBJ INAL-eye \sim 1.SG.NSBJ eye

‘my eye’

(45) \[ a \text{n-atu} \sim a \text{atu} \sim *a \text{h-atu} \]
1.SG.NSBJ INAL-stomach \sim 1.SG.NSBJ stomach

‘my stomach’

(46) \[ a \text{n-elehi} \sim ?\text{a elehi} \sim *a \text{h-elehi} \]
1.SG.NSBJ INAL-husband

‘my husband’ (generally occurs with inalienable marking)

### Alienable Possession

(47) \[ *a \text{n-ulur} \sim a \text{ulur} \sim a \text{h-ulur} \sim 1.SG.NSBJ breadfruit \sim 1.SG.NSBJ ALN-breadfruit \]

‘my breadfruit’

(48) \[ *a \text{n-ipar} \sim a \text{ipar} \sim a \text{h-ipar} \sim 1.SG.NSBJ dog \sim 1.SG.NSBJ ALN-dog \]

‘my dog’

### 2.4.2 Numbered Noun Phrases

Numbers follow the noun they modify.
Fataluku has a numeral classifier which occurs optionally when counting humans, *ater-e* ‘CL:HUM’, which occurs after the numeral in a serial verb construction. The classifier is more likely to occur when the humans involved are highly prominent in the following discourse.

2.4.3 NP Order Template

The elements of an NP follow this order:

[noun] + [descriptive word] + [number] + [demonstrative]

(53) *ulur lāfai ec-e*  
    breadfruit big two-VB  
    ‘two big breadfruit’  
    (LE:Elicit)

(54) *ipar moko ec-e*  
    dog small two-VB  
    ‘two small dogs’  
    (LE:Elicit)

(55) *lē laf ere iwini’i*  
    house big PL DEM.MES  
    ‘those big houses’  
    (LE:Elicit)
2.5 Verb Phrases and Simple Clauses

2.5.1 Argument Structure

Fataluku has nominative-accusative alignment whether arguments are full noun phrases or pronouns. Grammatical relations are shown primarily through word order: the basic SOV word order pattern is rarely violated. There is also subject-marking morpheme a ‘SBJ’, which may optionally follow the subject noun phrase. There is, however, no overt object-marker.

Case marking of subject

(56)   *Titiso a  kuca min-e*  
   Titiso SBJ horse has-VB  
   ‘Titiso has a horse’  
   (LE:Elicit)

(57)   *wani a  ipar neur-e*  
   bee  SBJ dog chase-VB  
   ‘The bees chased the dog’  
   (LE:Frog)

(58)   *mais aficalafur a  hai kayar-e*  
   but  crocodile  SBJ PRF tired-VB  
   ‘But the crocodile became tired’  
   (LE:Crocodile)

No case marking

(59)   *kinamoko hai  arah-e*  
   boy  PRF frightened-VB  
   ‘The boy was frightened’  
   (LE:Frog)

(60)   *Paul e  tutur-e*  
   Paul 2.SG.NSBJ push-VB  
   ‘Paul pushed you’  
   (LE:Elicit)

Fataluku’s case-marking system violates a strong cross-linguistic expectation of nominative-accusative languages. It is generally expected that in nominative-accusative languages, if only one case is zero-marked, it will be the nominative case (Dixon, 1994; König, 2006). Fataluku is unusual in this regard, since the nominative is marked overtly morphologically, while the accusative is not, contra expectations. Fataluku belongs to the class of languages Dixon calls “marked nominative” languages, in which the nominative is marked overtly but the accusative is not. “Marked nominative” languages are typologically unusual, and apart from an enclave in eastern Africa, they are generally quite rare (König, 2006).
2.5.2 Aspect and Time

The word *hai* ‘PRF’ can come before the verb to indicate an action is complete. Speakers note there is no one-to-one equivalent in English; the closest translation is something like ‘already’.

\[(61) \text{ma’ar nami unu hai naci} \]
\[
\text{person male ART PRF see} \\
\text{‘She saw a man’} \quad \text{(LE:Papapa)}
\]

I treat *hai* as perfective aspect, rather than as past tense, since it is not restricted to past events. Examples (62) and (63), which are from narratives, illustrate the use of *hai* with future actions. Both are direct quotes from a character in the story. The context of the story makes it clear in each case that the event marked with *hai* has not yet occurred, though the character speaking views the event as certain. The prediction of the first character, who speaks in (62), comes true, though not the prediction of the character speaking in (63).

\[(62) \text{ana akam hai fūleh-e} \]
\[
\text{1.SG.SBJ NEG PRF return-VB} \\
\text{‘I won’t come back’} \quad \text{(LE:Papapa)}
\]

\[(63) \text{ana e hai tali mohe} \]
\[
\text{1.SG.SBJ 2.SG.NSBJ PRF beyond run} \\
\text{‘I will outrun you.’} \quad \text{(JD:Cura)}
\]

Because of its semantic similarity to perfective aspect and the difficulty speakers have providing a direct translation (as would be expected of a grammatical morpheme), I analyze *hai* as a perfective aspect marker, though I note the possibility that *hai* is an adverb with a perfective-like meaning, rather than a true grammatical aspect marker. More research is needed on this point.

Time is generally indicated by means of a separate verb, which occurs before the main verb. For instance, the word *rahin-e* ‘to be yesterday’ can mean ‘yesterday’ or introduce the recent past. Table 2.15 shows several other temporal verbs, most of which have the verbal suffix -’e in their citation form. These time words occur most frequently in a serial verb construction with the main verb, in which case the verbal suffix -’e does not occur. Temporal verbs can also occur with the topicalization morpheme =iṭ(u) utterance-initially.

\[(64) \text{rahin cî karat-e} \]
\[
\text{yesterday thunderstorm RECP rumble-VB} \\
\text{‘Yesterday there was a thunderstorm’ (lit., ‘a thunderstorm rumbled’) \quad \text{(JD:Elicit)}}
\]
<table>
<thead>
<tr>
<th>Word</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>rohon-e</td>
<td>‘The day before yesterday; past’</td>
</tr>
<tr>
<td>rahin-e</td>
<td>‘Yesterday; recent past’</td>
</tr>
<tr>
<td>tain-e</td>
<td>‘Earlier today; very recent past’</td>
</tr>
<tr>
<td>kar</td>
<td>‘Right now’</td>
</tr>
<tr>
<td>nop-e</td>
<td>‘Tomorrow’</td>
</tr>
<tr>
<td>kolis-e ~ kois-e</td>
<td>‘Future’</td>
</tr>
</tbody>
</table>

Table 2.15: Temporal words

(65) *nop-e=t afta nita fanuhen-e.*
    tomorrow-VB=TOP 1.PL.1.SBJ RECP meet-VB
    ‘Tomorrow we will face each other.’ (JD:Cura)

2.5.3 Negation

Negation is shown with the negative morpheme *akam* ‘NEG’, which occurs after the subject, but before the direct object or aspect marker.

(66) *kuca akam nawar-e.*
    horse NEG know-VB
    ‘The horse didn’t know’ (JD:Cura)

(67) *ana akam hai fūleh-e.*
    1.SG.SBJ NEG PRF return-VB
    ‘I won’t come back’ (LE:Papapa)

(68) *akam mace-n nawa, akam ira tutu.*
    NEG eat-NMLZ eat, NEG water drink
    ‘It didn’t eat, it didn’t drink’ (LE:Aficalafur)

(69) *tawar akam cila aci.*
    3.PL NEG frog see
    ‘They didn’t see the frog’ (LE:Cila)

2.5.4 Reflexive

The reflexive is formed by placing the morphemes *jen* and *hin* in the object position of the verb. Native speakers see *jen* and *hin* as two separate words. Even though these morphemes often occur together, the analysis of these morphemes as separate words is confirmed by the fact that no other word-medial clusters of */n/ and */h/ are attested in the language. The morpheme *hin* can also occur
by itself, as a reflexive possessive (typically when the possessor has been prominent in the preceding dialog). I gloss both *jen* and *hin* as ‘REFL’.

(70)  
\[
\begin{array}{ll}
\text{ana} & \text{jen} \quad \text{hin} \quad \text{naci} \\
1.\text{SG.SBJ} & \text{REFL} \quad \text{REFL} \quad \text{see} \\
\end{array}
\]

‘I see myself’ (as in a mirror)  
(LE:Elicit)

(71)  
\[
\begin{array}{ll}
\text{ana} & \text{jen} \quad \text{hin} \quad \text{nawar-e} \\
1.\text{SG.SBJ} & \text{REFL} \quad \text{REFL} \quad \text{know-VB} \\
\end{array}
\]

‘I know myself’  
(LE:Elicit)

(72)  
\[
\begin{array}{ll}
\text{ia} & \text{jen} \quad \text{hin} \quad \text{naci} \\
2.\text{PL.SBJ} & \text{REFL} \quad \text{REFL} \quad \text{see} \\
\end{array}
\]

‘You (pl.) see yourselves’  
(LE:Elicit)

(73)  
\[
\begin{array}{ll}
\text{tawa} & \text{jen} \quad \text{hin} \quad \text{nâtane-n} \to\ldots \\
3.\text{SG} & \text{REFL} \quad \text{REFL} \quad \text{ask-SS} \quad \text{QUOT} \\
\end{array}
\]

‘He asked himself. . .’  
(LE:Wata)

The morpheme *hin* as possessive

(74)  
\[
\begin{array}{ll}
\text{em} & \text{hin} \quad \text{sakola} \quad \text{to’e} \\
\text{take} \quad \text{REFL} \quad \text{bag} \quad \text{put.in} \\
\end{array}
\]

‘Taking [it] he put it inside his bag’  
(LE:Wata)

(75)  
\[
\begin{array}{ll}
\text{hai} & \text{la’a} \quad \text{hin} \quad \text{lē} \quad \text{mara} \\
\text{PRF} \quad \text{go} \quad \text{REFL} \quad \text{house} \quad \text{go} \\
\end{array}
\]

‘[She] went back home’  
(LE: Papapa2)

2.5.5 Reciprocal

Reciprocal constructions are formed by placing the reciprocal morpheme *nita* in the object position of the verb.

(76)  
\[
\begin{array}{ll}
\text{afa} & \text{nita} \quad \text{hefe} \\
1.\text{PL.1.SBJ} & \text{RECP} \quad \text{know} \\
\end{array}
\]

‘We know each other’  
(LE:Elicit)

(77)  
\[
\begin{array}{ll}
\text{ipar} & \text{ho} \quad \text{posi} \quad \text{nita} \quad \text{kiki-’e} \\
\text{dog} \quad \text{and} \quad \text{cat} \quad \text{RECP} \quad \text{bite-VB} \\
\end{array}
\]

‘The dog and the cat are biting each other’  
(LE:Elicit)
2.6 Switch reference and verb serialization

2.6.1 Two Strategies for Combining Verbs

Fataluku has two frequently used grammatical strategies for combining verbs (aside from simple coordination). The first strategy is a system of switch reference, which combines entire clauses, indicating whether the subjects of the two clauses are the same or different.\(^5\) The second strategy is verb serialization, which combines two verbs in the same clause.\(^6\) Example 78 shows an example of switch reference, while example 79 shows verb serialization.

\[(78)\]  
\[\text{tawa hai ma’u=n ta’a, . . .}\]  
\[3.SG \text{PRF come=SS say}\]  
‘He came over and said, . . .’ (JD:Cura)

\[(79)\]  
\[\text{tawa la’a hawar-e}\]  
\[3.SG \text{go hunt-VB}\]  
‘He goes hunting’ (LE:Wata)

A full discussion of these systems could easily occupy an entire dissertation by itself; in the following sections, I aim to give a short overview of the most important aspects of each. After summarizing both systems, I discuss a few more complex syntactic constructions which involve one or the other of these strategies, namely give-constructions, causativization, topicalization and relativization.

2.6.2 Switch Reference

In this discussion, I follow Dougherty’s (2013) unpublished analysis of switch reference in Fataluku. A system of switch reference was also alluded to by van Engelenhoven (2010), though Dougherty (2013) gives a more extensive analysis.

Dougherty analyzes the morphemes =nu and =tu (often reduced to =n and =t) as clause-joining clitics that attach to the end of the first clause. The clitic =nu indicates that both clauses share the same subject, while =tu indicates that the subjects are different. Examples 80 and 81 illustrate this contrast, following Dougherty’s conventions of glossing =nu as SS for ‘same subject’ and =tu as DS for ‘different subject’.

---

\(^5\) The present analysis of Fataluku’s switch reference system was proposed by Dougherty (2013), whose analysis I follow.

\(^6\) The verb serialization analysis of this phenomenon was suggested by William O’Grady (personal communication), an analysis I have since developed more extensively.
Switch-reference markers are very common in narratives, especially \(=nu\) ‘SS’.

The marker -(i)tu ‘DS’ indicates that the second clause has a different subject than the first.

Clitics identical to the different subject marker are also used to show relativization (sec. 2.6.6) and topicalization (sec. 2.6.7). It is very likely that the morphemes used in these environments share a single historical source, though it is not clear synchronically whether there exist multiple homophonous morphemes or a single morpheme which serves multiple functions. In this work, I gloss these morphemes separately for ease of exposition.
2.6.3 Serial Verbs

In her synthesis of the literature on serial verbs, Alexandra Aikhenvald (2006:1) defines a serial verb complex (SVC) as “A sequence of verbs which act together as a single predicate, without any overt marker of coordination, subordination, or syntactic dependency of any other sort. Serial verb constructions describe what is syntactically a single event.” There exists one paper in which van Engelenhoven (2010) examines serial verbs in Fataluku. He takes a relatively narrow perspective on verb serialization however, including only a subset of what I classify as serial verbs here. In my discussion, I also include a number of constructions which he classifies as adjectival or adverbial, as well as constructions which are partly grammaticalized, since viewing these constructions as serial verbs provides the most insight into their syntactic behavior.

In the constructions I consider “serial verbs,” two or more verbs occur in the same clause, and only the final verb is permitted to bear the verbal suffix -’e ‘VB’. A few examples are shown in 88–90.

(88) tawa la’a hawar-e
     3.SG go    hunt-VB
     ‘He goes hunting’ (LE:Wata)

(89) ā    emer moh-e
     2.SG.SBJ first  run-VB
     ‘You run first’  (JD:Cura)

(90) tū-tū-ana aka nawar masu lauh-e
     RED-plant-NMLZ NEG know well  live-VB
     ‘The farm was not productive.’ (LE:Wata)

I also treat constructions like those in examples 91 and 92 as SVCs. I analyze the words nā ‘be at’ and tali ‘be beyond’ as verbs, which are in an SVC with the following verb—the verb that expresses the main action of the sentence.

(91) ana lē nā caya
     1.SG.SBJ house be.at sleep
     ‘I sleep in the house.’ (JL:Elicit)

(92) ana hai tali moh-e
     1.SG.SBJ PRF be.beyond run-VB
     ‘I (will) outrun you.’ (JD:Cura)
This analysis runs contra van Engelenhoven, who analyzes positional words like nā ‘at’ and tali ‘beyond’ as postpositions. The first reason for treating these positional morphemes as verbs, rather than postpositions, is that they regularly take verbal morphology. When they are not followed by another verb, both nā ‘be at’ and tali ‘be beyond’ (as well as the other positional morphemes) take the verbal suffix -’e ‘VB’. There are also examples of positional morphemes taking the nominalizing suffix -ana ‘NMLZ’, which derives nouns from verbs (e.g., cō-n-ana ‘the farthest one’). A second reason for this analysis is that positional morphemes occur in the same syntactic environments as other serialized verbs; they even trigger consonant mutation, a change which is only attested with serial verb constructions. One example of mutation is caya in example 91, the mutated form of taya ‘sleep’ (see section 4.2 for a detailed discussion of consonant mutation).

In the following sections, I compare Fataluku SVCs with several of the key characteristics of verb serialization outlined by Aikhenvald, showing that the constructions I call serial verbs in Fataluku behave like SVCs in other languages.

**Single Predicate, Conceptually and Grammatically**

First, Aikhenvald notes that serial verb constructions (SVCs) form a single predicate conceptually, often being translated by a single verb in languages without serial verbs. Additionally, they form a single predicate grammatically, and an SVC takes a single subordinator. Examples 93 and 94 illustrate both of these characteristics. In example 93, rohon somon ma’u, lit. ‘past carry come’, is best translated by a single English verb, ‘brought’. There is but a single subordinator, =(i)tu ‘REL’, which serves to subordinate the entire SVC construction. Example 94 is similar, where the expression nawar masu lauhe, lit. ‘able well live’, is best translated as ‘be productive’. Here also, a single instance of =(i)tu ‘DS’ occurs.

(93) ana wata=t [ele  ā rohon somon ma’u] iwnini’i
1.SG.SBJ coconut=REL [REL.PRO 2.SG.SBJ be.past carry  come] DEM.MES
‘I am the coconut that you brought in.’ (LE:Wata)

(94) mua akam rau=tu  tū-tū-ana aka nawar masu lauh-e
ground NEG good=DS RED-plant-NMLZ NEG know  well  live-VB
‘The soil was not good, so the farm was not productive.’ (LE:Wata)

**No Coordination or Subordination Between Serial Verbs**

Another crucial characteristic Aikhenvald mentions is that verbs in an SVC must not be subordinated or coordinated to each other. She does note a few instances, however, in which languages have a special marker for serial verb constructions.
Fataluku serial verbs meet this criterion as well, having no overt markers of coordination or subordination. However, as noted, only the last verb is able to maintain the verbal suffix -’e ‘VB’. I view the absence of the verbal suffix on non-final serial verbs as an indicator of serialization. Verbs which do not take the suffix -’e ‘VB’ show no morphological changes when serialized, as illustrated by the verb la’a ‘to go’ in example 95.

(95) tawa la’a hawar-e
3.SG go hunt-VB
’He goes hunting’ (LE:Wata)

Aspect and Negation Marked Only Once
A serial verb complex in Fataluku takes only one marker of aspect and negation, another criterion for serial verbs according to Aikhenvald (2006). I know of no examples in which the components of a serial verb construction take separate marking for aspect or negation: rather, one instance of an aspect or negative marker modifies the entire verb complex. For instance, in example 96, hai wa’an ca’a ‘speak like this’, it does not make sense to claim that only the first verb, wa’an ‘be similar’, is intended to be interpreted as perfective. Rather, in the context of the narrative, the most likely interpretation is that the entire event, ‘speak like this’, should be interpreted as perfective. Similarly in example 97, ‘I will outrun him’, it does not make sense to claim that only the first verb, tali ‘beyond’ is perfect; rather, it is the entire event of outrunning that is in view. Example 98 shows that aspect marking can occur in two adjacent clauses joined with switch reference marking, though apparently not with SVCs.

(96) mais cura e hai wa’an ca’a . . .
but rat DEM.PR X PRF like say
‘But the rat said (spoke like this), . . .’ (JD:Cura)

(97) ana hai tali moh-e
1.SG.SBJ PRF beyond run-VB
‘I [will] outrun [him].’ (JD:Cura)

(98) hin ipar hai wa’i=n hai=m cicika a’a more.
REFL dog PRF carry=SS PRF=VAL shoulder on put
‘He put his dog on his shoulder to carry it.’ (LE:Cila)

Argument Sharing
As far as sharing arguments, Fataluku SVCs usually share their subject (the most frequent possibility noted by Aikhenvald, 2006), though sharing the theme argument is also possible.
Examples [99–101] show intransitive verbs sharing subjects, example 102 shows a combination of transitive and intransitive verbs sharing a subject and example 103 shows a transitive verb and an intransitive descriptive verb sharing a theme.

(99)  
\[
\text{tawa la’a hawar-e} \\
3.\text{SG go hunt-VB}
\]
‘He goes hunting’ (LE:Wata)

(100)  
\[
\text{familia iwin tali rau} \\
\text{family DEM.PRX beyond good}
\]
‘That family is very good’ (LE:Xmas)

(101)  
\[
\text{Iwi=’it wani hai malu wā-wāhe.} \\
\text{DEM.PRX=TOP bee PRF out RED-swarm}
\]
‘Then the bees swarmed out’ (LE:Cila)

(102)  
\[
\text{wata=t ele ā rohon somon ma’u} \\
\text{coconut=REL REL.PRO 2.SG.SBJ be.past carry come DEM.MES}
\]
‘The coconut that you brought in.’ (LE:Wata)

(103)  
\[
\text{nana olo nēm toto} \\
\text{snake bird be.six see}
\]
‘The snake saw six birds’ (JL:Elicit)

Uses of Serial Verbs

Serial verbs constructions in Fataluku are used to express a range of different meanings. I give a sample of the range of possibilities here. Causative and give-constructions are treated further below.

Serial verbs can express sequential action, as in ex. 104, or simultaneous action, as in 105.

(104)  
\[
\text{kinamoko a la’a taya} \\
\text{boy SBJ go sleep}
\]
‘The boy went to sleep’ (LE:Cila)

(105)  
\[
\text{wata=t ele ā rohon somon ma’u} \\
\text{coconut=REL REL.PRO 2.SG.SBJ be.past carry come}
\]
‘The coconut that you brought in.’ (LE:Wata)

The first serial verb can express the starting position of the second verb, as in 106, or its ending point, as in 107.
(106) *kinamoko a kama hi’a isin*
boy SBJ bed up descend
‘The boy got down from his bed’ (LE:Cila)

(107) *Iwi=’it wani hai malu wā-wāhe.*
DEM.PRX=TOP bee PRF out RED-swarm
‘Then the bees swarmed out’ (LE:Cila)

In example (108), both the starting and ending points of the action are expressed.

(108) *ī cila a potil mucu malu moh-e*
POSS cila a SBJ potil mucu malu go-VB
‘His frog got out from inside the bottle’ (LE:Cila)

Serial verbs can also indicate the relative time during which an action takes place.

(109) *ā rohon somon ma’u*
2.SG.SBJ be.past carry come
‘... you brought in.’ (LE:Wata)

2.6.4 *Give Constructions*

SVCs are also used to express the give-construction in Fataluku. It is common for languages to use a dative strategy, in which the recipient is marked with a preposition or the dative case (e.g., “John gave the ball to Mary”) or a double-object strategy, in which the verb meaning ‘give’ takes two direct objects (e.g., “John gave Mary the ball”) (O’Grady, 2011). However, Fataluku uses neither of these strategies. Instead, the theme argument of the verb (the object being given) is marked with the valency-increasing clitic =im `VAL’, and the recipient argument is structurally the direct object.

(110) *Jon a sorot-im Mari ina*
John SBJ letter-VAL Mary give
‘John gave the letter to Mary’ (LE:Elicit)

In a typical dative construction, such as the English translation ‘John gave the letter to Mary’, the theme (‘letter’) is the structural direct object of the verb, and the recipient (‘Mary’) carries special marking (in this case, the preposition ‘to’). However, in Fataluku, it is the theme (sorot ‘letter’) that receives special marking, and the recipient (Mari) is the structural direct object.

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7 In this section, I draw on the work of van Engelenhoven (2009, 2010), Colleen O’Brian (personal communication), Tom Dougherty (personal communication), and Klamer & Schapper (2012) on this construction in the language family as a whole.
Van Engelenhoven (2010) proposes that the clitic =im is in the process of grammaticalizing from the verb em-e ‘take’ (a verb in common use in other constructions). Thus, the sentence above would have originally expressed something like ‘John takes the letter and gives it to Mary.’ Klamer & Schapper (2012) take this analysis a step further, comparing give-constructions across the TAP family. They find similar constructions in several other TAP languages, and build a convincing case for a series of grammaticalization paths from ‘take’.

(111) ana iwin=im tawa ina
    I.SG.SUBJ that.MES=VAL 3.SG give
    ‘I gave that to her’ (LE:Elicit)

Give-constructions lacking an overt theme are also possible. If the theme NP is not overt, the morpheme I gloss as VAL is realized as the independent word em, as in example (112) (an analysis advocated by Colleen O’Brien). This lends extra credence to the notion that the clitic =im has been grammaticalized from em-e ‘take’.

(112) ana em kinamoko ina
    I.SG.SUBJ VAL child give
    ‘I give [it] to the child’ (LE:Elicit)

The same type of construction is used to add valency in other circumstances as well, for instance, to express the notion of “selling something to someone.” The verb for sell is pura, which is a typical transitive verb. In order to increase its valency, two additional morphemes are used. The first is aci—likely an instance of the verb aci ‘see’—which expresses the notion ‘to, towards’ in this context. The second is =im, from em-e ‘take’, which occurs immediately after the theme of the selling event. The recipient occurs in the direct object position.

(113) Jerai a payah pura.
    Jerai SBJ mango sell
    ‘Jerai sells mangos’ (LE:Elicit)

(114) Jerai a payah=im Titiso aci pura
    Jerai SBJ mango=VAL Titiso see sell
    ‘Jerai sells mangos to Titiso’ (LE:Elicit)

One curious feature of Fataluku’s give-construction is the indication of aspect. Rather than being located before the verb ina ‘give’, the perfective aspect marker hai ‘PRF’ occurs directly after the theme argument, and =im cliticizes to the aspect marker, as in example (115). The word ali ‘again’ occurs in a similar position.
Knowing the verbal origins of =im ‘VAL’ helps explain this somewhat strange placement of aspect marking. However, synchronically, the placement of the noun phrase clitic =im suggests the possibility that the aspect marker is syntactically a component of the noun phrase. Additional research is necessary on this point.

2.6.5 Causatives

Two-Clause Causativization

Fataluku has two types of causatives, the first of which makes use of switch reference and the second of which makes use of verb serialization. The first type of causative consists of two clauses. In the first clause, the causer occurs as the subject of the verb fa’i ‘to make, to do’. The second clause expresses the caused event. The relationship between the clauses is indicated with different-subject marking on the verb fa’i ‘to make, to do’. This pattern can be used to causativize intransitive verbs, transitive verbs or give-events.

Causativization of intransitives

(117)  
ana fa’i=t Jerai a mac-e  
1.SG.SBJ make=DS Jerai SBJ eat-VB  
‘I make Jerai eat.’  
(LE:Elicit)

(118)  
ana fa’i=t Payarai imir-e  
1.SG.SBJ make=DS Payarai sit-VB  
‘I make Payarai sit.’  
(LE:Elicit)

Causativization of transitives

(119)  
ana fa’i=t Jerai a payah pura.  
1.SG.SBJ make=DS Jerai SBJ mango sell  
‘I make Jerai sell mangos’  
(LE:Elicit)
Causativization of *give*-constructions

(121)  \[
\text{tawa fa'i=t ana cicira'i-n=im kinamoko ina}
\]
3.SG make=DS 1.SG.SBJ play-NMLZ=VAL child give

‘He made me give a toy to the child.’ (LE:Elicit)

(122)  \[
\text{ana fa'i=t Jerai a payah=im Titiso aci pura}
\]
1.SG.SBJ make=DS Jerai SBJ mango=VAL Titiso see sell

‘I make Jerai sell mangos to Titiso’ (LE:Elicit)

Serial Verb Causativization

In the second type of causative, the verb expressing the caused event is serialized with the verb *fa'i* ‘to do’, and both verbs share a single set of grammatical relations. Evidence for serialization include the facts that verbs lose their verbal suffix -'e 'VB’ in this construction and the verb *fa'i* ‘to do’ undergoes consonant mutation, becoming *pa'i* ‘to do’ (see sec. 4.2); both of these characteristics are reliable markers of SVCs. The subject of the caused event is followed by the clitic =im ‘VAL’ (another use of the valency-increasing clitic). Examples (123–125) illustrate this type of causative.

(123)  \[
\text{ana Jerai=m arur pa'i.}
\]
1.SG.SBJ Jerai=VAL cry do

‘I make Jerai cry’ (LE:Elicit)

(124)  \[
\text{ica ma'u e na'e=n, ini=m arah-ara pa'i}
\]
some come DEM.PRX be=SS, 1.PL.EXCL.SBJ=VAL fear-REDUP do

‘Some of them came here, to scare us.’ (lit. ‘cause us to be frightened’) (Indo1999)

(125)  \[
\text{ila em nē-nēr pa'i}
\]
hole VAL RED-flat do

‘make the holes flat’ (JD:Cura)

Examples (126 and 127) are paraphrases of each other; the first uses switch reference marking, the second uses verb serialization. The same is true of (128 and 129).

(126)  \[
\text{nāl a fa'i=t moco arur-e}
\]
mother SBJ make=DS child cry-VB

‘The mother makes the child cry’ (LE:Elicit)
(127) nāl a moco=m arur pa’i
   mother SBJ child=VAL cry make
   ‘The mother makes the child cry’ (LE:Elicit)

(128) kinamoko a fa’i=t ipar kayar-e
   boy SBJ make=DS dog tired-VB
   ‘The boy makes the dog tired’ (LE:Elicit)

(129) kinamoko a ipar=im kayar pa’i
   boy SBJ dog=VAL tired do
   ‘The boy makes the dog tired’ (LE:Elicit)

2.6.6 Topicalization

A constituent can be emphasized by placing it sentence-initially and attaching the clitic =(i)tu ‘TOP’. Like the different subject switch reference clitic, there is phonologically conditioned allomorphy in the first vowel: the vowel i occurs following consonants, though not after vowels. The final vowel u occurs only in careful speech. It is possible that this clitic is homophonous with the different subject switch reference clitic =(i)tu ‘DS’, or alternatively, that both represent different functions of a single clitic. This is an open question; at present, I have chosen to gloss the topic marker separately from the switch reference marker for expositional clarity. Subject pronouns may be followed by =ta, which also has an apparently topicalizing meaning, but which is still poorly understood.

Topicalization is shown in examples 130–132.

(130) kois-e=tu an=ta mara
   be.future-VB=TOP 1.SG.SBJ=TOP go
   ‘I’ll be there’ (JL:Elicit)

(131) nop-e=t aﬁ=ta nita fanuhen-e.
   tomorrow-VB=TOP 1.PL.1.SBJ=TOP RECP meet-VB
   ‘Tomorrow we will face each other.’ (JD:Cura)

(132) Ėri=t(u) ā fa’i
   2.SG=TOP 2.SG.SBJ do
   ‘You did (it)!’ (JL:Elicit)

The topicalization marker =(i)tu ‘TOP’ is also commonly used to front wh- words. Fataluku’s basic strategy is to place wh- words in situ, though they can be fronted with the topicalization
marker, as seen in example 134. The syntax of wh- questions is discussed in greater detail in section 2.7.2 below.

In situ wh-

(133) Zerai a ina toto.
Zerai SBJ what look.at
‘What was Zerai looking at?’ (JL:Elicit)

Topicalized wh-

(134) Ina=it Zerai a toto.
what=TOP Zerai SBJ look.at
‘What was Zerai looking at?’ (JL:Elicit)

2.6.7 Relative Clauses

In the following description of relative clauses, I lean heavily on the unpublished, preliminary analysis of relative clauses done by Victoria Chen (2012), a colleague who also worked with LE. Chen explains that Fataluku relative clauses are head-external and follow the noun phrase they modify. Positions which can be relativized include subjects, direct objects, objects of comparison and possessors, all of which are relativized using a gap strategy. Relative clauses are introduced by the relative clitic =(i)tu ‘REL’, which attaches to the modified noun phrase.8 The morpheme ele, which Chen analyzes as a relative pronoun, may also occur at the beginning of the relative clause. She states the occurrence of ele is optional for subject and object relatives, while obligatory for the relativization of other positions (which are unnatural or ungrammatical without it).

Examples 135–137 show gap-type relativization for both subject and object positions.

Relativization of the subject of an intransitive verb (S)

(135) ana ma’ar=it [ (ele) ___ tifar-e ] paha
1.SG.SBJ person=REL (REL.PRO) run-VB hit
‘I hit the man who runs.’ (LE:Elicit)

8This morpheme is also homophonous with the different subject switch reference marker, or potentially a different function thereof.
Relativization of the subject of a transitive verb (A)

(136) \[ \text{ana ma'ar=it [ (ele) ipar neur-e ] paha} \]
      \[ \text{1.SG.SBJ man=REL (REL.PRO) dog chase-VB hit} \]
      ‘I hit the man who chases the dog.’ \hspace{2cm} (LE:Elicit)

Relativization of the object of a transitive verb (O)

(137) \[ Meri a ipar=it [ (ele) tawa ___ paha ] uca \]
      \[ \text{Mary SBJ dog=REL (REL.PRO) 3.SG hit kill} \]
      ‘Mary killed the dog that he hit.’ \hspace{2cm} (LE:Elicit)

Examples (138–140) show relativization of other positions.

Relativization of the object of a positional verb

(138) \[ \text{ana meja=t [ ele kinamoko a ___ u'a mir-e ] iwi naler-e} \]
      \[ \text{1.SG.SBJ table=REL REL.PRO child SBJ under sit-VB that hit-VB} \]
      ‘I knocked the table which the child sits under.’ \hspace{2cm} (LE:Elicit)

Relativization of the object of comparison (syntactically the object of a serial verb)

(139) \[ \text{ana ma'ar=it [ ele Tom ___ tali lōhai ] iwi paha} \]
      \[ \text{1.SG.SBJ person=REL REL.PRO Tom beyond tall DEM.MES hit} \]
      ‘I hit the person that Tom is taller than.’ \hspace{2cm} (LE:Elicit)

Relativization of a genitive\footnote{Chen places the gap between \( \ddot{i} \) and \( le \), treating \( \ddot{i} \) ‘POSS’ as a clitic which attaches to the preceding word, \textit{ele} ‘REL.PRO’ in this case. I, however, analyze \( \ddot{i} \) as a separate word, since it satisfies the minimum word requirement and can occur without an overt possessor (cf. sec. \textsection 2.4.1). For this reason, I place the gap before \( \ddot{i} \), where the missing element would be in a typical possessive construction.}

(140) \[ \text{Tom a ma'ar=it [ ele ___ \( \ddot{i} \) lē a lāfai ] uca} \]
      \[ \text{Tom SBJ person=REL REL.PRO POSS house SBJ big kill} \]
      ‘Tom killed the man whose house is big.’ \hspace{2cm} (LE:Elicit)

\textbf{Potential Ambiguities}

Because of several characteristics of Fataluku’s syntax, there is a potential for ambiguity between subject and object relatives. Because of its SOV word order, both the subject and the object are on
the same side of the embedded verb, so it can be ambiguous whether the subject was relativized or the object, and there is no verbal agreement morphology to help in this regard. Chen notes, however, that the subject and object readings are (at least sometimes) disambiguated by a subtle phonological difference. Examples [141], a subject relative, and [142], an object relative, are almost identical, though Chen reports that the final vowel in the pronoun tawa is longer in the subject relative.

(141) ana ipar=it [___ tawa kiki-’e] iwi uca
1.SG.SBJ dog=REL ___ 3.SG bite-VB DEM.MES kill
‘I kill the dog that bites him.’ (LE:Elicit)

(142) ana ipar=it [tawa(;) ___ kiki-’e] iwi uca
1.SG.SBJ dog=REL ___ 3.SG bite-VB DEM.MES kill
‘I kill the dog that he bites.’ (LE:Elicit)

Chen explains this difference in duration as a unique prosodic property of subjects, namely, that subjects are emphasized. I propose however, that the additional length of tawa in the object relative is in fact a consequence of fusion of the subject marker a ‘SBJ’ with the final vowel of tawa. The presence of the subject marker a ‘SBJ’ would flag tawa ‘3.SG’ as the subject, forcing the gap to be interpreted as an object relative.

Examples [143] and [144] further illustrate the use of the subject marker to disambiguate relative clauses. In slower speech, the subject marker is kept distinct from the preceding vowel by a glottal stop, though in more rapid speech, the adjacent identical vowels fuse, explaining the results observed by Chen.

(143) ana ipar=it [___ tawa neure] paha
1.SG.SBJ dog=REL ___ 3.SG chase hit
‘I hit the dog that is chasing him.’ (LE:Elicit)

(144) ana ipar=it [tawa a ___ neur-e] paha
1.SG.SBJ dog=REL 3.SG SBJ chase-VB hit
‘I hit the dog that he is chasing.’ (LE:Elicit)

Chen also gives another type of relative clause which is nearly ambiguous, but distinguished by a subtle phonological difference. Since the second person subject and first person nonsubject pronouns are both monosyllabic words containing the vowel /a/, subject relatives with an embedded first person object and object relatives with an embedded first person subject are very similar phonologically. Examples [145] and [146] illustrate this.

48
(145) Meri a ipar=it [ ___ a kiki-'e ] paha
Mary SBJ dog=REL ___ 1.SG.NSBJ bite-VB hit
‘Mary hits the dog that bites me.’  

(146) Meri a ipar=it [ ā ___ kiki-'e ] paha
Mary SBJ dog=REL 2.SG.SBJ ___ bite-VB hit
‘Mary hits the dog that you bite.’  

Chen notes a slight difference in intonation, as well as a difference in length, with the second person singular subject longer than the first singular object. These differences are caused by the fact that the second person subject is phonemically long, while the first person nonsubject pronoun is phonemically short, a general property of these morphemes which is not specific to relative clauses.

2.7 Clause types
The following section presents clause types besides basic declaratives, particularly polar questions, wh-questions and imperatives. Direct and indirect quotation are also discussed here.

2.7.1 Polar Questions
Polar questions are syntactically identical to declaratives, apart from the optional presence of the question particle ā ‘Q’ or the question tag ana upe ‘or not’. I have not been able to find any substantial semantic differences between the three question strategies. Regardless of this syntactic flagging, questions are marked prosodically with a L+HL% boundary tone, which also causes substantial lengthening of the final syllable. This intonational pattern is redundant for flagged questions, but serves to disambiguate sentences that lack explicit syntactic flagging. (See section 6.2 for a detailed description of the prosody of polar questions.)

Declarative/Unflagged question

(147) kinamoko a maca mahane
child SBJ bat fear
‘The child was afraid of the bat.’

or ‘Was the child afraid of the bat?’

Question flagged with ā ‘Q’

(148) kinamoko a maca mahane ā
child SBJ bat fear Q
‘Was the child afraid of the bat?’
Question flagged with *ana upe* ‘or not’

(149)  *kinamoko a   maca mahane ana upe*
       child   SBJ bat   fear   or not
       ‘Was the child afraid of the bat or not?’

### 2.7.2 Wh- questions

Fataluku has two strategies for *wh*- questions. The most basic strategy is for the *wh*- word to be left in situ, realized in the same position as the corresponding non-*wh* phrase. This strategy is exemplified in (150).

In situ *wh-*

(150)  *Zerai a   ina   toto.*
       Zerai   SBJ what   look.at
       ‘What was Zerai looking at?’ (JL:Elicit)

The other possibility is for the *wh*- word to be fronted and followed by the topicalizing clitic *(i)tu* ‘TOP’ (see section 2.6.6), as in (151). In elicitation, consultants have not identified any semantic differences between in situ and movement options, though a detailed investigation of the semantics of these alternatives would be an interesting topic for future investigation.

Topicalized *wh-*

(151)  *Ina=it   Zerai a   toto.*
       what=TOP Zerai   SBJ look.at
       ‘What was Zerai looking at?’ (JL:Elicit)

Table 2.16 shows the most common *wh*- words. Of particular interest is the morpheme *te-* ‘WH’, which can attach to verbs to form a *wh*- verb. For instance, *na’e* ‘to be at’ becomes *te-na’e* ‘to be where?’, and *wa’an-e* ‘to be alike’ becomes *te-wa’an-e* ‘to be like what?’ Examples [152–163] illustrate the use of various *wh*- words in context.

Questions with *ina* ‘what?’

(152)  *ipar ina   nawa?*
       dog   what   eat
       ‘What did the dog eat?’ (LE:Elicit)
<table>
<thead>
<tr>
<th><strong>wh- word</strong></th>
<th><strong>gloss</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>ina</td>
<td>‘what?’</td>
</tr>
<tr>
<td>ina hinta</td>
<td>‘why?’, lit. ‘for what reason?’</td>
</tr>
<tr>
<td>uman</td>
<td>‘who?’</td>
</tr>
<tr>
<td>tarupaha</td>
<td>‘how much?’</td>
</tr>
<tr>
<td>tarut-e</td>
<td>‘when?’</td>
</tr>
<tr>
<td>te-</td>
<td>WH</td>
</tr>
<tr>
<td>te-mara</td>
<td>‘to go where?’</td>
</tr>
<tr>
<td>te-na-‘e</td>
<td>‘to be located where?’</td>
</tr>
<tr>
<td>te-‘an-e</td>
<td>‘to be done how?’</td>
</tr>
<tr>
<td>te-wa’an-e</td>
<td>‘to be like what?’</td>
</tr>
</tbody>
</table>

Table 2.16: Common wh- words

(153) tawa ī nāl a leura ina nā rakas-e?
3.SG POSS mother NOM meat what at fry-VB
‘In what did his mother fry the meat?’ (PL:Sentences)

(154) ina=’it nami moko a em tupur moko ina?
what=TOP male child SBJ VAL female child give
‘What did the boy give the girl?’ (Ll:Elicit)

Questions with uman ‘who?’

(155) uman=it tifare?
who=TOP run
‘Who is running?’ (LE:Elicit)

(156) ā sorot asa=m uman ina?
2.SG.SBJ book leaf=VAL who give
‘Who did you give the paper?’

(157) ā fa’i=t uman=it dosi una?
2.SG.SBJ make=DS who=TOP cake eat
‘Who did you make eat cake?’ (LE:Elicit)

Question with tarut-e ‘when?’

(158) ā tarut mac-e?
2.SG.SBJ when eat-VB
‘When did you eat?’ (LE:Sentences)
(159) ă rohon tarut la’a
2.SG.SBJ be.past when go
‘When did you go?’ (LE:Elicit)

Question with *te-na-’e* ‘to be located where?’

(160) e lē te-na-’e?
2.SG.SBJ house WH-at-VB
‘Where is your house?’

Question with *te-mara* ‘to go where?’

(161) ă la’a te-mara?
2.SG.SBJ go WH-go
‘Where are you going?’

Questions with *te-wa’an-e* ‘to be like what?’

(162) ipar te-wa’a-wa’an-e
dog WH-RED-like-VB
‘What does that dog look like?’ (LE:Elicit)

(163) nami moko a ulur=im te-wa’an pa’i
male child SBJ breadfruit-VAL WH-like do
‘What did the boy do with the breadfruit?’ (Ll:Sentences)

Multiple *wh-* words

(164) uman=it rahin ina fa’i
who=TOP be.past what do
‘Who did what?’ (LE:Elicit)

### 2.7.3 Imperatives

**Positive Imperatives**

Positive imperatives are syntactically identical to declaratives, aside from the absence of an explicit subject in all circumstances. They are illustrated in examples 165–167.
Negative Imperatives

Negative imperatives are formed by placing the negative imperative marker *tapa* ‘NEG.IMP’ initially.

(168)  
\[ \text{tapa arapou pura} \]  
\[ \text{NEG.IMP buffalo sell} \]  
‘Don’t sell the water buffalo’

(169)  
\[ \text{tapa la’aa} \]  
\[ \text{NEG.IMP go} \]  
‘Don’t go’

(170)  
\[ \text{tapa nana na’al-e} \]  
\[ \text{NEG.IMP snake at touch-VB} \]  
‘Don’t touch the snake.’

2.7.4 Quotation

Fataluku has a number of syntactic possibilities for showing quotation, both direct and indirect. One strategy is to simply place the quote directly after the verb of speaking, as in example (171).

This sentence represents a direct quote, as evidenced by the fact that the man uses the second person pronoun to address the woman.

(171)  
\[ \text{mar’ar tupur e na’u kolew-e=n atan-e, “Ā umani?”} \]  
\[ \text{person female DEM.PROX completely hug-VB=SS ask-VB 2.SG.SBJ who} \]  
‘He hugged the woman and asked her, “Who are you?” ’  

Another strategy for direct quotes is to use the quotative particle *to* ‘QUOT’ immediately before the beginning of the quoted material.
Indirect quotes can be formed by linking a clause with a speaking verb to a clause representing the spoken material using the switch reference clitic (=)tu ‘DS’, as in examples [174] and [175]. Example [173] is clearly an indirect quote, as evidenced by the choice of pronouns. The “inviter” in this example is quoted as using the first person exclusive pronoun ina ‘1.PL.X.SBJ’. It makes no sense to interpret this as a direct quote, since in this case, the inviter’s choice of pronouns would exclude the audience he is inviting. Rather, the exclusive pronoun should be interpreted with respect to LE, who uttered the entire sentence, who means to say that he and a few others were invited, excluding the audience to which he is relating the story. Similarly, example [175] refers to the addressee of the quote in the third person.

2.8 Historical relationships

2.8.1 Subgrouping

I conclude this overview of Fataluku’s grammar with a brief summary of historical relationships. Fataluku’s status as a member of the Timor-Alor-Pantar (henceforth TAP) family of Papuan languages was demonstrated by Schapper et al. (2012, 2014), and further confirmed by Heston (2015). The application of the comparative method to the TAP languages is still in its very early stages, and many important issues regarding the history of the languages remain to be worked out. In this section, I summarize what is known of the TAP language family and Fataluku’s place in the family.

54
Figure 2.1: Preliminary subgrouping of the TAP languages (Holton et al., 2012; Schapper et al., 2012, 2014)

The subgrouping of the TAP family given by Holton et al. (2012) and Schapper et al. (2012, 2014) is shown in figure 2.1. This subgrouping is very preliminary in nature, since the phoneme inventory of PTAP has not yet been fully established. Most nodes are supported by only one or two shared innovations. Schapper et al. give three sound changes which define Proto-Eastern-Timor (PETIM; the node containing Makalero, Makasae, Fataluku and Oirata) and three which define Proto-Fataluku-Oirata (PFRATA).

Innovations defining Proto-Eastern-Timor:

1. *k > /V__V
2. *h > /ø/#_VNON-FRONT
3. *w > /ø_/u

They also give three sound changes which define Proto-Fataluku-Oirata.

Innovations defining Proto-Fataluku-Oirata:

1. Loss of 3rd person prefix *g-11
2. PETIM *h > /ø/#_VFRONT
3. The merger of PETIM *p and *b as PFRATA *p12

10 For reasons of space, several languages forming primary branches from PAP and proto-Alor could not be shown.
11 As a loss, rather than an innovation, this change has questionable value as a subgrouping heuristic.
These two subgroups are some of the most reliable units in the family. They also correlate with impressionistic similarity between the languages. However, even these subgroups are not entirely unproblematic: much future work is definitely needed.

2.8.2 Vowel Reflexes

Table 2.17 summarizes the vowel reflexes of PTAP in Fataluku, based on my own work, described in an as yet unpublished manuscript (Heston, 2015). The origin of Fataluku /o/ remains unknown. While PTAP did have *o, the phonemes *o, *u and *ə have all merged as *u in Fataluku.

<table>
<thead>
<tr>
<th>PTAP</th>
<th>Env.</th>
<th>Fataluku</th>
</tr>
</thead>
<tbody>
<tr>
<td>*a</td>
<td>a</td>
<td></td>
</tr>
<tr>
<td>*e</td>
<td>e</td>
<td></td>
</tr>
<tr>
<td>*i</td>
<td>i</td>
<td></td>
</tr>
<tr>
<td>*o</td>
<td>u</td>
<td></td>
</tr>
<tr>
<td>*u</td>
<td>u</td>
<td></td>
</tr>
<tr>
<td>*ə</td>
<td>u</td>
<td></td>
</tr>
</tbody>
</table>

Table 2.17: Vowel correspondences from PTAP to Fataluku

2.8.3 Consonant Reflexes

The following table summarizes the relationship between the PTAP consonant inventory and Fataluku’s consonant inventory, based entirely on the work of Schapper et al. (2012, 2014). A blank environment indicates a reflex that appears in all other cases. The origins of the Fataluku phonemes /z/ and /j/ remain unknown.

---

12 The merger of PETIM *p, *b > *p, would generally be good evidence of subgrouping, since it clearly establishes a particular directionality for the change. However, in their most recent paper, Schapper et al. (2014) treat PTIM *p and *b as the result of a conditioned phonemic split, from PTAP *p. Thus, Schapper et al.’s analysis proposes that PTAP *p split into *p and *b, which later merged again into *p. While such a situation is certainly not impossible, it would be simpler to posit a single change from *b to *p in the other PETIM languages.
<table>
<thead>
<tr>
<th>PTAP</th>
<th>Env.</th>
<th>Fataluku</th>
</tr>
</thead>
<tbody>
<tr>
<td>*p</td>
<td>f</td>
<td></td>
</tr>
<tr>
<td>*b</td>
<td>p</td>
<td></td>
</tr>
<tr>
<td>*t</td>
<td>t</td>
<td></td>
</tr>
<tr>
<td>*d</td>
<td>#_V[-bk]</td>
<td>Ø</td>
</tr>
<tr>
<td></td>
<td>#_V[+bk]</td>
<td>òs</td>
</tr>
<tr>
<td></td>
<td>V__V</td>
<td>òs</td>
</tr>
<tr>
<td>*k</td>
<td>#__</td>
<td>k</td>
</tr>
<tr>
<td></td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>*g</td>
<td>#__</td>
<td>k</td>
</tr>
<tr>
<td></td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>*s</td>
<td>#__</td>
<td>h</td>
</tr>
<tr>
<td></td>
<td>V__V[-lo]</td>
<td>h~?</td>
</tr>
<tr>
<td></td>
<td>V__V[+lo]</td>
<td>s</td>
</tr>
<tr>
<td></td>
<td>#__(verbs)</td>
<td>h~s</td>
</tr>
<tr>
<td>*h</td>
<td>Ø</td>
<td></td>
</tr>
<tr>
<td>*w</td>
<td>v</td>
<td></td>
</tr>
<tr>
<td>*j</td>
<td>Ø</td>
<td></td>
</tr>
<tr>
<td>*r</td>
<td>r</td>
<td></td>
</tr>
<tr>
<td>*R</td>
<td>l</td>
<td></td>
</tr>
<tr>
<td>*l</td>
<td>l</td>
<td></td>
</tr>
<tr>
<td>*m</td>
<td>m</td>
<td></td>
</tr>
<tr>
<td>*n</td>
<td>n</td>
<td></td>
</tr>
</tbody>
</table>

Table 2.18: Consonant correspondences from PTAP to Fataluku (following Schapper et al., 2012, 2014). The symbol Ø is used to represent ‘zero’ in the case of deletions.
3 PHONEMES

In this chapter, I give an overview of the phonemes and phonotactics of Fataluku. The chapter is organized as follows: section 3.1 deals with the consonant phonemes of Fataluku, while section 3.2 deals with the vowels. These sections provide minimal pairs illustrating the relevant phonemic contrasts and provide phonetic descriptions of each phoneme’s typical realization. Section 3.3 summarizes syllable structure requirements and phonotactics. Section 3.4 gives a detailed phonological analysis of several sounds whose precise analysis is not clear from minimal pairs alone, including surface long vowels, surface diphthongs and the glide [j].

3.1 Consonant Phonemes

The Fataluku inventory contains 15 native consonants and 3 loan consonants (the voiced stops /b/, /d/ and /g/, which occur only in loan words). The consonant inventory is summarized in table 3.1.

<table>
<thead>
<tr>
<th></th>
<th>Bilabial</th>
<th>Labdent</th>
<th>Alveolar</th>
<th>Palatal</th>
<th>Velar</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop</td>
<td>p (b)</td>
<td>t (d)</td>
<td>k (g)</td>
<td>?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affricate</td>
<td></td>
<td>f</td>
<td></td>
<td>s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fricative</td>
<td></td>
<td>v</td>
<td></td>
<td>z</td>
<td>h</td>
<td></td>
</tr>
<tr>
<td>Nasal</td>
<td>m</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tap/trill</td>
<td></td>
<td>r</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lateral</td>
<td></td>
<td>l</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3.1: Consonant phonemes

The following examples show minimal and near-minimal pairs in broad transcription, which serve as evidence for the phonological analysis proposed here. More detailed statistical analyses are also given for several phonetic properties, based on the speech of two male speakers of Fataluku in their early twenties. One speaker (LE) is from the centrally-located town of Lospalos, while the other (JL) is from the village of Com on the northeastern coast. Phonetic analyses are based primarily on a list of words read in the frame *ana ___ ta’a ‘I said ___ ’. These utterances were produced in general as two accentual phrases, [AP *ana] [AP ___ ta’a]; thus, segments realized word-initially are also accentual phrase initial (see chapters 5 and 6 for discussion of prosodic phrasing).
3.1.1 Stops

Fataluku has four native stops /p, t, k, ?/, all of which are voiceless. The oral stops /p, t, k/ are each realized with a small amount of aspiration (see VOT measurements below). The phoneme /p/ is realized as a voiceless bilabial stop [p] in all positions. The realization of the phoneme /t/ most closely resembles a dental stop [t], though in the absence of palatographic data, it is difficult to determine its exact place of articulation. The phoneme /k/ is generally realized as a voiceless velar stop [k], although in the presence of front vowels it is fronted towards the palatal region, as [k], and in the presence of back vowels it is realized further towards the uvular region, as [q] or [ɢ]. Stops are typically released word-finally.

Examples 1–6 give minimal pairs illustrating contrasts between these stops in broad transcription. Word-level prosody is not marked in these examples, since there is no convincing evidence for any type of contrastive stress, tone or pitch accent in Fataluku. Word-level suprasegmental behavior is predictable, with an intonational high generally occurring on the second vowel of a word (see chapter 5 for a detailed investigation).

<table>
<thead>
<tr>
<th></th>
<th>/p/ vs. /t/</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>paʔa</td>
<td>‘a lot’</td>
</tr>
<tr>
<td></td>
<td>taʔa</td>
<td>‘say’</td>
</tr>
<tr>
<td></td>
<td>rapu</td>
<td>‘vegetable type’</td>
</tr>
<tr>
<td></td>
<td>ratu</td>
<td>‘clan’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>/p/ vs. /k/</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>pala</td>
<td>‘farm’</td>
</tr>
<tr>
<td></td>
<td>kalah</td>
<td>‘taro’</td>
</tr>
<tr>
<td></td>
<td>tapa</td>
<td>‘NEG.IMP’</td>
</tr>
<tr>
<td></td>
<td>taka</td>
<td>‘cover’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>/p/ vs. /ʔ/</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>tapa</td>
<td>‘NEG.IMP’</td>
</tr>
<tr>
<td></td>
<td>taʔa</td>
<td>‘say’</td>
</tr>
</tbody>
</table>
There are also three voiced stops /b, d, g/, which occur only in recent loan words (primarily from Malay, Portuguese or Tetun Dili). Table 3.2 shows a number of loan words with voiced stops.\textsuperscript{1} When realized between vowels, as in the frame \textit{ana ___ ta’a} ‘I said ___ ’, /b/, /d/ and /g/ are voiced throughout their entire duration. An example spectrogram is shown in figure 3.1.

\textsuperscript{1}Malay glosses are from http://www.indodic.com/; Portuguese glosses are from http://www.wordreference.com/; Tetun glosses are from Williams-van Klinken 2011.
Figure 3.1: An example of the loan phoneme /d/, taken from the frame /ana dosi ta?a/ ‘I said cake.’ This stop is voiced throughout its duration, as shown by the presence of periodic vibrations in the waveform and low frequency energy in the spectrogram (a “voicing bar”).

<table>
<thead>
<tr>
<th>Fataluku</th>
<th>Gloss</th>
<th>Source Lg.</th>
<th>Original</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>/b/</td>
<td>baru</td>
<td>Malay</td>
<td>baru</td>
<td>‘new’</td>
</tr>
<tr>
<td></td>
<td>buku</td>
<td>Malay</td>
<td>buku</td>
<td>‘book’</td>
</tr>
<tr>
<td></td>
<td>bir</td>
<td>Malay</td>
<td>bir</td>
<td>‘beer’</td>
</tr>
<tr>
<td></td>
<td>obrigadu</td>
<td>Portuguese</td>
<td>obrigado</td>
<td>‘thank you’</td>
</tr>
<tr>
<td></td>
<td>tamba</td>
<td>Tetun Dili</td>
<td>tamba</td>
<td>‘because’</td>
</tr>
<tr>
<td>/d/</td>
<td>dosi</td>
<td>Portuguese</td>
<td>doce</td>
<td>‘sweet’</td>
</tr>
<tr>
<td></td>
<td>doutor</td>
<td>Portuguese</td>
<td>doutor</td>
<td>‘doctor’</td>
</tr>
<tr>
<td></td>
<td>depois</td>
<td>Portuguese</td>
<td>depois de</td>
<td>‘after’</td>
</tr>
<tr>
<td></td>
<td>kuandu</td>
<td>Portuguese</td>
<td>quando</td>
<td>‘when’</td>
</tr>
<tr>
<td></td>
<td>maksud</td>
<td>Malay</td>
<td>maksud</td>
<td>‘purpose’</td>
</tr>
<tr>
<td>/g/</td>
<td>governo</td>
<td>Portuguese</td>
<td>governo</td>
<td>‘government’</td>
</tr>
<tr>
<td></td>
<td>designa</td>
<td>Portuguese</td>
<td>designa</td>
<td>‘designate’</td>
</tr>
<tr>
<td></td>
<td>goyabas</td>
<td>Portuguese</td>
<td>goiaba</td>
<td>‘guava’</td>
</tr>
<tr>
<td></td>
<td>kolega</td>
<td>Portuguese</td>
<td>colega</td>
<td>‘colleague’</td>
</tr>
<tr>
<td></td>
<td>tiga</td>
<td>Malay</td>
<td>tiga</td>
<td>‘three’</td>
</tr>
</tbody>
</table>

Table 3.2: Loan words with voiced stops

The native oral stops, on the other hand, are fully voiceless both initially and medially, and have some aspiration. Figure 3.2 displays the mean VOTs for the three oral stops, averaged across 191 tokens in all (/p/, 53; /t/, 79; /k/, 59). All measurements were made in the frame ana ___ ta’a ‘I said ___’, before the vowel /a/. Word-medial stops were both preceded and followed by /a/. In word-initial position, mean VOTs for the native stops are as follows: /p/ 18.7ms; /t/ 15.5ms; /k/ 42.3ms. In word-medial position, mean VOTs are: /p/ 23.2ms; /t/ 17.6ms; /k/ 40.6ms.
Applying a linear mixed-effects model revealed a significant effect of place of articulation, though no significant effect of position in the word (see table 3.3). I chose initial alveolar stops as the reference category, since the generally expected correlation between backness and VOT makes comparisons between adjacent places of articulation of particular interest (see e.g., Shalev et al. [1993]). Velar stops have significantly larger VOTs than alveolar stops, $b = 25.09$, $t(186) = 14.36$, $p < .0001$. Labial stops have slightly longer VOTs than alveolar stops numerically, but this difference is not significant, $b = 3.04$, $t(186) = 1.61$, $p > .05$. Position in the word (initial vs. medial) had no significant effect. Overall, word-medial stops were very slightly longer than word-initial stops numerically (though this tendency was reversed for the velars). The effect of word position is not significant, $b = 1.18$, $t(186) = .75$, $p > .05$. There was a small variance in the intercept (baseline VOT) across speakers which just reached significance, $SD = 0.80$ (95% CI: 0.06, 9.95), $\chi^2(1) = 3.88$, $p = 0.048$.

<table>
<thead>
<tr>
<th></th>
<th>$b$</th>
<th>$SE b$</th>
<th>95% CI</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intercept (initial alveolar)</strong></td>
<td><strong>16.21</strong></td>
<td><strong>1.59</strong></td>
<td><strong>13.11, 19.31</strong></td>
<td><strong>$p &lt; .0001$</strong></td>
</tr>
<tr>
<td>Labial (0=nonlabial, 1=labial)</td>
<td>3.04</td>
<td>1.89</td>
<td>-0.64, 6.72</td>
<td><strong>$p = .11$</strong></td>
</tr>
<tr>
<td><strong>Velar (0=nonvelar, 1=velar)</strong></td>
<td><strong>25.09</strong></td>
<td><strong>1.75</strong></td>
<td><strong>21.68, 28.51</strong></td>
<td><strong>$p &lt; .0001$</strong></td>
</tr>
<tr>
<td>Position (0=initial, 1=medial)</td>
<td>1.18</td>
<td>1.56</td>
<td>-1.87, 4.22</td>
<td><strong>$p = .45$</strong></td>
</tr>
</tbody>
</table>

Table 3.3: Mixed-effects model of the effects of place of articulation and word position on VOT (in ms)
The last native stop, /P/, is phonemic only in intervocalic position, though a glottal stop is also inserted morpheme-initially before a vowel, following silence or another vowel (see section 4.2.2). In rapid speech, the phonemic glottal stop is generally realized only as a period of creakiness on the vowel, or may be deleted altogether (see examples in section 4.3.1). Realization of a phonemic glottal stop as a period of creakiness instead of a complete closure is a common crosslinguistic tendency noted by Ladefoged & Maddieson (1996).

Although the glottal stop has a limited distribution, and is sometimes deleted, there are minimal pairs which show that it must indeed be analyzed as a phoneme. Its presence morpheme-internally is unpredictable. Though not always realized in words in which it occurs phonemically, it may not be added to words in which it does not.

(7) /P/ vs. /ø/

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ra?u</td>
<td>‘plate’</td>
</tr>
<tr>
<td>rau</td>
<td>‘good’</td>
</tr>
<tr>
<td>ha?i</td>
<td>‘species of tree’</td>
</tr>
<tr>
<td>hai</td>
<td>‘PRF’</td>
</tr>
</tbody>
</table>

In all, Fataluku’s system of stops is fairly normal typologically. The use of labial, alveolar, velar and glottal places of articulations is fairly typical. Fataluku furthermore conforms to the tendency for labial stops to have shorter VOTs than velar stops (Shaley et al., 1993). Alveolar stops also have shorter VOTs than velars, though they are not distinguishable statistically from the VOTs of labials.

### 3.1.2 Affricates

Fataluku has only one affricate phoneme, /ts/, which is realized phonetically as a voiceless, lightly aspirated alveolar or dental affricate [ts]. The phonetics of the fricative portion of [ts] are discussed in detail in the section below on fricatives.

The minimal pairs below show the contrast between /ts/ and the two phonemes to which it bears the most resemblance, /t/ and /s/.
The Analysis of țs

Although these minimal pairs show a contrast between [țs] and [t] or [s], they do not a priori rule out the possibility that [țs] is represented as a sequence of the phonemes /t/ and /s/. Since /t/ and /s/ are independently necessary, such an analysis would have the effect of simplifying the phoneme inventory. However, I argue that [țs] should be analyzed as a single unit phoneme, on the basis of its distribution and behavior.

The strongest evidence for the unit phoneme analysis is that [țs] behaves like a single segment with regard to phonotactics. Native Fataluku phonotactic constraints do not permit consonant clusters within a morpheme, but [țs] can occur within a morpheme word-initially (e.g., [țsal] ‘grandparent’), word-medially (e.g., [țsa] ‘fire’) or rarely even word-finally ([i-h-țs] ‘Tuesday; the second’). No other clusters are permitted in these positions, not even homorganic stop-fricative sequences at other places of articulation. Taking the consonant cluster analysis would thus require making exceptions to native phonotactic patterns which find no other motivation, but treating [țs] as a unit phoneme allows its distribution to be predicted straightforwardly.

Another reason for considering [țs] a unit phoneme is that it behaves like a single phoneme in phonological rules. For instance, in consonant mutation, discussed in section 4.2, the phonemes /t/, /s/ and /h/ are each replaced by [țs]. It is generally expected that phonological rules which operate at the phonemic level substitute one phoneme for another, rather than substituting two phonemes for a single one. Speakers also generally think of this sound as a single unit, using a single letter (c) to represent it.
Another reason for viewing [츠] as a unit phoneme is that it corresponds to a single phoneme in related languages. Fataluku [츠] corresponds regularly to /d/ in Makalero, Makasae and Oirata, Fataluku’s closest historical neighbors, reflecting Schapper et al.’s (2014) Proto-Timor-Alor-Pantar *d. There are even some dialects of Fataluku, namely the dialects spoken in the North, which are reported to have a “post-alveolar occlusive” [[]> in place of [츠] (van Engelenhoven, 2009:334). Because of the behavior of [츠] as a single segment in phonotactics and phonological substitutions, as well as its correspondence to a single segment historically, I analyze it as the unit phoneme, /atsu/.

3.1.3 Fricatives

Fataluku has five fricatives phonemes, /f, v, s, z, h/, spread across three places of articulation: labiodental, dental/alveolar and glottal. There is no velar fricative to correspond to the velar stop. There is a voicing contrast for all fricatives except the glottal fricative.

It is notable that Fataluku has a voicing contrast for fricatives, though not for stops (setting aside, for the moment, the more recent introduction of voiced stops in loanwords), since the former usually implies the latter. In the World Atlas of Language Structures, Maddieson (2013) reports that only 6.7% of the languages of his sample have voicing as a distinguishing feature for fricatives, but not for stops. In this number, he includes languages that have voiced stops, but for which voicing is not the only feature that distinguishes them from their voiceless counterparts, such as languages whose only voiced stops are implosives (like the Formosan language Tsou) or prenasalized (like the Bantu language UMbundu). Thus, the actual number of languages with a voicing contrast in fricatives but no voiced stops of any kind is even smaller than this, though such systems are attested, as in Siberian Yupik.

Examples 10–13 show the contrast in manner between stops and fricatives at labial, coronal and post-coronal places of articulation.

(10)  /p/ vs. /f/  

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pata</td>
<td>‘log’</td>
</tr>
<tr>
<td>fata</td>
<td>‘direct’</td>
</tr>
<tr>
<td>api</td>
<td>‘fish’</td>
</tr>
<tr>
<td>afi</td>
<td>1.INCL.ACC</td>
</tr>
<tr>
<td>tapa</td>
<td>NEG.IMPR</td>
</tr>
<tr>
<td>tafa</td>
<td>‘shoot’</td>
</tr>
</tbody>
</table>

65
(11) /t/ vs. /s/

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>tapun</td>
<td>‘round thing’</td>
</tr>
<tr>
<td>sapun</td>
<td>‘lung’</td>
</tr>
</tbody>
</table>

(12) /k/ vs. /h/

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>kafa</td>
<td>‘eight’</td>
</tr>
<tr>
<td>hafa</td>
<td>‘bone’</td>
</tr>
<tr>
<td>aku</td>
<td>‘feces’</td>
</tr>
<tr>
<td>ahu</td>
<td>‘for’</td>
</tr>
</tbody>
</table>

(13) /ʔ/ vs. /h/

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>paʔa</td>
<td>‘a lot’</td>
</tr>
<tr>
<td>paha</td>
<td>‘hit’</td>
</tr>
<tr>
<td>muʔu</td>
<td>‘banana’</td>
</tr>
<tr>
<td>puhu</td>
<td>‘pot’</td>
</tr>
</tbody>
</table>

Examples 14–16 illustrate contrasts among fricatives.

(14) /f/ vs. /v/

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>fata</td>
<td>‘direct’</td>
</tr>
<tr>
<td>vata</td>
<td>‘coconut’</td>
</tr>
<tr>
<td>kafa</td>
<td>‘eight’</td>
</tr>
<tr>
<td>kava</td>
<td>‘short’</td>
</tr>
</tbody>
</table>

(15) /ʃ/ vs. /s/

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>hafa</td>
<td>‘bone’</td>
</tr>
<tr>
<td>hasa</td>
<td>‘leaf’</td>
</tr>
</tbody>
</table>

(16) /s/ vs. /z/

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>hasa</td>
<td>‘leaf’</td>
</tr>
<tr>
<td>aza</td>
<td>‘rain’</td>
</tr>
</tbody>
</table>
Voiced Fricatives

The voiced fricatives show substantially more variation in their phonetic realizations than do the voiceless fricatives. This is consistent with the fact that voiced fricatives are more difficult to produce phonetically, since vocal fold vibration slows the airflow needed to produce frication (Ladefoged & Maddieson, 1996). The phoneme /v/ may be realized phonetically as a labiodental fricative [v], a bilabial fricative [β] or a labial approximant [w/v]. It is cross-linguistically common for voiced fricatives to be realized as approximants, because of the aerodynamic difficulty of maintaining frication at the same time as voicing (Ladefoged & Maddieson, 1996), though motivation for realizing an approximant as a voiced fricative in all environments is questionable. It is for this reason that I analyze this phoneme as underlyingly a fricative, rather

Figure 3.3: A fricative realization of /v/, from the frame /ana valikasa taʔa/ ‘I said ear’ (JL). Note high frequency aperiodic energy above 7,000Hz.
than an approximant. This analysis also resonates with the observation that the fricative realization is generally more common (at least impressionistically). Figure 3.4 illustrates the fricative realization of this phoneme, while figure 3.4 shows an approximant realization.

The fricative /z/ also exhibits free variation, though of a different type. This phoneme is sometimes realized as a voiced fricative [z], but other times as a voiced affricate [ʣ]. This

Figure 3.5: The phoneme /z/ realized as a voiced affricate, from the frame /ana azane taʔa/ ‘I said chew’ (JL). Note relative silence during the stop portion aside from voicing, which continues throughout (shown by periodic vibrations on the waveform and the presence of low frequency energy in the spectrogram.)
Figure 3.6: The phoneme /z/ realized as a voiced fricative, from the frame /ana azane ta?a/ ‘I said chew’ (JL). Note the absence of a stop closure.

variation cannot be expressed in terms of a phonological conditioning environment, since both realizations can occur in identical environments. Figures 3.5 and 3.6 illustrate affricate and fricative realizations of this phoneme, respectively. Both are from the same word, spoken by the same speaker, taken from successive repetitions of a wordlist.

Typically, the fricative realization is voiced all the way through, as in figure 3.6. When realized as an affricate, however, it is common for voicing vibrations to be substantially deadened by the time of the fricative portion, making the affricate’s release similar to a voiceless fricative in many cases.

Fricative Durations
The duration of fricative noise in affricates is only about half as long as the duration of fricatives, as shown in figure 3.7. [f] has a duration of 97.49ms, and [s] has a duration of 103.35ms, while the duration of frication in [ts] is roughly half of that, at 52.30ms. Though data for /z/ is less abundant, affricate realizations of /z/ are observed to be comparable to those of [ts], at 49.32ms, while fricative realizations of /z/ are much more like other fricatives, at 83.15ms.

Phonetically, /f/, /s/ and /ts/ are each realized with a small amount of aspiration. Voice onset time was measured beginning at the point at which aspiration noise became more prominent in the spectrogram than frication. Voicing was judged to begin at the upwards zero-crossing of the first full cycle of the vocal folds which showed more than one formant. All examples were word-initial or word-medial, preceded and followed by /a/. The results reported are based on a sample of 104 fricatives (24 /f/, 20 /s/, 60 /ts/), spoken in the same frames by the same speakers as
Figure 3.7: The mean duration of frication, excluding aspiration. For affricates, only the duration of frication is measured. Error bars show standard error. The symbol $c$ represents /ts/, while $j$ represents /z/, following orthography.

Figure 3.8: The mean VOT (in ms) of fricatives. Error bars show standard error.
the stops analyzed in the previous section. Average VOT was 22.11 for /f/, 21.25 for /s/, and 21.85ms for /ts/, as shown in fig 3.8 below. All three fricatives have almost identical VOTs, well within standard error. The VOTs are furthermore comparable to labial stops (18.7ms initially) and alveolar stops (15.5ms).

**Spectral Characteristics**

Phonetically, fricatives are characterized by a turbulent airflow that results in stochastic, non-repeating noise spread across a wide range of frequencies. The most important acoustic characteristic of a fricative is how this “noise” is distributed across the frequencies. The shape of the frequency distribution depends in large part on where frication is produced in the vocal tract. When frication is produced towards the back of the mouth, the part of the oral cavity in front of the constriction forms a tube, which resonates with certain frequencies. Places of articulation further towards the back of the oral cavity are accompanied by a longer tube, which amplifies lower frequencies. For this reason, lower frequency peaks correlate with places of articulation further towards the back of the mouth, at least for non-labials. Labials are unique; since they are produced at the front of the vocal tract, there is no tube in front of the noise source, to filter the sound. For this reason, labials do not typically show sharp peaks; instead fricative energy is distributed across the full range of frequencies (Johnson, 2012).

Fricatives are generally analyzed both qualitatively and quantitatively. Qualitative analysis involves examination and description of spectra, which plot the amplitude of noise at each frequency. Quantitative analysis generally focuses on the four spectral moments of fricatives, four different measures of spectral shape. Here, I discuss the first two spectral moments, center of gravity and standard deviation. The center of gravity (or centroid) measures the average frequency of fricative noise. Higher centers of gravity correlate with places of articulation further forward in the oral cavity, because of the filtering effect of the vocal tract. The standard deviation, parallel with its use in statistics, measures the extent to which energy is centralized in a particular frequency range. Higher standard deviations indicate more diffuse spectra (see Johnson, 2012; Gordon et al., 2002; Sundara, 2005).

Qualitatively, the fricative portions of [s], [ts] and [dz] show very similar spectral characteristics, especially compared to [f]. The coronals each show sharp rise in energy at 5 kHz, while [f] has a more diffuse peak at around 11 kHz. This difference is fairly typical, since alveolar or post-alveolar fricatives typically show one or more peaks in the range of 4–8 kHz, but labials generally show a much more even distribution of fricative energy throughout the spectrum (Johnson, 2012). Figure 3.9 shows a typical spectrum for /f/, while figures 3.10–3.12 show spectra for the coronal fricatives.
Figure 3.9: An FFT spectrum of [f], from the word /kafa/ ‘eight’ (JL).

Figure 3.10: An FFT spectrum of [s], from the word /asa/ ‘leaf’ (JL).

Figure 3.13 summarizes the mean centers of gravity of /f/, /s/, /z/ and /ts/. The average centers of gravity were 3958 Hz for /f/, 6318 Hz for /s/, 5745 Hz for the fricative portion of /ts/, and 6432 Hz for /z/. In each case, the center of gravity was measured at the second power, averaged across the entire fricative portion of the segment. Since voicing affects the distribution of energy in a spectrum, only tokens of /z/ realized as affricates in which voicing had substantially died away by the time of the fricative portion were included in the analysis. Because of these necessary restrictions, means reported for the center of gravity of /z/ are based on only 8 tokens, and should be taken as preliminary.

Applying a linear mixed-effects model shows that the center of gravity of /f/ is significantly lower than that of /s/, but there are no significant differences in center of gravity between /s/, /ts/ or /z/ (see table 3.4). I take the alveolar fricative /s/ as the reference category, consistent with treatment
of stops above. The intercept of the model (the base value for alveolars) is 5788, $t(107) = 8.22$, $p < .0001$. Labial fricatives have significantly smaller centers of gravity than alveolars, $b = -1756$, $t(107) = -4.77$, $p < .0001$. The effect of the voiceless affricate /ts/ was numerically negative but non-significant, $b = -514$, $t(107) = -1.69$, $p > .05$. The effect of /z/ likewise had a non-significant negative effect, $b = -240$, $t(107) = -0.48$, $p > .05$. Variance in the intercept (baseline center of gravity) across speakers was significant, $SD = 900.23$ (95% Confidence Interval: 323.85, 2502.43), $\chi^2(1) = 40.24$, $p < .0001$.

It is interesting that the average center of gravity of /f/ is lower than that for /s/ and the other alveolars, since qualitatively, /f/ has higher peak (around 11 kHz). It is important to note, however, that the center of gravity takes into account the overall shape of the spectrum, and not
only the peak. In the alveolars, there is relatively little energy below 5 kHz, which contributes to their higher centers of gravity.

Figure 3.14 summarizes the values of the second spectral moment, which measures spectral diffuseness. Mean values were 4518Hz for /f/, 3235Hz for /s/, 3254Hz for the fricative portion of /\d\sigma/, and 3435Hz for /z/. The segment /f/ is significantly more diffuse than the coronal fricatives, which show no significant differences among themselves. The reference category, /s/, has a value of 3235Hz, $t(108) = 24.30$, $p < .0001$. The labial /f/ has a significantly higher second spectral moment, indicating greater diffuseness, $b = 1283$, $t(108) = 7.12$, $p < .0001$. There are no significant differences between /s/ and /\d\sigma/, $b = 19$, $t(108) = .12$, $p > .05$, or /s/ and /z/, $b = 200$, $t(108) = .42$, $p > .05$. Variance in the intercept across speakers is not significant, $SD = .03$, $\chi^2(1) < .0001$, $p = .99$. 

Table 3.4: Linear mixed-effects model of the effects of segment on center of gravity (in Hz)
To sum up, the coronal segments that involve frication, /s/, /ʃ/ and /z/, have very similar spectral characteristics. Qualitatively, they show the same spectral shape, with a sharp rise to a peak around 5 kHz. Quantitatively, there are no significant differences in either center of gravity or diffuseness.

It is interesting, therefore, that native English speakers often perceive /ʃ/ and /z/ as [tʃ] and [z] (though /s/ is robustly heard as [s]). A possible explanation for the divergent perceptions of English speakers is provided in the work of Boersma & Hamann (2008). In this paper, the authors see center of gravity as a continuum along which fricatives are located. In a language with many sibilants, it is expected that fricatives will be more or less evenly distributed perceptually, while in a language with only one sibilant, that sibilant will be located towards the center of the continuum. Since Fataluku does not distinguish more than one place of articulation of sibilant, a
sibilant could potentially vary across a perceptual region somewhat intermediate between English /s/ and /ʃ/, explaining English speakers’ perceptual difficulty. I therefore analyze all three sibilants as alveolar in place, using the general symbols [s], [], and [z] to represent them phonetically until more precise articulatory analysis can be made to determine the exact configuration of articulators.

3.1.4 Nasals
Fataluku has two nasals, /m/ and /n/, illustrated below.

(18) /m/ vs. /n/

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>maʔu</td>
<td>‘come’</td>
</tr>
<tr>
<td>naʔu</td>
<td>‘completely’</td>
</tr>
<tr>
<td>moko</td>
<td>‘small’</td>
</tr>
<tr>
<td>noko</td>
<td>‘young sibling’</td>
</tr>
<tr>
<td>tamu</td>
<td>‘aunt’</td>
</tr>
<tr>
<td>tanu</td>
<td>‘against’</td>
</tr>
</tbody>
</table>

3.1.5 Liquids
Unlike most Papuan languages (see Foley, 2000), Fataluku distinguishes two liquids, /l/ and /ɾ/. /l/ is realized as a voiced alveolar lateral approximant, while /ɾ/ is realized as a voiced alveolar trill (see figure 3.15) or a voiced alveolar tap (see figure 3.16). The trill [ɾ] generally occurs word-initially and word-finally, while the tap [ɾ] generally occurs word-medially.

(19) /l/ vs. /ɾ/

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>rata</td>
<td>‘old’</td>
</tr>
<tr>
<td>lata</td>
<td>‘hometown’</td>
</tr>
<tr>
<td>lau</td>
<td>‘clothes’</td>
</tr>
<tr>
<td>rau</td>
<td>‘good’</td>
</tr>
<tr>
<td>pali</td>
<td>‘to not have’</td>
</tr>
<tr>
<td>pari</td>
<td>‘wind’</td>
</tr>
</tbody>
</table>
Figure 3.15: The phoneme /r/ realized as a trill, from the frame /ana rapu ta?a/ ‘I said rapu (a type of leafy vegetable similar to spinach)’ (LE). Note the three lighter regions in the realization of [r], which represent three distinct contacts of the tongue during the trill.

Figure 3.16: The phoneme /r/ realized as a tap, from the frame /ana aaroh-e ta?a/ ‘I said reach’ (JL). Note that there is a single, short light region, indicating a single brief contact.

(20) /n/ vs. /l/

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ono</td>
<td>‘still’</td>
</tr>
<tr>
<td>olo</td>
<td>‘bird’</td>
</tr>
<tr>
<td>wani</td>
<td>‘bee’</td>
</tr>
<tr>
<td>wali</td>
<td>‘ear’</td>
</tr>
</tbody>
</table>
3.1.6 Glides

Fataluku has only one phonemic glide, /j/, realized as a voiced palatal approximant [j], though as noted above, the fricative /v/ may also be realized as a labial approximant. There is idiolectal and dialectal variation in some lexical items between /j/ and /z/. For instance, some speakers say [taza] for ‘sleep’, others [taja], with no apparent difference in meaning. However, the main consultants for this project have (near) minimal pairs for /z/ and /j/, and for this reason, the two are analyzed as separate phonemes. Evidence for treating the glide /j/ as a phoneme—rather than as being derived from the high front vowel /i/—is put forward in section 3.4.3.

(23) /z/ vs. /j/

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>aza</td>
<td>‘rain’</td>
</tr>
<tr>
<td>paja</td>
<td>‘liquid’</td>
</tr>
</tbody>
</table>

(21) /t/ vs. /ʈ/  

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>tau</td>
<td>‘gourd’</td>
</tr>
<tr>
<td>rau</td>
<td>‘good’</td>
</tr>
<tr>
<td>ote</td>
<td>‘bean’</td>
</tr>
<tr>
<td>ore</td>
<td>‘weaving’</td>
</tr>
<tr>
<td>ete</td>
<td>‘branch’</td>
</tr>
<tr>
<td>ere</td>
<td>PLURAL</td>
</tr>
</tbody>
</table>

(22) /n/ vs. /ʈ/  

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>naʔu</td>
<td>‘completely’</td>
</tr>
<tr>
<td>rãʔu</td>
<td>‘plate’</td>
</tr>
<tr>
<td>wani</td>
<td>‘bee’</td>
</tr>
<tr>
<td>wari</td>
<td>‘always’</td>
</tr>
<tr>
<td>ulun</td>
<td>‘tadpole’</td>
</tr>
<tr>
<td>ulur</td>
<td>‘breadfruit’</td>
</tr>
<tr>
<td>anah-e</td>
<td>‘to seek’</td>
</tr>
<tr>
<td>arah-e</td>
<td>‘to be scared’</td>
</tr>
</tbody>
</table>
3.2 Vowel Phonemes

Fataluku has a typologically common five-vowel system. Vowel length is contrastive, though long vowels are represented phonologically as sequences of identical vowels, rather than as separate unit phonemes (see section 3.4.2).

<table>
<thead>
<tr>
<th></th>
<th>Front</th>
<th>Central</th>
<th>Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>i</td>
<td></td>
<td>u</td>
</tr>
<tr>
<td>Mid</td>
<td>e</td>
<td></td>
<td>o</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td></td>
<td>a</td>
</tr>
</tbody>
</table>

Table 3.6: Vowel phonemes

3.2.1 Minimal Pairs for Vowel Quality

The following minimal and near-minimal pairs (in phonemic transcription) give evidence for the phonemic status of all five vowel qualities. Vowel length is discussed in section 3.4.1.

(24) /i/ vs. /e/

<table>
<thead>
<tr>
<th>Index</th>
<th>Transcription</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>‘2.PL.NSBJ’</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>‘2.SG.NSBJ’</td>
<td></td>
</tr>
<tr>
<td>ihini</td>
<td></td>
<td>‘his (things)’</td>
</tr>
<tr>
<td>eheni</td>
<td></td>
<td>‘yours’</td>
</tr>
</tbody>
</table>

(25) /a/ vs. /e/

<table>
<thead>
<tr>
<th>Index</th>
<th>Transcription</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ale</td>
<td>‘rice’</td>
<td></td>
</tr>
<tr>
<td>ele</td>
<td>‘REL..PRO’</td>
<td></td>
</tr>
<tr>
<td>sapu</td>
<td></td>
<td>‘pomelo’</td>
</tr>
<tr>
<td>sepu</td>
<td></td>
<td>‘watermelon’</td>
</tr>
<tr>
<td>atar-e</td>
<td></td>
<td>‘crack’</td>
</tr>
<tr>
<td>ater-e</td>
<td></td>
<td>‘CL:HUM’</td>
</tr>
</tbody>
</table>

79
#### (26) /a/ vs. /o/

<table>
<thead>
<tr>
<th>/a/</th>
<th>/o/</th>
</tr>
</thead>
<tbody>
<tr>
<td>laar</td>
<td>‘time, instance’</td>
</tr>
<tr>
<td>loor</td>
<td>‘rainstorm’</td>
</tr>
<tr>
<td>maťsa</td>
<td>‘bat’</td>
</tr>
<tr>
<td>motso</td>
<td>‘child’</td>
</tr>
<tr>
<td>afša</td>
<td>‘fire’</td>
</tr>
<tr>
<td>ofso</td>
<td>‘orchard’</td>
</tr>
</tbody>
</table>

#### (27) /o/ vs. /u/

<table>
<thead>
<tr>
<th>/o/</th>
<th>/u/</th>
</tr>
</thead>
<tbody>
<tr>
<td>motšo</td>
<td>‘child’</td>
</tr>
<tr>
<td>muťsu</td>
<td>‘in’</td>
</tr>
<tr>
<td>ono</td>
<td>‘still’</td>
</tr>
<tr>
<td>unu</td>
<td>‘one, an’</td>
</tr>
<tr>
<td>foho</td>
<td>‘animal pen’</td>
</tr>
<tr>
<td>fuhu</td>
<td>‘muscle’</td>
</tr>
</tbody>
</table>

#### (28) /i/ vs. /u/

<table>
<thead>
<tr>
<th>/i/</th>
<th>/u/</th>
</tr>
</thead>
<tbody>
<tr>
<td>îtsa</td>
<td>‘some’</td>
</tr>
<tr>
<td>uťsa</td>
<td>‘kill’</td>
</tr>
<tr>
<td>vatsi</td>
<td>‘today’</td>
</tr>
<tr>
<td>vatsu</td>
<td>‘sun’</td>
</tr>
<tr>
<td>tsi</td>
<td>‘thunderstorm’</td>
</tr>
<tr>
<td>tsu</td>
<td>‘hut’</td>
</tr>
<tr>
<td>ina</td>
<td>‘give’</td>
</tr>
<tr>
<td>una</td>
<td>‘eat’</td>
</tr>
</tbody>
</table>

#### (29) /e/ vs. /o/

<table>
<thead>
<tr>
<th>/e/</th>
<th>/o/</th>
</tr>
</thead>
<tbody>
<tr>
<td>ete</td>
<td>‘branch’</td>
</tr>
<tr>
<td>ote</td>
<td>‘bean’</td>
</tr>
</tbody>
</table>
3.3 Syllable Structure and Phonotactics

3.3.1 Syllable Structure

In native Fataluku vocabulary, the basic syllable structure is (C)V(V)(C).\textsuperscript{2} I am not aware of any monosyllabic content words whose nuclei consist of a single short vowel. I therefore propose that there is a minimum word requirement which requires content words to contain at least two moras. There is an exact one-to-one mapping between vowels and moras: each vowel bears exactly one mora, and no other segments are able to bear a mora.

<table>
<thead>
<tr>
<th>CV pattern</th>
<th>Example</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>/a/</td>
<td>‘1.SG.NSBJ’</td>
</tr>
<tr>
<td>CV</td>
<td>/to/</td>
<td>‘QUOT’</td>
</tr>
<tr>
<td>VC</td>
<td>/em/</td>
<td>‘VAL’</td>
</tr>
<tr>
<td>CVC</td>
<td>/tapil/</td>
<td>‘almost’</td>
</tr>
<tr>
<td>VV</td>
<td>/aa/</td>
<td>‘2.SG.SBJ’</td>
</tr>
<tr>
<td>CVV</td>
<td>/lau/</td>
<td>‘cloth’</td>
</tr>
<tr>
<td>VVC</td>
<td>/ait/</td>
<td>‘maybe’</td>
</tr>
<tr>
<td>CVVC</td>
<td>/laik/</td>
<td>‘areca’</td>
</tr>
</tbody>
</table>

Table 3.7: Possible syllable types in Fataluku

Fataluku favors open syllables, and a substantial percentage of syllables in the language are of the shape V(V) or CV(V). In general, Fataluku allows only the final syllable of a word to be closed; consonant clusters are very rare, apart from recent loanwords. There are a few marginal examples of consonant clusters in native vocabulary, but they can be understood as resulting from recent or currently productive morphological changes. For instance, the compound /naal-paal/ ‘parents’ has a medial cluster, but it is quite clearly derived from the words /naal/ ‘mother’ and /paal/ ‘father’. Another example is the emphatic first person subject pronoun /ant/ ‘1.SG.TOP’, a contraction from the citation form of the first singular pronoun /anir/ ‘1.SG’ and the topicalization clitic /=itu/ (see section 2.3.1 for more on emphatic pronouns).

3.3.2 Limitations on Consonant Distribution

One notable characteristic of the phonotactics of Fataluku concerns the occurrence of consonants word-finally. In the present sample of 1,200 words, most consonants are widely attested in word-final position, but several phonemes are rare or unattested word-finally. The consonants /ts/, /p/, /m/, and /f/ are each attested in only one or two marginal examples, most of which have lost a surface long vowel.

\textsuperscript{2}Surface long vowels and surface diphthongs are here treated as underlyingly sequences of vowels, an analysis substantiated below.
final vowel (for example, /ihefts/ ‘Tuesday’, from /i/ + /eĩs-e/ ‘two’, /nop/ < /nop-e/ ‘tomorrow’, /em/ < /em-e/ ‘take’, /laf/ < /lafai/ ‘big’), while /p/, /z/, /j/, and /w/ are unattested word-finally.

While it is possible that these gaps are an artifact of the particular sample available, it is more likely that the absence of these particular consonants in word-final position is the result of specific changes that have taken place over the history of the language. Since Schapper et al. (2014) do not give examples of word-final *p, *b, *d, *m, or *w (which have reflexes in other positions in Fataluku as /f/, /p/, /t/, /m/ and /v/, respectively) in their reconstruction of Proto-Timor-Alor-Pantar, it seems likely that there is a historical explanation for the skewed distribution of these consonants in Fataluku. Explaining these data is not crucial to the point at hand, although it does present an interesting direction for future research.

3.4 Complex Segments

3.4.1 Vowel Length

Background

Several authors have mentioned vowel length in Fataluku, though they give contradictory descriptions. Van Engelenhoven (2010, 2009:334) reports that there are examples of contrastive vowel length in the variety spoken around the town of Loré (what he calls the “South dialect”), but that “long vowels . . . are either absent or obsolete in the other dialects.” Hull (2005:1–5) mentions “long vowels” in the variety spoken in Lospalos (the “Central” dialect), although he does not go into detail about his analysis. On the other hand, other authors who have analyzed the South dialect have claimed that vowel length is predictable from the suprasegmental environment. Campagnolo (1973) analyzes the differences in vowel length as the result of a phonemic “long accent,” which raises the pitch and increases the duration of the vowel it is attached to. Stoel (2008:75) revises Campagnolo’s analysis, replacing the concept of “accent” with that of “tone” and making some other modifications, but nevertheless agrees that vowel length is predictable.

In the speech of the primary consultants for this project (from Lospalos and Com), each of the five vowel qualities has a long counterpart, as shown in the following examples. In the present sample, the surface long vowels occur much less frequently than their short counterparts. The vowel [a:] is the most common of the long vowels, followed by the mid vowels [e:] and [o:], which are less common. The long high vowels [i:] and [u:] are even less frequent, and there exist only a few examples of each. Long vowels are most frequent in the penultimate syllable of disyllabic words, but they can also occur in other positions.

3Speakers recognize Loré and Lorehe as being the same place.

4An earlier version of this section was published in Oceanic Linguistics, as Heston 2014.
Evidence that Vowel Length is Phonemic

The strongest evidence that vowel length is contrastive comes from the presence of several minimal and near-minimal pairs. Because of the rarity of long vowels, vowel length distinguishes only a few morphemes. However, the minimal pairs in example (35) and the near-minimal pairs in example (36) demonstrate that vowel length is not predictable.
Further confirmation that vowel length is contrastive is that, when asked, speakers are able to identify the words in minimal pairs for vowel length as sounding different from each other, as opposed to true homophones, such as [va’re] ‘always’ and [va’ri] ‘nest’, which sound the same. Speakers also have trouble recognizing words if they are pronounced with the incorrect vowel length. There have even been instances in which a speaker has explicitly stated (to paraphrase), “[a:kina] is a word that means ‘firm’, but [akina] is not a word. If you say [akina], I will not understand what you mean.” Thus, evidence not only from the structural facts of the language, but also from speakers’ perception and metalinguistic awareness supports the conclusion that vowel length is not predictable in this variety of Fataluku.

Stoel’s Analysis
As noted above, it has been proposed that vowel length can be predicted in at least some dialects of Fataluku from suprasegmental features. The strongest proposal in this regard is the proposal from Stoel (2008:75), who argues that vowel length in the Loré dialect is predictable based on “tone.” In his analysis, the surface contrast in vowel length in pairs such as [lo:re] ‘leave’ and
[lore] ‘sow’ is derived from an underlying difference in tone through the application of several rules and constraints.

The core of Stoel’s analysis is that every content word in Fataluku has a high tone associated with either the first or the second syllable (indicated by Stoel with a superscripted H following the syllable). He analyzes the word [lo:Hre] ‘leave’ as having a high tone on the first syllable underlyingly, /loHre/, while the word [lo:Hre] ‘sow’ has a high tone on the second syllable, /loreH/.

Constraints on foot shapes allow feet of the shape (σσ), (σσH) or (σH), but not *(σHσ). For this reason, a word that has a high tone on the first syllable, like /loHre/ ‘leave’, will be footed as /(loH)re/, while a word with a high tone on the second syllable is footed as /(loreH)/. He posits a rule that lengthens the vowel in a syllable if it is the only syllable in the word that is footed. Thus (loH)re ‘leave’ becomes (loH)re, but (loreH) does not change. This rule accounts for the contrast in vowel length. Additionally, there is one final rule that causes an utterance-final high tone to move from the final to the penultimate syllable, yielding the surface forms [lo:Hre] ‘leave’ and [lo:Hre] ‘sow’. Thus, by Stoel’s analysis, the surface difference in vowel length between the words is completely predictable based on the underlying association of tone, but the tonal contrast itself is neutralized. A sample derivation is given in table 3.8.

<table>
<thead>
<tr>
<th></th>
<th>Penult H</th>
<th>Final H</th>
</tr>
</thead>
<tbody>
<tr>
<td>UR</td>
<td>/loHre/ ‘leave’</td>
<td>/loreH/ ‘sow’</td>
</tr>
<tr>
<td>Footing</td>
<td>(loH)re</td>
<td>(loreH)</td>
</tr>
<tr>
<td>Lengthening</td>
<td>(loH)re</td>
<td>–</td>
</tr>
<tr>
<td>Tone move</td>
<td>–</td>
<td>loHre</td>
</tr>
<tr>
<td>SR</td>
<td>loHre</td>
<td>loHre</td>
</tr>
</tbody>
</table>

Table 3.8: A sample derivation illustrating Stoel’s (2008) analysis

Stoel’s analysis is an intriguing suggestion, but there are serious challenges with applying his analysis to the data collected here. First, there appear to be lexical differences between the dialects; I have not been able to elicit either the word [lo:re] ‘leave’ or [lore] ‘sow’. Additionally, word-level prosody is predictable in the varieties of Fataluku I have examined (as argued in chapter 5). A third, crucial difference concerns the distribution of phonetically long vowels. Stoel’s analysis predicts long vowels only in the first syllable of disyllabic or monosyllabic words. However, I have found examples of phonetically long vowels in various positions in words of one, two, three and four syllables, as shown in example 57, data for which Stoel’s analysis is unable to account.
(37) One syllable words

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>tsi:</td>
<td>'thunderstorm'</td>
</tr>
<tr>
<td>le:</td>
<td>'house'</td>
</tr>
<tr>
<td>lo:</td>
<td>'cuscus sp.'</td>
</tr>
<tr>
<td>tsa:l</td>
<td>'grandparent'</td>
</tr>
<tr>
<td>la:n</td>
<td>'friend'</td>
</tr>
</tbody>
</table>

Two syllable words

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>hu:la</td>
<td>'spoon'</td>
</tr>
<tr>
<td>tso:-n-e</td>
<td>'far-LOC'</td>
</tr>
<tr>
<td>su:k-e</td>
<td>'to duck'</td>
</tr>
<tr>
<td>fat-e</td>
<td>'four'</td>
</tr>
</tbody>
</table>

Three syllable words

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>a:kina</td>
<td>'to be firm'</td>
</tr>
<tr>
<td>ne:nukas</td>
<td>'plant species'</td>
</tr>
<tr>
<td>a:fsan-e</td>
<td>'to be enough'</td>
</tr>
<tr>
<td>hu:leven</td>
<td>'young'</td>
</tr>
<tr>
<td>a:he:-?e</td>
<td>'to be stuck'</td>
</tr>
<tr>
<td>fu:leh-e</td>
<td>'to return'</td>
</tr>
<tr>
<td>mautu:le</td>
<td>'to be lazy'</td>
</tr>
<tr>
<td>tso:-n-ana</td>
<td>'the farthest one'</td>
</tr>
</tbody>
</table>

Four syllable words

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>a:tan-ana</td>
<td>'question'</td>
</tr>
<tr>
<td></td>
<td>(lit. ask-NMLZ)</td>
</tr>
</tbody>
</table>

Discussion
To sum up, the variety of Fataluku under investigation here has a vowel-length contrast that is not predictable either from the segmental or the suprasegmental environment, and thus, it must be represented underlyingly. Evidence for the contrast between long and short vowels on the surface comes from speaker metalinguistic awareness, speaker perceptions and a number of minimal and near-minimal pairs. The present results thus support Hull’s (2005) report—which claims that Lospalos Fataluku has long vowels—providing evidence to support this analysis.

It is interesting to compare these results with the claim of van Engelenhoven (2009:334) that vowel length is “absent or obsolete” in all dialects except Loré. While it is not entirely clear what van Engelenhoven means here by “obsolete,” the term suggests the idea of a contrast that is becoming more restricted in its distribution. Vowel length does have a relatively low functional
load in Lospalos and Com varieties, in the sense that only a few lexical items are distinguished solely by vowel length. There are also some instances in which speakers have trouble stating whether a particular vowel in a word is long or short. It is possible that the vowel length contrast was once more widespread in the language, and that the contrast is beginning to be neutralized, as implied by van Engelenhoven. Alternatively, it is possible that vowel length has always had a low functional load. More comparative research is needed on the history of long vowels in this language family.

3.4.2 The Analysis of Long Vowels and Diphthongs
Possible Representations
The fact that vowel length must be represented underlingly raises the question of how exactly it is to be represented, as there are a number of possibilities. The question of long vowel representation is closely related to the question of how diphthongs are represented underlingly, and for this reason, this section deals with both questions together. Fataluku has six diphthongs that fall in sonority, \([ei], [ai], [oi], [eu], [au] \) and \([ou]\). Surface rising diphthongs are also attested in rapid speech (for instance, the word /io/ ‘also’ is typically realized as [i.o], but can be realized as the single syllable [i o] in faster speech). Since falling diphthongs are the most clear and robust examples, they will be the focus of the following discussion, though the conclusions reached here apply to both rising and falling diphthongs.

In an article analyzing the underlying representation of surface diphthongs in Hawaiian, Rehg (2007:120) writes that there are in fact four possible sources of a surface falling diphthong. These are as follows:

1. /VV/, an underlying unit phoneme that involves a gliding articulation from the position of one vowel to that of another; 2. /VV/ an underlying sequence of two non-identical vowels, in which the second vowel is less sonorant than the first; 3. /VG/, an underlying sequence of a vowel followed by a glide; or 4. /V/ a vowel subject to one or more rules of diphthongization.

The possible analyses of long vowels are parallel to the possible analyses of diphthongs, as a long vowel can be represented as: /V/, an underlying unit phoneme; /VV/, an underlying sequence of two identical vowels; or /V/, a vowel lengthened by phonological rule.

Rehg (2007:120) explains that only surface diphthongs of source (1), in which each is represented as a single phoneme underlingly, are “true diphthongs,” while those from other sources are “apparent diphthongs.” In the same way, we shall consider long vowels that are underling unit
phonemes, represented as /V:/, to be true long vowels, while those from other sources are apparent long vowels.

Rehg states that the analysis of long vowels and diphthongs as underlying sequences of vowels, identical vowels in the case of long vowels and non-identical vowels in the case of diphthongs, is the simplest analysis, and that this should be the default analysis in a particular language in the absence of evidence to the contrary. This is the analysis taken by Campagnolo ([1973] for Fataluku diphthongs. Hull (2005:5), on the other hand, claims that Fataluku has “true diphthongs and not simply vocalic sequences as in other Timorese languages.” The discussion below will discuss the evidence for each of the possible analyses of long vowels and diphthongs in turn, demonstrating that both surface long vowels and surface diphthongs are represented as sequences of vowels in Fataluku.5

Evidence Against the Single Vowel Analysis

Of the possibilities, the easiest to rule out is the analysis of vowels and diphthongs as lengthened or diphthongized allophones of one of the five short vowels. As was shown above, analyses that attempt to predict the presence of long vowels by a rule that lengthens short vowels are not able to account for their distribution in Lospalos Fataluku. This type of analysis does not adequately explain the distribution of diphthongs either. There are at least six phonetic diphthongs (i.e., [ei], [ai], [oi], [eu], [au] and [ou]),6 which can occur in the same environments as short and long monophthongs. There is no apparent way to predict these diphthongs as allophones of the five attested monophthongs, as shown by the minimal and near-minimal pairs in examples 38–41.7

<table>
<thead>
<tr>
<th>(38)</th>
<th>/e(ː)/ vs. /ei/</th>
</tr>
</thead>
<tbody>
<tr>
<td>kav-e</td>
<td>‘to marry’</td>
</tr>
<tr>
<td>lavei</td>
<td>‘crocodile’</td>
</tr>
<tr>
<td>le:</td>
<td>‘house’</td>
</tr>
<tr>
<td>fei</td>
<td>‘pretty’</td>
</tr>
</tbody>
</table>

5This is not to say that all surface long vowels and diphthongs are necessarily derived from the same source, but rather, that this is the primary source. As shown below, surface long vowels and diphthongs can also be derived from a sequence of a vowel, followed by a glottal stop and another vowel /V'V/.

6I have chosen to transcribe diphthongs phonetically by using the non-syllabic diacritic under the less sonorant component. Though a number of valid alternatives are available, this transcription accords best with the phonological analysis of diphthongs I establish below (namely, that diphthongs are represented underlyingly as sequences of vowels).

7It would be theoretically possible to propose six abstract vowel qualities, which are diphthongized in all environments. This “abstract vowel” analysis is essentially a more abstract version of the unit phoneme analysis, but without support for this added abstraction, it is necessarily suboptimal.
Evidence Against the Vowel-Glide Analysis

There are several pieces of evidence that show that the vowel-glide analysis is not right for Fataluku either. The first piece of evidence is based on a test suggested by Rehg (2007) for Hawaiian. Since it is typically recognized that Hawaiian has only open syllables, it would be unmotivated to adopt an analysis in which glides form syllable codas. While Fataluku syllable structure is less restricted than Hawaiian, a similar argument applies.

As discussed above, two-consonant sequences are very rare in native Fataluku words, with only a few exceptions across morpheme boundaries. However, diphthongs frequently precede consonants within native morphemes, for instance [məs-e] ‘to be straight’, [kəl-e] ‘to be bent’ and [əsəj-e] ‘to rub, scour’. Even beyond this, there are monomorphemic words that have a diphthong directly before a final consonant, for instance [ət] ‘maybe’, [lək ‘areca’ and [mo̱k] ‘cloud’. Analyzing diphthongs with the vowel-glide analysis would mean allowing consonant clusters and complex codas within a morpheme in native vocabulary. Such an analysis is dispreferred, since it requires a revision of the phonotactics for which there is no other motivation.

Another piece of evidence comes from the variation found in the realization of the glide /j/ in Fataluku. As noted above, there is individual and dialect variation between /j/ and /z/ in intervocalic position. For instance, the word for ‘necklace’ is pronounced [paja] by some, but can
also be pronounced as [paza]. However, attempting to replace the second element of a surface diphthong with [z] results in unacceptable pronunciations. For instance, replacing the word [laːfai] ‘to be big’ with **[laːfaz] or the word [pai] ‘pig’ with **[paz] resulted in completely unacceptable sequences. While Fataluku sociolinguistics is not yet well understood, the fact that the correspondence between /j/ and /z/ does not hold for the second element of surface diphthongs does provide some evidence against the vowel-glide analysis.

A final argument against the vowel-glide analysis is based on another test Rehg applies to Hawaiian. One of the arguments Rehg (2007:125) gives against analyzing Hawaiian surface diphthongs as vowel-glide sequences is that, in pre-contact Hawaiian, /w/ was not “the non-syllabic counterpart of /u/,” but likely had a significant degree of frication. He points out that a [w] produced with frication is much more like a consonant than like the vocalic component of a diphthong. The description of the Hawaiian /w/ as an approximant with some frication also describes the Fataluku phoneme /v/ quite well, which sometimes has labiodental frication, sometimes has bilabial frication, and sometimes is a labial approximant with no frication at all. Using a fricative to represent the vocalic portion of a diphthong is a rather abstract analysis, which is difficult to justify for Fataluku, given the presence of more natural alternatives. It is much more natural to analyze surface diphthongs as being derived from a vocalic source.

**Diphthongs and Long Vowels as Underlying Sequences**

The two remaining possible sources are underlying single unit phonemes and underlying sequences of vowels. There are several pieces of evidence that Fataluku surface diphthongs are underlyingly sequences of vowels. The first argument comes from parsimony. Rehg (2007) notes that treating surface diphthongs as underlying unit phonemes greatly increases the phoneme inventory of a language. For this reason, he favors the underlying vowel sequence analysis over the true diphthong analysis in every case, unless there is evidence to the contrary. In Fataluku, analyzing long vowels as unit phonemes would add five phonemes to the inventory, and analyzing diphthongs as unit phonemes would add at least six more phonemes, yielding a total of at least sixteen vowel phonemes. Such an analysis more than triples the vowel inventory.

The second piece of evidence comes from the range of possible surface diphthongs permitted in Fataluku. Rehg (2007:126) states that “in a language like English true diagonal diphthongs have a highly skewed distribution;” however, in Hawaiian, one can predict which surface diphthongs appear based upon phonological criteria and the speech rate. Fataluku is like Hawaiian in this regard, in that the attested surface diphthongs follow regular rules, without gaps. Example 42 shows all possible combinations of a non-high vowel preceding a high vowel. In a parallel way, all possible long vowels are attested, as illustrated by examples 30–34 above.
The third reason that it is preferable to treat surface diphthongs as underlyingly sequences of vowels is that it simplifies the description of speech rate differences. Speech rate can have a large influence on how closely two adjacent vowel qualities are pronounced, and it is not always clear whether two vowel qualities are produced in the same syllable or different syllables. For example, in slow speech, the word /rau/ ‘to be good’ can be pronounced [ra.u], with [a] and [u] in different syllables, but in speech at more naturalistic speeds, it is realized as [rau], with the two vowel qualities indisputably in the same syllable (as judged by native speakers’ syllabifications as well as my own perceptions). Adopting the vowel-sequence analysis requires proposing a process that joins two vowels into the same syllable in rapid speech, a process which is phonetically motivated and attested in other languages (e.g., Hawaiian, as discussed in Rehg, 2007). On the other hand, adopting the unit-phoneme analysis requires proposing a rule that splits a single phoneme into separate syllables in slow speech. While this is not necessarily impossible, it is rather contrived.

A fourth piece of evidence comes from the behavior of surface diphthongs located utterance-finally in questions. Polar questions take an L+HL% IP-final boundary tone, which causes lengthening of the final vowel. The penultimate vowel is realized with a low tone, and the final vowel is realized with a high-falling tone and lengthened to over twice the duration it would have in the corresponding declarative (see section 6.2 for more details). When the final word of a polar question ends in a surface diphthong, lengthening behavior provides a convenient test for the internal composition of diphthongs. How do surface diphthongs behave in this environment?

If a surface diphthong were composed of a vowel-glide sequence, we would expect the vocalic component to undergo lengthening, with the glide relatively undisturbed. If there were a true diphthong, a similar prediction is most likely. An alternative possibility would be for both the sonorant and less sonorant components of a diphthong to undergo a comparable amount of
lengthening. In neither case, however, would it be expected for the less sonorous element of the diphthong to lengthen. However, it is in fact the least sonorous element of a diphthong which is lengthened in this prosodic environment, as shown in figure 3.17. This behavior is completely unexplained in the vowel-glide or true diphthong analyses, but is completely natural in the vowel sequence analysis.

![Figure 3.17: The word /hiʔamoi/ ‘climb’, realized as the final word in the question, /aʔsur ia ten ete hai hiʔamoi/ ‘Did the cuscus climb the tree?’ (JE). The spectrogram is given on a scale from 0–5,000Hz, to allow easier identification of vowel formants. Observe the substantial lengthening of the vowel /i/ (note the high second formant), which is typically realized as an off-glide.](image)

On the basis of this evidence, I conclude that Fataluku has neither true long vowels nor true diphthongs. Rather, adjacent vowels may be realized in the same syllable as a surface long vowel or diphthong under certain phonological conditions (although, as noted above, this syllabification is not required at slower speech rates). These conditions can be stated as follows:

**The fusion of adjacent vowels**

Two adjacent vowels may be realized in the same syllable if either of the following is true:

- The vowels are identical to each other.
- The first vowel is non-high and the second vowel is high.

---

8In my present analysis, I follow an analysis proposed by Poser (1985) for Tongan, assuming that underlying forms are parsed exhaustively into monomoraic syllables early in the derivation, and that long vowels and diphthongs are created late in the derivation by a lenitive process fusing adjacent syllables meeting the appropriate conditions. See section 4.3.2 for further discussion.
A compelling independent piece of evidence comes from the phonetic realization of words with an intervocalic glottal stop, which is phonemic but frequently deleted in faster speech. When an intervocalic glottal stop is deleted, two identical vowels are realized as a single long vowel, as in /maʔar/ [mar] ‘person’, while two non-identical vowels are realized as a diphthong, as in /raʔu/ [rau] ‘plate’. These examples serve as independent evidence that Fataluku has the preceding rule for the syllabification of adjacent vowels, regardless of one’s analysis of surface long vowels and diphthongs. Thus, crucially, analyzing surface long vowels and diphthongs as sequences of vowels is completely parsimonious, as it does not require the addition of any phonemes or any rules that are not independently motivated by other facts about the language.

3.4.3 The Analysis of /j/

In light of the preceding analysis of diphthongs, it is reasonable to wonder whether it would be possible to eliminate /j/ from the phoneme inventory entirely. Though such a proposal is appealing on the grounds of simplicity, there is convincing evidence that not all surface glides are derived from vowels. I analyze Fataluku as having a true phonemic glide /j/, which is differentiable from “derived glides” on the basis of its behavior with respect to speech rate, reduplication and intonation.

The first distinguishing characteristic of /j/ is its insensitivity to speech rate. Glides derived from underlying vowels display substantial variability, and a sequence that is realized as a diphthong in rapid speech will generally be realized as a two-syllable sequence in slower speech. This is not the case for /j/, however, which I have never observed to form a syllable peak, regardless of speech rate. For example, the syllabification of /pajah/ ‘mango’, as given by a native speaker, is [pa.jah], and I have no examples in which it is pronounced as three syllables. Similarly, the word for ‘sleep’, /taja/, is syllabified as [ta.ja], not [ta.i.a].

The second distinguishing characteristic of /j/ is that it does not bear a mora. In Fataluku, all vowel phonemes bear exactly one mora, but no consonants are moraic. The non-moraic status of /j/ is demonstrated by two phonological tests, the first from reduplication patterns and the second from prosodic structure. Reduplication in Fataluku typically involves the first two moras of a word. For instance, /fuulehe/ ‘return’ reduplicates as /fuu-fuulehe/, /kaure/ ‘scratch’ reduplicates as /kau-kaure/, /lavan/ ‘money’ reduplicates as /lava-lavan/ and /mimireke/ ‘red’ reduplicates as /mimi-mimireke/ (see section 5.8.1 for more on reduplication). If the word [paja] ‘kind of traditional necklace’ were represented phonemically as /paia/, with the [j] bearing a mora, we would expect it to reduplicate as [pajpaja]. However, it reduplicates instead as [pajapaja] ‘necklace (general)’, a reduplication which treats /j/ as non-moraic.
Another test that demonstrates the failure of /j/ to bear a mora comes from Fataluku’s prosodic structure. There is no convincing evidence for either stress or tone in Fataluku; rather, an intonational f0 peak occurs over the syllable containing the second mora of each phrase. When a word like /kailana/ ‘sinfulness’ occurs phrase-initially, this intonational peak occurs over the first syllable, as [kaí.lana] (using an acute accent to represent the phonetic f0 peak), showing that the first syllable counts for two moras. However, in words like /pajah/ ‘mango’, the peak occurs on the second syllable, [pa.jáh], indicating that the first syllable is light.

Upon seeing this data, one might argue that the [j] in [pajah] ‘mango’ is moraic, though it occurs in the second syllable. One might wish to represent the word for ‘mango’ underlyingly as /paiah/, and claim the medial /i/ is made to form a rising diphthong with the following vowel, [pa.iah]. However, this analysis does not adequately handle the data. Fataluku avoids disyllabic words consisting of a light syllable followed by a heavy syllable, since they cannot be properly footed.9 For this reason, the presence of the intonational peak on the second syllable of words like [pajah] ‘mango’ (and other words of this shape) is reliable evidence that /j/ does not bear a mora.

In sum, although under certain conditions the high vowels have glide-like phonetic realizations, one cannot attribute all instances of surface glides to high vowels; there is good evidence for a consonant phoneme /j/. Unlike a vowel, /j/ cannot form a syllable peak, and it does not bear a mora, behaving like a consonant for the purposes of syllabification, reduplication and intonation. I have only observed /j/ in intervocalic position (as word-initial and word-final examples of [j] are typically from /i/), but here, it must be treated as a phoneme.

### 3.5 Orthography

The working orthography I use for Fataluku closely follows emerging conventions used by Fataluku speakers, which give a fairly good representation of the phonemes. These orthographic practices seem to be heavily influenced by Indonesian orthography (e.g., <c> for [ʦ], <j> for [z]/[ʣ], <y> for [j], <w> instead of <v>), since most younger speakers learned to read Indonesian during the time of Indonesian occupation.

Symbols which differ from the IPA-based symbols I use for phonemes are given in table 3.9. Two exceptions to common practice are my use of /j/ for [j], instead of using /i/, as many speakers do. I use /j/ here to provide a more direct representation of Fataluku’s phonemes (a motivation which does not necessarily apply to the development of a practical orthography for speakers).

Another difference is that I represent vowel length in my orthography, though native speakers rarely do. Because of its low functional load, there is no real need to represent length in a

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9There is in fact an active process making the first syllable heavy if the second syllable is heavy (see section 5.3).
Table 3.9: Working orthography

<table>
<thead>
<tr>
<th>Orthography</th>
<th>Phonemes</th>
</tr>
</thead>
<tbody>
<tr>
<td>c</td>
<td>ʰtɛɾɕ/</td>
</tr>
<tr>
<td>j</td>
<td>/zɬ/</td>
</tr>
<tr>
<td>w</td>
<td>ʰsɬ/</td>
</tr>
<tr>
<td>y</td>
<td>ʰjɬ/</td>
</tr>
<tr>
<td>ř</td>
<td>/ɬɭ/</td>
</tr>
<tr>
<td>ā, ē, etc.</td>
<td>/aa/, /ee/, etc.</td>
</tr>
</tbody>
</table>

practical orthography, but it is important for my purposes here. I use the macron to represent vowel length, since it allows length to be indicated in a way that is unobtrusive and can be easily removed when adapting materials from this dissertation to practical materials for native speakers. I represent diphthongs as adjacent vowels, consistent with my analysis above and emerging conventions in the community.
4 PHONOLOGICAL RULES AND PROCESSES

This chapter describes the phonological alternations that take place in Fataluku. A number of these are mentioned elsewhere in this dissertation, and this chapter provides a reasonably thorough catalog of slow speech substitutions, and a few of the more common rapid-speech substitutions. Section 4.1 summarizes the framework of Natural Phonology, which informs my analysis of this aspect of Fataluku. Section 4.2 describes the rules of Fataluku, with particular emphasis on a syntactically-conditioned mutation of initial consonants. Section 4.3 describes active segmental processes, giving rule statements and examples of each, while section 4.4 deals with prosodic processes, most of which concern the realization of intonational tones.

4.1 Rules vs. Processes

The theory of Natural Phonology (NP) (Donegan & Stampe, 1979; Donegan, 1993) sees a fundamental distinction between alternations which are phonetically motivated by universal limitations on the vocal tract or on perception (“processes”), and alternations which are simply applied by convention (“rules”). The former apply unconsciously, modifying underlying representations to make them easier to pronounce. Examples of processes include nasalization of a vowel before a nasal, devoicing of an obstruent word-finally or flapping of a stop. The speech of children allows more substitutions of this type than the speech of adults. NP sees the acquisition of phonological competence in production as learning how to suppress these natural processes. Conventional rules, on the other hand, do not have a phonetic motivation synchronically (though they may have historically). Examples of rules include English “velar softening” (e.g., k → s, as in electric → electricity, as discussed in Chomsky & Halle, 1968), or the vowel alternations in pairs such as divine/divinity. Table 4.1 summarizes several of the key differences between phonetically-conditioned processes and conventional rules.

<table>
<thead>
<tr>
<th>Processes</th>
<th>Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonetically motivated</td>
<td>Lack synchronic motivation</td>
</tr>
<tr>
<td>Innate</td>
<td>Learned</td>
</tr>
<tr>
<td>Involuntarily</td>
<td>Voluntary</td>
</tr>
<tr>
<td>Difficult to violate</td>
<td>Easy to violate</td>
</tr>
<tr>
<td>Transfer to L2</td>
<td>Do not affect L2 pronunciation</td>
</tr>
<tr>
<td>Sensitive to speech rate</td>
<td>Speech rate insensitive</td>
</tr>
<tr>
<td>Apply to output of rules</td>
<td>First in derivation</td>
</tr>
</tbody>
</table>

Table 4.1: Differences between phonological processes and rules
Donegan and Stampe (1979:142) distinguish three types of processes, “prosodic processes”, “fortition processes” and “lenition processes.” Prosodic processes create prosodic structure from segmental input, including metrical structure and the higher-level prosodic phrasing. Fortitions “intensify the salient features of individual segments and/or their contrast with adjacent segments,” enhancing perception. Lenitions, on the other hand, make production easier, often making adjacent segments more alike. Rules precede processes in the derivation, and fortitions precede lenitions.

Natural Phonology’s “phonological processes” correspond in large part to “markedness constraints” in Optimality Theory (OT). Both restrict outputs that are difficult, ill-formed or unnatural, but are also potentially violable. The suppression of phonological processes in child language acquisition in NP corresponds to a re-ranking of faithfulness constraints above markedness constraints in the OT framework. NP’s notion of the conventional rule finds no direct analog in classic versions of OT, however. Depending on the situation, substitutions of this type tend to either be treated in the same way as processes or attributed to the morphology.

I here couch my results in terms of rules, rather than constraints, since rule-based descriptions tend to be more broadly accessible, and promise a greater chance of being understandable well into the future. A phonological description of a language consisting of a comprehensive list of ordered constraints would also tend to be unwieldy, and more difficult to interpret in practice. Using Natural Phonology, as opposed to another rule-based framework, allows one to capture many of the same insights about conflicting phonological motivations yielded by OT, while maintaining a rule-based presentation format which will hopefully be useful to a broad potential readership.

The remainder of this chapter therefore discusses common phonological alternations in Fataluku in the NP framework. I begin by discussing rules before turning to segmental and suprasegmental processes.

4.2 Phonological Rules

4.2.1 Consonant Mutation

The initial consonants of certain verbs in Fataluku undergo an alternation which is not phonologically conditioned. This alternation is illustrated in examples 1 and 2 in which the verb ‘to sleep’ alternates between [taja] and [tsaja].
(1)  *ana* taya
    /ana taja/
    1.SG sleep
    ‘I sleep’  (JL:Elicit)

(2)  *ana* lē nā caya
    /ana lee naa taja/
    1.SG house at sleep
    ‘I sleep at the house’  (JL:Elicit)

This alternation was observed by [Campagnolo (1973)](1973), and discussed further by [van Engelenhoven (2009)](2009); I follow [van Engelenhoven (2009)](2009) in using the term “consonant mutation” for this change, though I present a new analysis. The term “mutation” is appropriate, since this alternation in Fataluku shares many similarities with the well-known Celtic consonant mutations. As in Celtic languages, Fataluku mutation defies formulation in terms of a single rule in distinctive feature notation, applies in a syntactically-conditioned environment and is subject to dialectal and individual variation in application (for more on Celtic mutation, see e.g., [Ball & Müller (2002)](2002)). In the following sections, I discuss several of the most interesting properties of Fataluku consonant mutation.

**Changes Cannot be Stated in a Single Rule**

According to [van Engelenhoven (2009)](2009) observations, as well as my own, the consonants affected by mutation are /t/, /s/, /h/ and /f/, each having a single possible outcome. [Campagnolo (1973)](1973) also notes an addition of [n] at the beginning of certain verbs, an alternation which I treat as another manifestation of mutation. Patterns of mutation are shown in the following table.

<table>
<thead>
<tr>
<th>Change</th>
<th>Example</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>t →  Ŕ</td>
<td>taja →  Ŕsaja</td>
<td>‘to sleep’</td>
</tr>
<tr>
<td>s →  Ŕ</td>
<td>sil-e →  Ŕsil-e</td>
<td>‘to tie’</td>
</tr>
<tr>
<td>h →  Ŕ</td>
<td>hura →  Ŕsura</td>
<td>‘to scoop’</td>
</tr>
<tr>
<td>f → p</td>
<td>faʔi → paʔi</td>
<td>‘to do’</td>
</tr>
<tr>
<td>ø → n</td>
<td>eluh-e → neluh-e</td>
<td>‘to want’</td>
</tr>
</tbody>
</table>

Table 4.2: Patterns of consonant mutation

There is no apparent way to specify this rule in distinctive features. In the first place, the segments /t/, /s/, /h/ and /f/ do not form any obvious natural class. While it would be possible to state the input to the rule as [-voiced, -back] if /s/, /p/ and /f/ were included vacuously, the change that takes place is quite different each instance, even excluding the insertion of [n]. In one case, a stop
is made an affricate (t → ţ). In another, a fricative is made an affricate (s → ţş). In the third, a
fricative is made to change place and become an affricate (h → ţş), while in the fourth, a
labiodental fricative becomes a bilabial stop (f → p). There is no obvious way to formulate these
changes into a single, well-formed rule in distinctive feature notation, barring copious use
(abuse?) of alpha-notation.

Environment of Mutation
The environment of mutation also defies description in simple phonological terms. Examples [1]
and [2] (repeated as [3] and [4] below) illustrate two instances of the word /taja/ ‘sleep’. In both cases,
the phoneme /t/ is in word-initial position, following /n/ and /a/.

In spite of almost identical
phonological environments, mutation is possible only in the second example, not in the first.

(3) ana taya
    /ana taja/ 1.SG sleep
    ‘I sleep’  (JL:Elicit)

(4) ana le nā caya
    /ana lee nā ṭaja/ 1.SG house at sleep
    ‘I sleep at the house’  (JL:Elicit)

Van Engelenhoven (2009:337) follows Campagnolo in treating the alternation as morphologically
conditioned, claiming that mutation takes place when a verb is “prefixed by either a verbal or
locational/directional morpheme.” He treats morphemes such as /naa/ ‘be at’ as verbs when they
occur in isolation with the verbal suffix /-e/, but as prefixes in examples such as [4] where they
precede another verb and trigger mutation. Van Engelenhoven (2010) even uses mutation as
grounds for claiming that two verbs form “a compound rather than an SVC containing separate
verbs,” though it is not clear why.

In contrast to van Engelenhoven, I here analyze “locative morphemes” such as /naa/ ‘be at’ as
serial verbs, since they follow cross-linguistic expectations of serial verbs grammatically (see
section 2.6.3) and behave like independent words prosodically (see section 6.1). For these
reasons, I analyze consonant mutation as syntactically conditioned, rather than morphologically
conditioned. Specifically, eligible consonants are subject to mutation when they are the first
segment in a non-initial serial verb.

1The difference in vowel length also turns out to have no effect as a conditioning factor, as illustrated by following
examples.

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Examples 5 and 6 illustrate the importance of verb serialization to stating the environment of mutation. These examples are nearly identical phonologically, but mutation occurs only in example 6. In both cases, the relevant consonant (the first consonant of the word /ta?a/ ‘to say’) is word-initial, and follows an /n/ in the preceding phonological word. They are furthermore from the same speaker, recorded on the same occasion, in the same narrative, a single sentence apart.

The crucial difference between the two phrases, however, is that in example 5, the two verbs are joined with switch reference marking, as shown by the presence of the same-subject clitic /=n/ ‘SS’, and there is no mutation. In example 6, however, the verbs are serialized (as indicated by the lack of switch reference marking and the lack of the verbal suffix /-e/, which /va?an/ ‘to be like’ would usually bear). With verb serialization, consonant mutation is triggered, t → ţ. These two examples are very nearly minimal phonologically and syntactically, and the presence of mutation only in the example with serial verbs illustrates that verb serialization is the conditioning environment for mutation.

(5) hai ma’un ta’a
   /hai ma?u=n ta?a/
   PRF come=SS say
   ‘He came over and said, . . . ’ (JD:Cura)

(6) hai wa’an ca’a
   /hai va?an tsu?a/
   PRF like say
   ‘He spoke like this, . . . ’ (JD:Cura)

The verb /tali/ ‘to be beyond’ frequently occurs in serial verb constructions with a comparative or superlative force. For instance, /laaafai/ means ‘to be big’, while /tali laaafai/ means ‘to be very big’. This construction triggers verb serialization in the following word, as shown in examples 7 and 8.

(7) tahine
    /tahin-e/
    pretty-VB
    ‘To be pretty’ (JL:Elicit)

(8) tali cahine
    /tali tsahin-e/
    beyond pretty-VB
    ‘To be very pretty’ (JL:Elicit)

Mutated forms, however, cannot occur outside of a serial verb environment.
(9)  
* cahine
  sahin-e
  pretty-VB
  ‘To be pretty’
  (JL:Elicit)

This pattern is further illustrated with the verb /timin-e/ ‘to be hot (in temperature)’.

(10)  
timine
 /timin-e/
  hot-VB
  ‘To be hot’
  (JL:Elicit)

(11)  
tali  cimin-e
 /tali  simin-e/
  beyond hot-VB
  ‘To be very hot’
  (JL:Elicit)

(12)  
* cimine
  simin-e
  hot-VB
  ‘To be hot’
  (JL:Elicit)

The same environment triggers the addition of an initial [n].

(13)  
* ikar-e
  cold-VB
  ‘to be cold’
  (LE:Elicit)

(14)  
tali  nikar-e
  beyond cold-VB
  ‘to be very cold’
  (LE:Elicit)


(15)  
ma’ar tupur aci
 /maʔar tupur aʔsi/
  person female see
  ‘The girl saw (someone)’
  (Elicit)

(16)  
ma’ar tupur a ipar tali naci
 /maʔar tupur a ipar tali natsi (< aʔsi)/
  person female SBJ dog beyond see
  ‘The girl looked over (spatially) the dog’
  (Elicit)
Examples 17–20 illustrate mutation in other contexts.

(17)  
\( \text{olo lē mucu nipile} \)
\( /\text{olo lee mufsu nipil-e (<ipil-e)/} \)
bird house in fly-VB
\( \text{‘The bird flew in the house’} \)
(JL:Sentences)

(18)  
\( \text{nami moko a ulurim tewa’an pa’i} \)
\( /\text{nami moko a ulur=im te-wa?an paʔi (<faʔi)/} \)
male child SBJ breadfruit-VAL WH-like do
\( \text{‘What did the boy do with the breadfruit?’} \)
(Ll:Elicit)

(19)  
\( \text{ifi anahe em masu pa’i} \)
\( /\text{ifi anah-e em masu paʔi (<faʔi)/} \)
worm seek-VB VAL well do
\( \text{‘Look for a worm to prepare’} \)
(LJ:Fishing)

(20)  
\( \text{ana Jeraim arur pa’i} \)
\( /\text{ana Jerai=m arur paʔi (<faʔi)/} \)
1.SG.SBJ Jerai=VAL cry do
\( \text{‘I make Jerai cry’} \)
(LE:Elicit)

**Variability**

Mutation is thus conditioned syntactically, being permitted to occur only in the non-initial verbs of an SVC. Mutation does not apply in every serial verb construction, however, even among verbs that begin with the appropriate consonants: there is both lexical and individual variation in the application of mutation. For instance, mutation of the verb /teiteil-e/ ‘to be slow’ was rejected, even in the appropriate environment (*tali >ţ eiteil-e*).

There is no apparent way to predict whether a verb will undergo mutation based on syntactic, morphological or phonological criteria. Phonological conditioning is not relevant, as the same speaker allows mutation for the verb /toto/ [ţoto] ‘see’, but not for the verb /tot-e/ ‘cut’, which is almost identical phonologically. Neither is it the case that the verbal suffix blocks mutation, since there exist verbs which take the suffix and mutate (e.g., tapul-e → ăapul-e ‘buy’), and others that lack the suffix and do not mutate (tina ‘to kindle’ → *ţina). Furthermore, verb subclass does not appear to be relevant. The set of verbs which mutate cross-cut distinctions between adjectival, intransitive and transitive verbs, as shown in table 4.3. There are also no obvious semantic criteria which would allow the application of mutation to be predicted.

There exists variation on this point, and even the same speaker may not apply mutation consistently. For instance, speakers vary in whether they use /tali tahin-e/ or /tali ăahin-e/ for
Table 4.3: Consonant mutation is not predictable from the type or argument structure of the verb. All examples and judgments are from the same speaker (JL).

<table>
<thead>
<tr>
<th>Type</th>
<th>Mutation</th>
<th>Gloss</th>
<th>Mutation ungrammatical</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stative</td>
<td>tefu-ʔe</td>
<td>→ ũɛfu-ʔe</td>
<td>‘to be broken’</td>
<td>sasak-e → *šasak-e ‘to be dry’</td>
</tr>
<tr>
<td>Intransitive</td>
<td>taja</td>
<td>→ ũsaja</td>
<td>‘to sleep’</td>
<td>titiriri → *šitiriri ‘to shiver’</td>
</tr>
<tr>
<td>Transitive</td>
<td>sil-e</td>
<td>→ ũsil-e</td>
<td>‘to tie’</td>
<td>salin-e → *šalin-e ‘to carry’</td>
</tr>
</tbody>
</table>

‘very beautiful’, though speakers acknowledge that both are valid pronunciations. The word for ‘hot’ can also be either /timin-e/ or /šimi-n-e/, varying by speaker. One consultant mutated the verb /tomok-e/ ‘to be soft’ as [tali ũsomoke] ‘very soft’, but another speaker rejected [tali ũsomoke] as completely unacceptable.

I propose that while the environment for consonant mutation is predictable syntactically (applying to non-initial members of SVCs), whether a particular verb will undergo mutation is a lexical property of the verb. The specification for a particular lexical item may also vary between speakers. Mutation is also optional in at least some cases, and speakers may not apply it in every eligible instance, though application of mutation outside of the appropriate syntactic environment is not observed, and when suggested, it is completely rejected.

**Analysis of Mutation**

This behavior raises a number of questions about the phonological representation and motivation of mutation. In the terminology of Natural Phonology, this alternation is clearly a “rule”, rather than a “process.” Mutation does not have any apparent phonetic motivation (at least synchronically), and producing the non-mutated forms presents no apparent articulatory difficulty for native speakers (as attested by examples which do not mutate, or which experience mutation variably).\(^2\) Mutation is conventional, in that speakers apply mutation out of convention, arbitrarily, rather than as a direct consequence of any physical limitations on the vocal tract.

This rule has important ramifications for theorization about the syntax-phonology interface. Simply put, the phonology must have direct reference to some level of syntactic structure at which the relationship between serial verbs is distinguished from other types of syntactic relations. Reference to prosodic structure is not sufficient to specify the environment of mutation, since the prosodic relationship between serial verbs is variable; they sometimes occur in the same AP, but other times in different APs (see section 6.1).

\(^2\)It is interesting, however, that mutation is optional, since conventional rules of this type are almost always obligatory (Donegan & Stampe, 1972).
This mismatch between the structure of serial verbs and hierarchical prosodic structure is perhaps not unexpected, given the lack of exact correspondences between prosodic and syntactic structures (Jun & Fletcher, 2015). However, the fact that mutation cannot be predicted in terms of prosodic structure means that the rule must be formulated as a phonological rule with a syntactic conditioning environment. Any theory of the syntax-phonology interface must provide a mechanism through which phonological rules can be conditioned through a syntactic phenomenon such as verb serialization, as well as providing access to a syntactic representation of a clause which must be fine enough to distinguish serialization from constructions which might be similar on the surface, but which do not trigger mutation (such as joining with switch reference marking, discussed above).

**Historical Explanation of Consonant Mutation**

The apparently arbitrary nature of consonant mutation raises questions about how it came to be. I propose that mutation most likely had a clear phonetic motivation in the past, which has been obscured by subsequent sound changes. I conclude this discussion by comparing the behavior of Fataluku with a similar alternation that has been reported in related Makalero, suggesting the same historical origin for both.

In her grammar of Makalero, Huber (2011:135) describes a phonological alternation which shares a number of similarities with Fataluku consonant mutation. She uses the term “Altered onset verbs”, but I use the term “mutation” for consistency with the discussion above. Table 4.4 shows the types of changes which take place in Makalero and examples of each.

<table>
<thead>
<tr>
<th>Change</th>
<th>Examples</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>t → d</td>
<td>tia → dia</td>
<td>‘sleep’</td>
</tr>
<tr>
<td></td>
<td>ti’al → di’al</td>
<td>‘kick’</td>
</tr>
<tr>
<td></td>
<td>taka → daka</td>
<td>‘to close’</td>
</tr>
<tr>
<td>h → s</td>
<td>hai’ → sai’</td>
<td>‘to be finished’</td>
</tr>
<tr>
<td></td>
<td>heke → seke</td>
<td>‘to be difficult’</td>
</tr>
<tr>
<td></td>
<td>hofe → sofe</td>
<td>‘to know’</td>
</tr>
<tr>
<td></td>
<td>huri → suri</td>
<td>‘to shoot’</td>
</tr>
<tr>
<td>ø → n</td>
<td>umu → numu</td>
<td>‘die’</td>
</tr>
<tr>
<td></td>
<td>uta → nuta</td>
<td>‘fall (of rain)’</td>
</tr>
</tbody>
</table>

Table 4.4: Consonant mutation in Makalero (Huber, 2011:135)

The conditions in Makalero reported by Huber (2011) are very similar to those for Fataluku. Consonants mutate verb-initially when directly following another verb, in a closely-knit construction. No other elements can intervene between the two verbs, and from the examples she gives, the two verbs seem to indicate a complex event. Huber does not use the term “serial verb”
for these constructions, though a very similar construction is clearly involved, at least historically, if not synchronically as well. Examples 21 and 22 illustrate the construction.3

Makalero SVC-like constructions

(21)  
iskola isi mit
school at:RED sit.SG
‘sit at school’

(22)  
anî (. . . ) hai Dili isi la’a
I S NSIT D. be.at:RED go
‘I (. . . ) went to Dili’

Examples 23 and 24 show mutation from [h] to [s].

(23)  
teul suma (< huma)
chase angry
‘be angry and chase away’

(24)  
matenek e’ (. . . ) na’u ma’u mutu se’el (< he’el)
clever DEM just come inside:RED jump:BD
‘. . . the wisdom (. . . ) just jumped inside him.’

At first glance, the segments which participate in mutation in Makalero and the changes they undergo appear rather different from the changes in Fataluku. However, upon closer examination, the segments involved in mutation in both Makalero and Fataluku share the same source at the level of Proto-Timor (PTIM).

For instance, /t/ becomes [d] in Makalero (MKL), rather than [ts], as happens in Fataluku (FAT). However, Makalero /d/ and Fataluku /ts/ correspond regularly to one another, both from PTIM *d (Schapper et al., 2012). The voiceless stops /t/ also correspond to one another, unchanged from PTIM *t.

In a parallel way, Makalero has h → s in place of Fataluku’s h → ìs, but both MKL /s/ and Fataluku /îs/ share a common source, PTIM *D by Schapper et al.’s analysis. There are also correspondences between MKL [h] and FAT [h], from Schapper et al.’s PTIM *s. The following table summarizes the correspondences between the segments involved in mutation in Fataluku,

---

3I follow Huber’s (2011) glosses for examples from Makalero. Abbreviations which differ from my own include the following: BD ‘bound form’, NSIT ‘new situation’, RED ‘reduced verb form’.
Makalero and their ancestor, Proto-Timor. I give the corresponding PTIM segments in the top row of the table, as reconstructed in Schapper et al. (2012), with a small update to the labials.4

<table>
<thead>
<tr>
<th>Language</th>
<th>Mutations</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTIM</td>
<td>*t → *d *s → *D *s → *D *p → *b ø → *n</td>
</tr>
<tr>
<td>Fataluku</td>
<td>t → ŭs s → ŭs h → ŭs f → p ø → n</td>
</tr>
<tr>
<td>Makalero</td>
<td>t → d h → s h → s ø → n</td>
</tr>
</tbody>
</table>

Table 4.5: Comparison of mutations in Fataluku and Makalero, showing that they can be derived from the same PTIM segments.

It is notable that in all cases, mutation involves a change from a segment that was voiceless in PTim to one is voiced at the same place of articulation. There is also a change in manner, from *s → *D. The phonetic quality of *D is not certain, and Schapper et al. do not make it clear. Since reflexes include /z/, /d/, /s/, /ţ/ and /ú/, they suggest [ţd] as a reasonable possibility. This reconstruction is a good match for the affricate, fricative and stop reflexes observed. [ţd] is furthermore a typologically natural addition to the phoneme inventory, which does not interfere with the other coronals they reconstruct (*t, *d, *s and *T [perhaps ŭT]).

I propose that the consonant mutations found in Makalero and Fataluku are both inherited from a single phonetically-conditioned process present in PTIM. This process caused affrication of anterior fricatives and voicing of both stops and affricates. I propose that this process was conditioned by the presence of a morpheme /n/ after the first verb in a serial verb construction, which is preserved as the suffix /-n/ ‘LOC’ in Fataluku. The presence of [n] explains the voicing that takes place, since it is common for nasals to trigger voicing. It is also natural for [n] to trigger affrication, since there is motivation for the insertion of [t] between a nasal and a fricative, due to a slight mismatch in timing between nasal closure and oral opening. This sequence of a stop and a fricative would be voiced by the same rule affecting other obstruents, and could be reanalyzed as the affricate *D.

The nasal was lost in most cases, and the (originally underlyingly voiceless) segments were reanalyzed as phonemically voiced. Subsequent regular sound changes have since obscured the conditioning environment and original phonetic motivation of the rule. The nasal was preserved, however, in the mutative behavior of certain vowel-initial verbs, which insert an /n/.

---
4 Schapper et al. (2012) reconstruct three labials to PTIM, *p, *b and *f, but in their more recent article (Schapper et al., 2014), they reconstruct only two labials to PTAP—the ultimate ancestor of the family—*p and *b. Since *p and *f are in complementary distribution in PTIM, I maintain Schapper et al.’s (2013) analysis of labials at the level of PTim, proposing that the phonemic splits that took place, for instance, in Makalero, took place at a later time, probably at the level of Proto-Makasae-Makalero.
synchronously under roughly the same conditions as consonant mutation in both Fataluku and Makalero. This nasal is presumably a remnant of an earlier morpheme that triggered the consonant mutation. While the meaning of this morpheme remains uncertain, it is possible that it is reflexed as /-n/ ‘LOC’ in Fataluku, a morpheme used in the formation of positional verbs. The verbal stem of positional verbs can occur alone in serial verb constructions, but must occur with the morpheme /-n/ ‘LOC’ when in isolation. Thus, /mucu ñaṭa/ ‘sleep inside (smthing.)’, but /mucu-n-ṭe/ ‘to be located inside.’ The fact that the suffix occurs everywhere except serial verb constructions suggests it has been lost in that environment.

Tables 4.6 and 4.7 suggest a historical pathway from PTIM to Fataluku and Makalero.

<table>
<thead>
<tr>
<th>History of mutation, *d</th>
</tr>
</thead>
<tbody>
<tr>
<td>pre-PTIM</td>
</tr>
<tr>
<td>Voicing</td>
</tr>
<tr>
<td>*n-loss</td>
</tr>
<tr>
<td>PTIM</td>
</tr>
<tr>
<td>Fataluku</td>
</tr>
<tr>
<td>(T &gt; ñs, d &gt; ñs)</td>
</tr>
<tr>
<td>Makalero</td>
</tr>
<tr>
<td>(T &gt; t)</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>*muTu-n taja</td>
<td></td>
</tr>
<tr>
<td>muTu-n daja</td>
<td></td>
</tr>
<tr>
<td>muTu daja</td>
<td></td>
</tr>
<tr>
<td>mutu ñaṭa</td>
<td></td>
</tr>
<tr>
<td>mutu dia</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.6: A proposed historical pathway for consonant mutation in both Fataluku and Makalero

To sum up, Fataluku “consonant mutation” is a substitution affecting the first consonant in non-initial serial verbs. The substitutions (t → ñs, s → ñs, h → ñs, f → p, ø → n) have no apparent phonetic motivation, and cannot be stated easily in distinctive features. Not all verbs mutate, and even verbs which permit mutation sometimes surface unaffected in the relevant environment. I have suggested a possible historical origin for this mutation, namely, that the first consonant of a non-initial serial verb was caused to be voiced (and affricated, if a fricative) by a preceding locative morpheme /n/. Subsequent sound changes have since obscured the original phonetic motivation, though indications remain in both Fataluku and Makalero.
History of mutation, *D

<table>
<thead>
<tr>
<th></th>
<th>Fataluku</th>
<th>Makalero</th>
</tr>
</thead>
<tbody>
<tr>
<td>pre-PTIM IM</td>
<td>*muTu-n sina</td>
<td>*muTu-n sina</td>
</tr>
<tr>
<td>Epenthesis</td>
<td>muTu-n ŋina</td>
<td>muTu-n ŋina</td>
</tr>
<tr>
<td>Voicing</td>
<td>muTu-n ŋina</td>
<td>muTu-n Dina</td>
</tr>
<tr>
<td>Reanalysis</td>
<td>muTu-n Dina</td>
<td></td>
</tr>
<tr>
<td>*n-loss</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Fataluku</th>
<th>Makalero</th>
</tr>
</thead>
<tbody>
<tr>
<td>(T &gt; ŋ, D &gt; ŋ)</td>
<td>mutu ŋina</td>
<td>mutu sina</td>
</tr>
<tr>
<td>(T &gt; ŋ, D &gt; ŋ)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.7: A proposed historical pathway for consonant mutation involving PTIM *D in both Fataluku and Makalero

4.2.2 Glottal Stop Insertion

Another phonological alternation I analyze as a rule is glottal stop insertion. A glottal stop is inserted morpheme-initially when a morpheme begins with a vowel.

\[ \emptyset \rightarrow ? / + ____ V \]

This insertion can occur at the beginning of a prosodic word (ex. 25), between a reduplicant and its base (ex. 26), or between derivational morphemes and their bases (ex. 27). This rule, does, however, feed an optional process of Glottal Stop Deletion, meaning that the presence of the glottal stop in these positions is not obligatory on the surface.

(25) Insertion initially

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>/ali/</td>
<td>[ʔali]</td>
<td>‘again’</td>
</tr>
<tr>
<td>/un/</td>
<td>[ʔun]</td>
<td>‘a, one’</td>
</tr>
<tr>
<td>/uman=itu/</td>
<td>[ʔumänîtu]</td>
<td>‘who-TOP’</td>
</tr>
<tr>
<td>/ivi=itu/</td>
<td>[ʔivit]</td>
<td>‘then’</td>
</tr>
</tbody>
</table>

This process does not typically interfere with the contrastive nature of the glottal stop, since the contrastive glottal stop generally occurs morpheme-internally.
4.2.3 Final Vowel Insertion

Nouns which end in a consonant may optionally be made vowel-final by adding a low-sonority vowel. The vowel /i/ is most common, but /u/ is also a possibility. The form of the noun ending in /u/ is commonly used for addressing an individual (as a vocative).

\[
\begin{align*}
\emptyset & \rightarrow i / C \_\#]_{\text{NOUN}} \\
\emptyset & \rightarrow u / C \_\#]_{\text{NOUN}}
\end{align*}
\]

4.3 Segmental Processes

4.3.1 Glottal Stop Deletion

There is a common lenition process deleting a glottal stop before a vowel. Although the glottal stop is a phoneme, as shown in section 3.1.1, realizations of /ʔ/ with a period of silence resulting from full glottal closure are comparatively rare. It is much more common for the glottal stop to be realized only as a period of creakiness on surrounding vowels (a crosslinguistically common
realization of phonemic glottal stops noted by Ladefoged & Maddieson (1996), or deleted entirely. The figures below show a clear, full stop (figure 4.1), a period of creakiness (figure 4.2) and a full deletion (figure 4.3), all of which are possible realizations of an intervocalic glottal stop (or, more precisely, represent points along a continuum of possible realizations).

Figure 4.1: A glottal stop realized as a full glottal closure, in the word /he?e/ ‘to be scarce’

Figure 4.2: A glottal stop realized as a period of creakiness, in the word /ta?a/ ‘to say’
4.3.2 Vowel Fusion

As noted in section 3.4.2, given the appropriate conditions, adjacent vowels may fuse, forming either a surface long vowel (in the case of identical vowels) or a surface diphthong (in the case of nonidentical vowels). The formation of surface diphthongs, in particular, is sensitive to both speech rate and to the sonority of the vowels involved, while a surface long vowel may be formed from any sequence of identical vowels.

The conditions for vowel fusion in slow conversational speech may be stated as follows.

Fusion of adjacent vowels

Two adjacent vowels may be realized in the same syllable if either of the following is true:

- The vowels are identical to each other.
- The first vowel is non-high and the second vowel is high.

Vowel Fusion is fed by Glottal Stop Deletion.

(29) Fusion of identical vowels

| /keel-ana/ | [keːlænə] | ‘laughter’ |
| /aãsan-e/ | [ɑː̃sænə] | ‘enough’ |
| /vaal-e/   | [vaːle]   | ‘to bear a child’ |
(30) Fusion of non-identical vowels

<table>
<thead>
<tr>
<th>Phoneme</th>
<th>IPA</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>/nail-e/</td>
<td>[naiːle]</td>
<td>‘to hook out’</td>
</tr>
<tr>
<td>/isoθ-e/</td>
<td>[isoθe]</td>
<td>‘to mash’</td>
</tr>
<tr>
<td>/dzeu/</td>
<td>[dzeu]</td>
<td>‘wife’</td>
</tr>
<tr>
<td>/hai/</td>
<td>[hai]</td>
<td>‘PRF’</td>
</tr>
</tbody>
</table>

(31) Fusion fed by glottal stop deletion

<table>
<thead>
<tr>
<th>Phoneme</th>
<th>IPA</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>/laʔa/</td>
<td>[laː]</td>
<td>‘to go’</td>
</tr>
<tr>
<td>/maʔar/</td>
<td>[məːr]</td>
<td>‘person’</td>
</tr>
<tr>
<td>/raʔu/</td>
<td>[raʊ]</td>
<td>‘plate’</td>
</tr>
<tr>
<td>/faʔi=tu/</td>
<td>[faɪt]</td>
<td>‘to do=DS’</td>
</tr>
<tr>
<td>/naʔunop-e/</td>
<td>[naʊnɔpe]</td>
<td>‘(this) morning’</td>
</tr>
</tbody>
</table>

(32) Fusion across word boundaries within an AP

<table>
<thead>
<tr>
<th>Phoneme</th>
<th>IPA</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>/uru uukani/</td>
<td>[uruːkani]</td>
<td>‘one month (lit. moon one)’</td>
</tr>
</tbody>
</table>

Non-falling diphthongs are also possible in more rapid speech, including both rising diphthongs and diphthongs involving vowels of the same height. A few examples are shown in (33).

(33) Non-falling diphthongs

<table>
<thead>
<tr>
<th>Phoneme</th>
<th>IPA</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ia/</td>
<td>[ja]</td>
<td>‘road’</td>
</tr>
<tr>
<td>/io/</td>
<td>[iɔ]</td>
<td>‘also’</td>
</tr>
<tr>
<td>/kiukiu/</td>
<td>[kiukiu]</td>
<td>‘birdsong’</td>
</tr>
<tr>
<td>/kuekasa/</td>
<td>[kuekasa]</td>
<td>‘underwear’</td>
</tr>
<tr>
<td>/katuas/</td>
<td>[katuas]</td>
<td>‘to be old’</td>
</tr>
</tbody>
</table>

At this point, the precise phonological mechanism involved in the creation of surface long vowels and diphthongs is not entirely clear, though Poser presents an appealing analysis. In dealing with a similar issue in Tongan, Poser (1985) proposes that underlying forms are parsed exhaustively.
into light syllables early in the derivation. A rule he calls “Syllable Fusion” later creates long vowels or diphthongs from adjacent syllables meeting the appropriate criteria. This analysis is amenable to the data here, and consistent with the surface alternation I observe between diphthongs and disyllabic vowel sequences, conditioned by speech rate. It is also consistent with the observation that segmental rules may make reference to syllable structure, formalized in many theories of phonology (for the NP perspective, see Donegan & Stampe, 1979). Since the formation of long vowels and diphthongs in Fataluku is fed by Glottal Stop Deletion (another lenition process sensitive to speech rate), it must be seen as taking place relatively late in the derivation, presumable much later than the initial creation of syllable structure. For this reason, at present, I adopt the crux of Poser’s (1985) analysis of Tongan for Fataluku, namely, that the process of Vowel Fusion joins monomoraic syllables created early in the derivation.

### 4.3.3 Nasalization

Nasalization can spread from nasal consonants to adjacent vowels, both rightward and leftward. Example (34) illustrates the bidirectional spread of nasality.

\[ [+\text{syl}] \rightarrow [+\text{nas}] / [+\text{nas}] \]

(34)  
/sun-e/ [sūnē] ‘to blow’  
/anat-e/ [ānāte] ‘take one’s turn’  
/emer-e=n/ [ēmērēn] ‘to be first =SS’

Nasalization can spread across word boundaries, either rightward or leftward.

(35)  
/karuʔen afa/ [kāruʔēn āfa] ‘now we…’  
/lau mūralaku/ [lāu mūralaku] ‘clothes remove’  
/aka navar/ [akā nāvar] ‘not know’

### 4.3.4 Final Vowel Devoicing

Vowels at the end of an IP ending in a low intonational tone (L%) may be devoiced following a voiceless consonant. This process is optional, but generally quite common.

---

5One important difference between Poser’s analysis and my own, however, is that Poser views Tongan Syllable Fusion as a “Lexical Rule,” while I would consider Fataluku Vowel Fusion a “Postlexical” rule in the framework of Lexical Phonology.
4.3.5 Final Vowel Lowering

Another phonological process which occurs frequently in rapid speech is vowel lowering. In this process, a high vowel (/i/ or /u/) at the end of a word becomes lowered following a low vowel (/a/). This process is gradient, and possible realizations range from a high to a mid vowel.

Most consonants block lowering when they intervene between low and high vowels, though at least /r/ and glottal stop are transparent for the purposes of lowering. It is possible for a final vowel to be both lowered and devoiced, especially in more rapid speech.

\[
V \rightarrow [-hi] / V [+lo] \begin{cases} \text{?} \\ r \end{cases}
\]

4.4 Prosodic Processes

4.4.1 Foot-Conditioned Lengthening

Fataluku avoids degenerate feet, i.e., feet containing a single mora. Unfooted syllables can occur, but if a syllable is coterminous with a foot, it must contain two moras. In Fataluku, only vowels

---

6Since this process is optional, it is difficult to obtain negative evidence, that is, evidence that the rule cannot apply with a particular consonant intervening. The process is well-attested with /r/ and /ɬ/, and though I am not aware of any examples, it is possible that other consonants may also be transparent for lowering.
are moraic; thus, syllables with a long vowel or a diphthong count as heavy, while all other
syllables are light. In the event a light syllable must be footed, its vowel is lengthened so that it
bears two moras.

This process impacts the shape of monosyllabic words. Fataluku does not allow content words
which contain only a single mora; to avoid words of this type, a single short vowel is lengthened.
I analyze this minimum word requirement as an interaction between foot-conditioned lengthening
and footing procedures that require all content words to have at least one foot, following
McCarthy & Prince (1993), who propose a similar analysis of word minimality in an OT
framework.

In most cases, it is ambiguous whether the underlying representations of monosyllabic content
words contain a short vowel or a long vowel. Surface alternation is visible, however, in the verb
/na-e/ ‘to be at.’ With the verbal suffix /-el/, the vowel /a/ is short, since the verbal suffix is
included in the foot (see section 5.9); however, when the base /na/ ‘to be at’ occurs without the
verbal suffix, its vowel is lengthened, as [na:]. Several other examples are given in (38). These
transcriptions assume short vowels in the underlying representations, for expository purposes,
though aside from /na/ ‘to be at’, an analysis with underlying long vowels is also possible.

(38)  /na/  [na:]  ‘to be at’
     /tsal/  [tsa:l]  ‘grandparent’
     /hok/  [ho:k]  ‘mud’
     /nal/  [na:l]  ‘mother’
     /tsu/  [tsu:]  ‘hut’

The same process also applies in longer words, when a syllable with a short vowel must be footed
alone. This happens, for instance, in disyllabic words in which the first syllable is light and the
second is heavy. In words of this shape, each syllable forms a foot. In order to avoid a degenerate
foot in the first syllable, the vowel in the first syllable is lengthened if it is short. Again, it is
ambiguous whether these words contain a short vowel underlyingly or a long vowel. The
following examples assume a short vowel underlyingly, for expository clarity.

Procedures for footing—as well as the effects of feet on various aspects of the phonology—are
discussed in much greater detail in section 5.9.
4.4.2 Intonational Tone Clash Resolution

The following three processes are strategies for handling intonational tone clash, when intonational targets are clustered too tightly to be realized fully in the given phonetic space. Strategies include tone movement, intonation-conditioned prosodic lengthening and intonational tone undershoot.

Tone Movement

The first strategy, Tone Movement, occurs most commonly when a word with two short syllables occurs utterance-finally (including in isolation). There is a foot boundary tone (Hft) which attaches to the right boundary of the first foot in the word. In a word with two light syllables, this high intonational tone is attached to the right margin of the word (which is coterminous with the foot). There are also, however, intonational boundary tones which are realized utterance-finally, such as the low boundary tone (L%) typical of declaratives. Since the final syllable is generally too short to accommodate both a high tone and a low tone in series, the f0 maximum lands on the
Figure 4.5: The word /pala/ ‘farm’, realized in the phrase /pala mara/ ‘went to the farm’; here the peak lands at the right margin of /pala/, where it is expected.

Initial syllable of the word, instead of the final syllable. I analyze this change as a movement of the high foot boundary tone (Hft) to the penultimate syllable, where it can be realized fully.\(^7\)

Figure 4.4 shows the typical realization of /pala/ ‘farm’ in isolation, with the high foot boundary tone (Hft) on the first syllable. Figure 4.5 shows the realization of the same word in the phrase /pala mara/ ‘went to the farm’, in which both words are part of the same AP. Here, the foot boundary tone occurs at the right margin of the word /pala/, where it is expected, since there is no conflict with the final L\(^%\).

**Intonation-Conditioned Prosodic Lengthening**

Another strategy for intonational tone clash resolution is used for the complex boundary tone for questions, L+HL\(^%\). In order to accommodate all the tonal targets in this intonational morpheme, the final syllable is lengthened substantially (to approximately 2 times the length of a comparable syllable in a declarative, as calculated in section 5.4.2). One example is given in figure 4.6. Evidence that it is the final vowel of a word that it lengthened, rather than the final syllable, is found in instances in which a falling diphthong comes IP finally. Rather than lengthening the more sonorant component of the diphthong, or lengthening both components proportionally, it is the second component which is lengthened. As noted above in section 3.4.2, this is a good piece

\(^7\)An alternative analysis would be to claim that the Hft tone is deleted completely, and the higher f0 in the first syllable is a result of a default IP-initial pitch setting.
of support that diphthongs are represented underlingly as vowel sequences, rather than as unit phonemes.

Lengthening is also common in the extra-high continuation contour `H%, presumably to allow time for the vocal folds to make the necessary adjustments to achieve the pitch involved, well above the level of typical high intonational tones (see section 6.8).

![Figure 4.6: The word /hiʔamoi/ ‘climb’, realized as the final word in the question, /așur ia ten ete hai hiʔamoi/ ‘Did the cuscus climb the tree?’ (JE). The spectrogram is given on a scale from 0–5,000Hz, to allow easier identification of vowel formants. Observe the substantial lengthening of the vowel /i/ (note the high second formant), which is typically realized as an off-glide.]

**Intonational Tone Undershoot**

A third strategy is implemented when the intonational boundary tone for questions (L+HL%) is realized in close proximity to a high foot boundary tone (Hft). If the AP high occurs within two syllables of the intonational boundary tone, the initial L+ is undershot, and has no phonetic realization. This is illustrated in example 4.7.

It is interesting that a single language makes use of at least three different strategies for resolving intonational tone clashes. These three processes illustrate a conspiracy towards the goal of realizing all intonational tones with minimal disruption to segmental contrasts.

---

8Note the downstep between adjacent APs, meaning that the Hft tone of the second AP is lower than that of the first.
Figure 4.7: The phrase /jaampata neer-e/ ‘Is the road flat?’ Because of the close proximity of the high intonational tone on /neer-e/ to the end of the IP, the initial L+ of the question contour is undershot.
5 WORD-LEVEL PROSODY

In this chapter, I deal with the word-level prosody of Fataluku, discussing whether Fataluku has stress, tone, lexical pitch accent or another type of system. Section 5.1 gives a brief typological overview of word-level prosodic systems, while section 5.2 describes previous analyses of Fataluku. Section 5.3 reports the methodology for a phonetic investigation of word-level prosody. Sections 5.4 and 5.5 report the results of this investigation and compare them with previous claims. Sections 5.6–5.8 argue that Fataluku has neither stress, lexical pitch accent nor tone, but rather, word-level prosodic patterns are the result of intonational tones attaching to feet. Section 5.9 illustrates the footing of words of various lengths, while section 5.10 compares Fataluku’s feet with typological footing parameters (e.g., iambic vs. trochaic) and summarizes footing procedures.

5.1 Typology of Word-level Prosody

Word-level prosodic typology is an area which has engendered substantial debate and discussion, though consensus on the best typology remains elusive. One common typology is a three-way distinction between stress, lexical pitch accent (LPA) and tone (see e.g. Jun, 2005c). These phonological categories are neither mutually exclusive nor required, and a language may have more than one (such as Mandarin Chinese, which has both stress and tone; see Peng et al. 2005) or none at all (as is typically argued for Seoul Korean; see Jun 2005a). In this section, I briefly summarize the definitions and common properties of each of these categories in order to lay the groundwork for discussion of Fataluku word-level prosody.

5.1.1 Stress

Hayes (1995) defines stress as “the linguistic manifestation of rhythmic structure.” He notes that in spite of extensive acoustic work, it is very difficult to isolate a universal phonetic description of stress, though stress can have substantial effects on both segmental content and intonation. English provides a particularly good example of the potentially large impact of stress on segmental content. Vowels in unstressed syllables are reduced substantially, and stress conditions the phonotactic distribution of vowels. Languages often distinguish fewer segmental contrasts in unstressed syllables than in stressed syllables.

Stress can also have a large effect on the intonation, as discussed by Hayes (1995) and Jun and Fletcher (2015). In languages like English, intonational targets align with stress, so that stressed syllables often form local f0 minima or maxima. In the Autosegmental-Metric (AM) approach,
the phonetic realization of intonation is seen as a result of continuous interpolation between
discrete tonal targets. In the AM approach, intonational targets are called “tones”, though they are
very different from lexical tone used in “tone languages,” since they are neither lexically
specified, nor do they distinguish lexical items.

There are two main types of tonal targets—those which associate with stressed syllables, called
“Intonational Pitch Accents”, and those which associate with the edges of prosodic units, called
“Boundary Tones.” The terminological similarity between the intonational pitch accent and the
lexical pitch accent of, for instance, Japanese, is unfortunate, as the two are completely distinct.
As discussed below, the term lexical pitch accent is generally used for a tonal specification in the
underlying form of particular lexical items in languages like Japanese, which may not have stress.
On the other hand, the intonational pitch accent is an intonational target associated with a
particular stressed syllable at a level of organization higher than the word. Tonal targets are
represented by a letter or combination of letters (such as H for high, L for low or HL for falling),
accompanied by a symbol to represent the type of tone. Pitch accents are represented with a
following asterisk (*), while boundary tones are indicated with other punctuation (such as % for a
tone attached to the boundary of an intonational phrase).

An example from English is instructive. In the sentence “Victoria ate the rutabaga,” there exist
three syllables with primary stress at the word level, as follows: [vɪkˈtoʊɪə ˈeɪt də ˈrʊtəbæɡə]. In
the normal, unfocused reading of this sentence, the first and last stressed syllables receive a high
intonational pitch accent, represented as H*. The pitch remains moderately high between these
pitch accents, but after the last accent, the pitch falls because of a low final boundary tone (L%).
When transformed into a polar question, “Did Victoria eat the rutabaga?”, a mirror image of this
intonational pattern occurs. In this case, the first and last stressed syllables will show pitch valleys
because of a low intonational pitch accent on each (L*), and the sentence will end high because of
a high final boundary tone (H%). Other configurations of pitch accents are also possible; for
instance, if a speaker wishes to emphasize the word “ate”, this word will also take an intonational
pitch accent. It is also possible to combine high and low intonational peaks more or less freely in
a sentence (Veilleux et al., 2006).

These examples show that English stress does not have a uniform f0 correlate, but stress is
nevertheless extremely important for the specification of intonational contours. English’s
inventory of pitch accents includes not only high (H*) and low (L*), but also a downstepped high
(!H*), a low followed by a high (L*+H), a high preceded by a low (L+H*) and a downstepped
high preceded by a high (H+!H*) (Veilleux et al., 2006). Languages differ in the number and type
of intonational pitch accents they have, with a tendency for languages with unpredictable stress to
have larger inventories of pitch accents (Jun, 2005c; Jun & Fletcher, 2015). There are strong
expectations that stress languages will have intonational tones aligning with stressed syllables (Jun & Fletcher, 2015), though exceptions have been proposed (Lindström & Remijsen, 2005). In languages that do have intonational pitch accents, they are a useful and important diagnostic for stress.

5.1.2 Lexical Tone
Lexical tone involves the phonemic use of f0. Larry Hyman (2006:229) defines lexical tone as follows.

A language with tone is one in which an indication of pitch enters into the lexical realisation of at least some morphemes.

Pitch generally carries a distinguishing force in these languages, distinguishing one morpheme from another. Tonal systems may be very complex, displaying large numbers of tonal contrasts, as in Chinese languages, or they may have only a single tonal opposition. Tonal languages may also vary in the density of tonal specification. While in some languages, nearly every syllable may carry a specification for tone, in other languages, tonal specification may be much more sparse.

5.1.3 Pitch Accent
Lexical pitch accent is a particularly controversial prosodic category, related to lexical tone. Languages classified as having pitch accent generally show a restricted, typically contrastive tonal specification. Venditti (2005) describes Tokyo Japanese, an oft-cited example of a pitch accent language. The single Japanese “pitch accent” is realized as an f0 peak followed by a drop on following syllables. Not every word contains the pitch accent; the occurrence and position of the pitch accent is specified underlyingly, and can distinguish words.

The controversy surrounding pitch accent hinges not on whether systems such as Japanese exist, since there are numerous similar examples, but in the theoretical mechanisms necessary to explain them. As is often pointed out, prosodic systems like Japanese can be analyzed simply as sparse tone systems, thus avoiding the necessity of a distinct category of “pitch accent languages”, treating them rather as one end of a spectrum of tonal density (see e.g. Hyman, 2006). Hyman (2006) argues for a simple bifurcation between stress and tone; he sees good support for prototypical tones systems and prototypical stress systems, but no clearly defined, theoretically motivated class of pitch accent systems. Instead, he reanalyzes languages typically classified as having pitch accent systems either as sparse tone systems or as belonging to a heterogenous intermediate space drawing characteristics from both tone languages and stress languages. Though below I consider the possibility that Fataluku has a so-called “pitch accent” system, I remain neutral on the larger theoretical question of whether “pitch accent languages” form a
distinct typological category, since I find no convincing evidence from Fataluku which would favor one position over the other.

5.1.4 Intonation-Only Systems

There is evidence that a number of languages have neither stress, tone nor lexical pitch accent. In these languages, prosody at the word level is defined completely by the intonation. Jun & Fletcher (2015) note that these languages typically have a particular intonational melody accompanying each word, such as a rise or a fall. Languages differ in whether this tonal melody is associated directly with the prosodic word—an abstract prosodic unit corresponding roughly to a grammatical word—or with a larger unit containing one or more prosodic words. In the conceptualization of the prosodic hierarchy generally adopted in recent work in the AM framework, the prosodic unit just above the level of the prosodic word is called an accentual phrase (AP), a unit which may contain either a single word or a few close words. Two words are more likely to be realized in the same AP if they are short, or if they form a tight syntactic, semantic or collocational unit (Jun & Fletcher, 2015).

In these languages, phonological phrasing fulfills many of the roles played by intonational pitch accents in stress languages. For instance, the use of the same tonal melody for each AP serves to aid in word segmentation. Prosodic phrasing can also be used to disambiguate syntactic phrasing, as well as showing focus (see e.g. Jun 2011 on focus in Korean).

5.2 Previous Claims about Fataluku Word-Level Prosody

5.2.1 Campagnolo’s (1973) Analysis

With this brief typology of word-level prosody in mind, let us examine the claims made about Fataluku word-level prosody. The first to discuss the subject was Henri Campagnolo (1973). He claimed the existence of two types of accents in Fataluku, a short accent (which he represented with an acute accent, á) and a long accent (which he represented with a macron, ¯a). Both involved a raising of pitch, but the long accent was also accompanied by an increase in length (an alternative analysis of long vowels).

He divides the words of Fataluku into marked and unmarked “accentual classes,” based on their behavior with respect to the short accent. When produced after a pause, “marked” words are accented on the first syllable, while “unmarked” words are accented on the second syllable. Classification of words as marked or unmarked is lexically determined, with unmarked classes being more common.
He also gives an extremely involved set of rules for the realization of word pairs. Depending on the accentual classes of the words involved and the syntactic relationship between them, there are four possible accentual relationships which could hold between two words, which Campagnolo represents using the symbols +, □, <, and ×. The meaning of each symbol is given in table 5.1.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>Default accent on the first word, no accent on the second word. If both words are monosyllabic, the first word receives a long accent.</td>
</tr>
<tr>
<td>□</td>
<td>The first word has no accent, while the second word maintains its default accent.</td>
</tr>
<tr>
<td>&lt;</td>
<td>Default accent on the first word, accent occurs on the penult of the second word, or is suppressed</td>
</tr>
<tr>
<td>×</td>
<td>Both words have their default accent</td>
</tr>
</tbody>
</table>

Table 5.1: Campagnolo’s (1973) four types of accentual relationships

To determine which of these relationships holds between any given two words, it must be determined whether a “junction” or a “disjunction” exists between them. The nature of the distinction between the junction and disjunction is difficult to ascertain in Campagnolo’s original work; Stoel (2008) gives the following interpretation, which I quote:

Junction:
- 3rd person possessive pronoun í + noun
- compounds
- object + verb (in declarative sentences)

Disjunction:
- 2nd person plural possessive pronoun i + noun
- possessive constructions (with non-pronoun possessor)
- subject + verb
- object + verb (in imperative sentences)

Once it is determined whether there is a juncture or a disjuncture, table 5.2 may be consulted to determine the accentual relationship involved. For instance, consider a case in which the words wata ‘coconut’ and atar-e ‘break’ are realized with a junction. The word wata ‘coconut’ is from an unmarked accentual class, and the second word is polysyllabic, so consulting table 5.2, it can be determined that there exists a “+” relationship between the two. This means that the first word
takes its default accent, and there is no accent on the second word (see table 5.1), as *watá atare* ‘(someone) breaks the coconut’. When combining the words *i* ‘2.PL.POSS’ and *kuca* ‘horse’, there is a disjuncture. Since the first word is monosyllabic, and the second is polysyllabic, there exists a “□” accentual relationship between the two; this means that the first word loses its accent, but the second word maintains its default accent (*i kúca* ‘your horse’).

<table>
<thead>
<tr>
<th>2nd word is monosyllabic</th>
<th>2nd word is polysyllabic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st word is monosyllabic or unmarked disyllabic</td>
<td>□</td>
</tr>
<tr>
<td>Otherwise</td>
<td>+</td>
</tr>
</tbody>
</table>

Table 5.2: Campagnolo’s (1973) conditions for accentual relationships

To sum up, Campagnolo sees word-level prosody as lexically conditioned: each word is accented either on the first syllable or the second syllable, a distinction which is unpredictable and must be specified for each word. The realization of accents in two-word sequences depends on an elaborate system of rules based on word length and underlying accent.

### 5.2.2 Stoel’s (2008) Analysis

Stoel (2008:78) presents a new analysis of Fataluku word-level prosody, based primarily on Campagnolo’s data. He explains that his new analysis is “motivated by the idea that the analysis of Campagnolo is too complex.” He reanalyzes “accent” as a lexical high tone associated underlyingly with either the first or second syllable of a word. Words from Campagnolo’s “marked” accentual classes have a high tone on the first syllable, while words from “unmarked” classes have a high tone on the second syllable. All content words have a high tone on either the first or second syllable, though some function words do not have tone. He uses a superscript H to represent the high tone, a convention I follow here.

Stoel also posits several phonological mechanisms affecting tone realization. One important constraint is that a lexical high tone may not be realized on the final syllable of an utterance, since this position is reserved for intonational tones. Therefore, in a disyllabic word with a H tone on the final syllable, the H tone is moved to the penult. By his analysis, the word ‘cat’ is /po.si^H/ underlyingly, but realized phonetically as [po^Hsi].

He also gives a “phrase rule” which attempts to explain the behavior of tone in two-word phrases, quoted here (Stoel, 2008:81):
In two-word phrases, the lexical H tone of the first word does not change, but the H tone of the second word may be moved or deleted, according to a rule which I will call the “phrase rule.” This rule only applies in one of the following conditions:

- The first word has only one syllable
- The first word has two syllables with a H tone associated with the second syllable
- The second word has only one syllable

In other cases, nothing happens. The phrase rule is as follows:

- If the lexical H tone of the second word is associated with the last foot, then this H tone is deleted, otherwise it is moved to the penultimate syllable.

He gives a few examples to illustrate this rule.

(1) \( \text{i}^{\text{H}} \text{h}. \text{i}^{\text{H}} \text{.kar} \) ‘knife’ + \( \text{l}^{\text{H}} \text{.fai} \) ‘big’
    \( \text{i}^{\text{H}} \text{h}. \text{i}^{\text{H}} \text{.kar} \text{.l}^{\text{H}} \text{.fai} \) ‘machete’

(2) \( \text{i}^{\text{H}} \text{.a} \) ‘foot’ + \( \text{f}^{\text{H}} \text{.ka} \) ‘finger’
    \( \text{i}^{\text{H}} \text{.a}^{\text{H}} \text{.fu} \text{.ka} \) ‘toe’

(3) \( \text{i}^{\text{H}} \) ‘POSS’ + \( \text{l}^{\text{H}} \text{.ri}^{\text{H}} \text{.nu} \) ‘root’
    \( \text{i}^{\text{H}} \text{.la} \text{.ri} \text{.nu} \) ‘its root’

(4) \( \text{i}^{\text{H}} \cdot \text{POSS}’ + \text{sa}^{\text{H}} \text{.pu}^{\text{H}} \text{.ra} \text{.ki} \) ‘orange’
    \( \text{i}^{\text{H}} \text{.sa} \text{.pu} \text{.ra}^{\text{H}} \text{.ki} \) ‘his orange’

Stoel (2008:82) also claims that there is a high boundary tone that occurs on “the final syllable of the last word of a prosodic phrase,” which is used to indicate that the prosodic phrase is non-final. He reanalyzes Campagnolo’s notion of “disjunction” as a phrase boundary between two words, whereas a “junction” occurs when two words are in the same phrase. He illustrates the utility of this notion by applying it to the distinction between Subject-Verb and Object-Verb pairs. Campagnolo treats an object and its verb as a junction, but a subject and its verb as a disjunction. Stoel claims rather that the subject and verb have a phrase boundary between them (and thus an H boundary tone), while an object and verb do not, as in 5 and 6.
Object-Verb

(5)  \text{tu}^{H} \text{.pu.ku.ru} e.\text{ce}^{H}.\text{re.mu}\\
\text{owl} \quad \text{remember}\\
'h(he) remembers the owl.'

Subject-Verb

(6)  \text{tu}^{H} \text{.pu.ku.ru}^{H} e.\text{ce}.\text{re}^{H}.\text{mu}\\
\text{owl} \quad \text{remember}\\
'The owl remembers (him).'</n

5.2.3 Hull’s (2005) Analysis

Hull (2005:4) gives a rather different analysis of Fataluku word-level prosody, claiming that accent is predictable from the length of a word. His explanation is quoted below.

Fataluku, like Japanese, has an [sic] non-expiratory accent, possibly involving pitch and requiring further study. Stress is labile, as in Makasai. Normally, the three syllables of such a word as sorotu are equally stressed (sòròtù), which facilitates the occurrence of apocope (>sorot). However, when words are emphasized, weak paroxytonic stress is normal in words of two syllables (sorótu, ipáru, káfe, Tímor, ‘Ándre) and weak proparoxytonic stress characterizes compounds, sequences and words of more than two syllables (cipícipi, parí-hoto, kócó eni, aca-tápinu, húfute, Tutúala, fatalúkunu).

5.3 Methodology

Each of these analyses makes empirically testable claims about the word-level prosody of Fataluku. To compare the accuracy of each of these competing claims, four native speakers of Fataluku (3 male, 1 female) were recorded reading a mix of broad-focus declaratives and polar questions. Sentences were recorded in a quiet location with a Zoom H4n or H6 solid state recorder at 44.1 kHz/16bit. Speakers (who were all literate, high-proficiency speakers of English) were prompted with a list of approximately 12 declaratives and 12 interrogatives in English to translate into Fataluku. Speakers were recorded reading 2-3 repetitions, the best 1-2 of which were chosen for analysis.

Since all three authors mention “pitch” as a distinguishing factor of word-level prosody, and the data given by the authors generally correlate with f0 peaks in my own observations, f0 was taken as the primary focus of the analysis. The software Praat (Boersma & Weenink, 2013) was used to
observe f0 tracks, with special focus on the alignment of the f0 peaks to syllable and word boundaries, as deducible from the spectrogram and waveform. Full sentences were used, rather than words in isolation, since words in isolation conflate word-level and sentence level prosody (Jun & Fletcher, 2015). Using full sentences also provided a variety of words of different lengths, allowing different hypotheses about word-level prosody to be tested.

5.4 Results

All four speakers recorded here showed the same patterns robustly. The general pattern is for f0 to rise from the beginning of a word, peaking in the syllable containing the second mora, and falling to the end. The f0 may fall from the peak either to the end of the word, or, if the next several words form a tight syntactic or semantic unit with the first, to the end of the final word of the unit. For instance, it is very common for a verb and its object to share only a single peak.

There is some variation in peak location with speech rate, so that in more rapid speech, the peak often occurs in the syllable containing the third mora (or, rarely, even later), regardless of the particular lexical items involved. One exception to the general pattern of second mora peaks is that IP-final disyllabic words (including disyllabic words elicited in isolation) typically have an f0 peak on their first syllable, regardless of the weight of that syllable. Figure 5.1 shows a representative pitch track. The subject, [lua ia] ‘the monkey’, forms a single unit, with a peak late in the second syllable of [lua] ‘monkey’. The verb phrase [mu: toto] ‘sees the banana’ forms another unit, with a peak late in the word [mu:] ‘banana’ (phonemically /muʔu/, with the loss of glottal stop typical of more rapid speech).

Figure 5.1: An example declarative sentence, Lua ia mu’u toto. ‘This monkey sees the banana’ (JD).
Figure 5.2: Alignment of f0 peaks; the dotted line represents words with a light initial syllable, the solid line words with a heavy initial syllable.

Figure 5.2 graphs the distribution of f0 peaks by syllable. Each group of words containing a single rise-fall pattern was treated as a unit for this analysis. These units were classified based on the syllable containing the f0 maximum (reckoned from the left). Syllable counts are based on the citation form of each word. The dotted line represents words with light initial syllables and the solid line words with heavy initial syllables. As argued in section 5.9 below, only vowels count for a mora, while consonants are ignored for the purposes of weight.

<table>
<thead>
<tr>
<th></th>
<th>Heavy initial</th>
<th>Light initial</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial peak</td>
<td>44</td>
<td>40</td>
<td>84</td>
</tr>
<tr>
<td>Later peak</td>
<td>18</td>
<td>230</td>
<td>248</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>270</td>
<td>332</td>
</tr>
</tbody>
</table>

Table 5.3: Contingency table comparing the weight of the initial syllable and f0 peak location

There was a highly significant association between the weight of the first syllable and whether the f0 peak landed on the first syllable or a later syllable, $\chi^2(1) = 84.12, p < .001$. The odds of having an f0 peak on the first syllable is 13.89 times higher if the first syllable is heavy than if the first syllable is light (based on the odds ratio; 95% Confidence Interval: 7.07, 28.32). It is notable that both words with heavy first syllables and words with light first syllables have approximately the same percentage of third mora peaks relative to second mora peaks (41.3% for light syllables and 40.9% for heavy syllables).
5.5 Comparison with Previous Analyses

Each of the three previous analyses of word-level prosody makes some useful observations about the data, though none is able to provide a full explanation. For instance, both [Campagnolo (1973)] and [Stoel (2008)] identify f0 peaks on the first or second syllable of a word, though they treat the distribution of peaks as phonemic, rather than recognizing the conditioning effect of syllable weight. It is notable that the words classified by Campagnolo as ‘marked’, and by Stoel as having an initial high tone, are in fact those words which contain a phonemically heavy initial syllable in the present dataset (including both long vowels and diphthongs). Table 5.5 shows that Campagnolo’s distinction between “marked” and “unmarked” accentual patterns (analyzed by Stoel as a tone difference) is in fact a difference in syllable weight.1

<table>
<thead>
<tr>
<th>“Marked” = Heavy Initial Syllable</th>
<th>“Unmarked” = Light Initial Syllable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 syllable</td>
<td></td>
</tr>
<tr>
<td>ii ‘POSS’</td>
<td>i ‘2.PL.NSBJ’</td>
</tr>
<tr>
<td>lee ‘house’</td>
<td></td>
</tr>
<tr>
<td>too ‘bowl’</td>
<td></td>
</tr>
<tr>
<td>aur ‘lime’</td>
<td></td>
</tr>
<tr>
<td>2 syllables</td>
<td></td>
</tr>
<tr>
<td>Jeerai ‘Jeerai’ (a name)</td>
<td>vani ‘bee’</td>
</tr>
<tr>
<td>leura ‘meat’</td>
<td>toto ‘to see’</td>
</tr>
<tr>
<td></td>
<td>kaka ‘brother’</td>
</tr>
<tr>
<td></td>
<td>lavan ‘money’</td>
</tr>
<tr>
<td>3 syllables</td>
<td></td>
</tr>
<tr>
<td>aatane ‘to sit’</td>
<td>atare ‘to crack’</td>
</tr>
<tr>
<td></td>
<td>anukai ‘thread’</td>
</tr>
<tr>
<td>4 syllables</td>
<td></td>
</tr>
<tr>
<td>naaramahe ‘to squeeze’</td>
<td>sapuraki ‘orange’</td>
</tr>
</tbody>
</table>

Table 5.4: Campagnolo’s distinction between “marked” and “unmarked” accentual patterns is actually a distinction in syllable weight. Data are from [Campagnolo (1973:78–79)], transcribed phonemically according to my conventions.

Stoel goes a step further than Campagnolo, noting a connection between long vowels and f0 peaks, though he takes the position that vowel length is predictable from the placement of tone, rather than the reverse. However, since his derivation of vowel length only predicts long vowels in monosyllables and the first syllable of disyllabic words, it is ultimately unable to explain the

1Campagnolo does not distinguish between /ii/ ‘POSS’ and /i/ ‘2.PL.NSBJ’, treating all monosyllabic words as marked. He does give examples in which they behave differently, though he attributes the difference to junction/disjunction. Stoel treats /i/ ‘2.PL.NSBJ’ as having no lexical tone. I analyze the distinction between these words as a difference in phonemic vowel length. Examples of light monosyllabic words are rare because of a minimum word constraint requiring all content words to contain at least two moras. Note also that the form /naaramahe/ ‘to squeeze’ is likely morphologically complex, containing /naa/ ‘on, at’.
occurrence of long vowels in words of three or four syllables, such as [akina] ‘firm’, [nənukas] ‘plant sp.’ or [atsane] ‘enough’ (see further discussion in section 3.4.1).

The third analysis, that of Hull (2005), does treat accent as predictable, though since his analysis is based only on the number of syllables, regardless of their weight, it is not able to capture the effect of weight either. Hull’s analysis predicts accent correctly in many instances, though it is not able to explain the behavior of disyllabic and trisyllabic words with all light syllables. Hull predicts penultimate accent in light disyllabic words, when the general pattern is for an f0 peak to occur on the final syllable, as in [atsür] ‘cuscus’ or [var] ‘always’ (using an acute accent to indicate the phonetic f0 peak). Similarly, Hull predicts accent on the first syllable of light trisyllabic words, when the pitch peak occurs on the second syllable, as in [atsane] ‘to be old’ or [totòle] ‘to look’.

5.6 Analysis of Pitch Peaks
Although the presence of predictable f0 peaks has been established, there remains the question of how they are to be analyzed phonologically, since in theory, a phonetic f0 peak could be the result of any type of word-level prosody discussed above.

I begin by ruling out tonal or lexical pitch accent analyses for Fataluku, since they do not adequately account for the data. As demonstrated above, the distribution of f0 peaks in Fataluku is predictable, and thus not compatible with conventional tone or pitch accent analyses, which imply underlying specification for pitch. Even a broader definition of tone, such as that advocated by Hyman (2006), is unsupported. Hyman includes in his definition of tone not only languages in which tone is specified underlyingly, but also languages in which tone is introduced by rule at the lexical level of representation. However, in Fataluku, whether a word will bear an f0 peak depends on its sentential context; it is common for a word to lack an f0 peak when following a word which is close semantically or syntactically. Thus, the actual phonological high must be assigned at the postlexical level (i.e., the intonation), rather than the lexical level, which has no access to sentential context, ruling out both tonal analyses and word-level pitch accent analyses.

It would be possible, however, for each word to have an abstract prominence on a particular syllable, which may or may not be assigned a pitch peak by the intonation, depending on the particular phrasal context. This analysis is equivalent to proposing predictable stress. In the terminology of metrical stress theory (see Hayes, 1995), such a system would be seen as depending on weight-sensitive iambics assigned from left to right. The first iamb in a word would

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2 It is interesting to speculate that there may be other dialects of Fataluku in which the vowel length contrast has been lost, and which have since developed phonemic tone from the distribution of pitch peaks. While this is certainly a possibility, in the absence of any supporting data, it remains a speculation.
receive primary stress, and be a potential site at which an intonational high tone (H*) could attach. An alternative is that these f0 peaks are represented as intonational high tones independent of stress. By this analysis, words in Fataluku would be grouped into APs, each with a rising-falling contour peaking on the second mora (similar to the realization of pitch accentless APs in Tokyo Japanese, described in Venditti, 2005).

In the remainder of this section, I compare the claims made by the stress and the intonation-only analyses, concluding that the intonation-only analysis is superior for several reasons. In the next section, I deal with the question of how this intonational high peak is to be represented, since it is not obviously attached to any prosodic head, or to the boundary of any prosodic unit (as is required in AM theory). I argue that the intonational high on the second mora of a AP is attached to a foot boundary, leading to a prolonged analysis of feet in Fataluku. I conclude that, even though I find no convincing evidence for stress, feet play an important role in the intonation and several independent components of the phonological system.

5.6.1 Comparison of Stress-Based and Intonation-Only analyses

One of the biggest advantages of the intonation-only analysis is its ability to properly handle disyllabic words. Disyllabic words with two light syllables generally have an f0 peak on the second syllable, unless they are IP-final, in which case, there is an f0 peak on the first syllable. If the default location of the f0 peak represents stress, then these words are stressed on the second syllable. However, this analysis is untenable, since the second syllable of a disyllabic word shows several characteristics of an unstressed syllable. For instance, phonemic long vowels can occur in the penultimate syllable, but not in the final syllable (nor in fact in the final syllable of any word longer than a single syllable). Word-finally, high vowels are lowered following a low vowel (see section 4.3.5). Furthermore, IP-finally, the final syllable of a two-syllable word can become shortened, reduced, and even devoiced (see section 4.3.4).

It is untenable to analyze a syllable as being stressed when it maintains fewer phonemic contrasts and is subject to more reduction than any nearby syllables. The alternative, analyzing the penultimate syllable of these words as stressed, is also problematic, since such an analysis would require an exception to the general pattern of stress, and would also fail to explain the occurrence of f0 peaks on the second syllable in running speech. Creating a rule that shifts stress in an IP-final word finds no apparent motivation and still fails to explain why there would be a greater range of segmental contrasts in the penult than in the final syllable, even when a word is not IP-final.

On the other hand, in the intonation analysis, a motivation for this behavior is readily apparent. Since the final syllable of a declarative or unmarked citation IP is associated with a L% boundary
tone (see chapter 6), it is natural for the high intonational tone to be realized on the preceding syllable, so that both can be realized fully. Such an analysis also explains the behavior of f0 peaks in running speech—which land on the second mora, unexceptionally—and causes no conflict with observations of final syllable reduction.

Another benefit of the intonation-only analysis is its ability to naturally predict which words in a given sentence will carry an f0 peak. As noted above, when two or three words form a tight semantic or syntactic unit it is common that only the first will carry a peak. Analyzing a group of closely knit words as an AP is a typologically natural way to explain this behavior (see Jun & Fletcher, 2015).

On the other hand, the best way to explain the distribution of peaks in the stress analysis is not immediately obvious. While one would not necessarily expect every stressed syllable to have an intonational pitch accent, since the distribution of peaks fits cross-linguistic expectations of APs so well, the most natural analysis would probably be to posit AP-like phrases in which the first stressed syllable receives an intonational pitch accent. A system incorporating both APs and stress is certainly possible, but if the stress system still requires positing APs, it certainly calls into question the analytic benefit of stress.

The stress account is called into further question by the fact that only one type of intonational pitch accent would need to be posited. In languages like English, stress often serves as a landing site for various types of pitch accents (Jun & Fletcher, 2015). If only one type of f0 excursion occurs on these syllables, it is simpler to propose a single intonational tone associated directly with the relevant syllables, bypassing the additional abstraction of stress. Furthermore, as we have seen, the intonation-only account fits the data better, especially in instances in which the stress analysis falters. For this reason, I analyze the f0 peaks observed here as manifestations of a high intonational tone realized on the second mora of an AP, and at present posit neither stress, pitch accent nor lexical tone in Fatalukan.

5.7 Intonation as Dependent on Feet
This raises another question: namely, what is the anchoring point of this intonational high tone? The Autosegmental Metrical framework treats intonational tones as being associated either with a prominent syllable or with the edge of a prosodic constituent (Pierrehumbert, 1980; Ladd, 1996, 2008). I have argued above that the syllable with which this tone is attached is not stressed; however, since this tone often appears in the middle of a prosodic word, it is not immediately apparent which prosodic unit the tone attaches to. I argue that the f0 peak observed in the vicinity of the second mora of Fatalukan words is in fact a foot-final boundary tone (Hft), which attaches to
the right margin of the first foot of an AP.\textsuperscript{3} I analyze Fataluku as having weight-sensitive feet. I begin by arguing for the theoretical benefits of this analysis, before presenting independent evidence that this analysis of feet is correct.

5.7.1 Theoretical Benefits of a Foot-Based Analysis
One significant alternative to the foot-based analysis is that the intonational high tone is attached directly to the second mora of an AP. Although this type of analysis has been proposed for a number of languages, it is questionable how this analysis fits with the Autosegmental Metrical theory. The AM model treats intonational tones as associated either with a prominent syllable or the edge of a prosodic constituent; this model has been found useful and successful for a wide range of languages (see, e.g. Jun \textit{2005b, 2014}). The foot boundary tone analysis allows this intonational peak to be handled unexceptionally, like any other edge tone, while proposing an intonational high attached directly to the second mora would require at least additional theoretical machinery, if not a revision of a core tenet of the theory.

An additional benefit of the foot-based analysis is that it treats surface long vowels and diphthongs as units for the sake of prosody, rather than simply counting mora-bearing elements. The mora-counting option is much more arbitrary, and implies a powerful theory allowing intonational peaks at an arbitrary point in a string. The foot-based analysis, however, offers a principled rationale for having a pitch peak on the second mora. Feet often condition word-level prosody, so their use in this way is consistent with typological generalizations. The foot-based analysis is also supported by the phonetic details of f0 alignment. Most often, peaks occur very late in the syllable containing the second mora or very early in the syllable containing the third mora; assigning the tone to the boundary between the second and third mora captures this distribution well.

In fact, analyses which do not make reference to feet leave several generalizations unstated. Upon closer investigation, there are a number of seemingly independent aspects of Fataluku phonology which make reference to the same two-mora units as the intonation. In the next section, I give several independent pieces of evidence for two-mora feet in Fataluku.

5.8 Foot Structure in Fataluku
5.8.1 Evidence for Feet
I propose weight-sensitive, bimoraic feet in Fataluku, with the leftmost foot aligned with the left margin of a prosodic word. While feet are generally discussed in the context of stress, much

\textsuperscript{3}I use ‘ft’ to represent a foot boundary when naming intonational tones (analogous to the use of % for IP boundaries and ‘a’ for AP boundaries), since ‘f’ is already in use for the designation of focus (Jun \& Fletcher \textit{2015}).
evidence has been put forward for the existence of feet in languages without stress (see for instance Poser 1990 on Japanese, Akinlabi & Urua 2002 on Ibibio, Downing 2004 and the references within on Khoisan languages and extensive discussion in Bennett 2012).

There exist three independent pieces of evidence that Fataluku has bimoraic, left-aligned feet. The first piece of evidence is a minimum word requirement requiring all content words to contain at least two moras. Each vowel counts for a single mora; therefore, short vowels count as a single mora while surface long vowels and diphthongs each count for two moras (since they are each represented with two vowels underlyingly, see section 3.4.2). I propose a process lengthening a short vowel if it is the only vowel in the foot (see section 4.4.1).

A minimal word requirement is a classic piece of evidence for foot structure (see e.g., McCarthy & Prince, 1993:45–48). McCarthy and Prince derive the minimal word requirement from two more primitive notions, the binary structure of feet and the “prosodic hierarchy.” Since the prosodic word is above the foot on the prosodic hierarchy, it follows that each prosodic word must contain at least one foot. Since a foot must have two moras (or syllables, depending on the language), it follows that a prosodic word must also contain at least two moras (or syllables). The fact that the minimal word requirement can be derived directly from these two independently motivated notions, as well as the fact that the minimum word requirement is generally only weight sensitive when other foot-conditioned processes in the language are also weight sensitive, provides good support for analyzing this phenomena in terms of feet. Therefore, the fact that Fataluku has a minimum word requirement is good evidence that Fataluku does have feet, in spite of the absence of convincing evidence for stress.

Another compelling piece of evidence for feet is the behavior of reduplication. Partial reduplication in Fataluku involves reduplicating the first two moras of a word, as illustrated in table 5.5.

The fact that reduplication makes reference to the same two-mora units involved in the minimum word requirement is additional evidence for foot structure. McCarthy and Prince view reduplication patterns of this type as examples of foot-conditioned morphology, and discuss a few languages in which the reduplicant is equivalent to the minimal word. The evidence of reduplication for foot structure in Fataluku was observed by Stoel (2008), though his analysis of footing differs significantly from that put forth here. Stoel proposes that the presence of a lexical high tone conditions footing, which in turn conditions vowel length. I propose the reverse, namely, that syllable weight conditions footing, which in turn conditions intonation (see section 3.4.2 for a more detailed comparison of Stoel’s analysis of vowel length with my own).
Table 5.5: Reduplication is based on bimoraic units (transcriptions are phonemic, hyphens represent morpheme boundaries)

<table>
<thead>
<tr>
<th>Base form</th>
<th>Reduplicated form</th>
</tr>
</thead>
<tbody>
<tr>
<td>mimirek-e</td>
<td>'red'</td>
</tr>
<tr>
<td>karas-e</td>
<td>'yellow'</td>
</tr>
<tr>
<td>ipil-e</td>
<td>'steal'</td>
</tr>
<tr>
<td>tifar-e</td>
<td>'run'</td>
</tr>
<tr>
<td>teper-e</td>
<td>'quiet'</td>
</tr>
<tr>
<td>ofot-e</td>
<td>'cut'</td>
</tr>
<tr>
<td>fuuleh-e</td>
<td>'return'</td>
</tr>
<tr>
<td>laafai</td>
<td>'big'</td>
</tr>
<tr>
<td>loohai</td>
<td>'tall'</td>
</tr>
<tr>
<td>uukani</td>
<td>'one'</td>
</tr>
<tr>
<td>faat-e</td>
<td>'four'</td>
</tr>
<tr>
<td>kaur-e</td>
<td>'scratch'</td>
</tr>
</tbody>
</table>

| mimirek-e | mimi-mimirek-e |
| karas-e   | kara-karas-e   |
| ipi-ipil-e| ipi-ipil-e     |
| tifa-tifar-e| tifa-tifar-e |
| tepe-teper-e| tepe-teper-e |
| ofo-ofot-e| ofo-ofot-e     |
| fuu-fuuleh-e| fuu-fuuleh-e |
| laa-laafai| laa-laafai     |
| loo-loohai| loo-loohai     |
| uu-uukani| uu-uukani      |
| faa-faat-e| faa-faat-e     |
| kau-kaur-e| kau-kaur-e     |

Table 5.6: Possible syllable structures of two-syllable words (H = Heavy, L = Light).

<table>
<thead>
<tr>
<th>Word shape</th>
<th>Example</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>L L</td>
<td>vata</td>
<td>'coconut'</td>
</tr>
<tr>
<td>H L</td>
<td>huula</td>
<td>'spoon'</td>
</tr>
<tr>
<td>*L H</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>H H</td>
<td>ruuamau</td>
<td>'pomegranate'</td>
</tr>
</tbody>
</table>

A third piece of evidence for feet is a phonotactic restriction on the metrical structure of two-syllable words. Out of four logical combinations of light and heavy syllables, only three are attested. Using H for heavy syllables and L for light syllables, words of the shape LL, HL and HH are attested, but words of the shape *LH are not. Examples are shown in table 5.6.

Though this may seem a somewhat unusual phonotactic constraint at first glance, it follows logically from two properties of Fataluku foot structure mentioned above.

The first property is that Fataluku requires the first foot to be aligned with the left word boundary, as can be seen from the prevalence of processes which make reference to the first two moras of a word (regardless of the number of syllables following). The second property is that Fataluku requires feet to contain two moras, and lengthens a vowel when it is the only vowel in the foot.

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4 A related restriction holds for three-syllable words, preventing monomorphemic words with three light syllables, discussed below.

5 Fataluku is more relaxed about unfooted final syllables, especially in suffixes, as shown in reduplicated forms such as tifar-e 'to run' → tifa-tifar-e 'to jog', which indicate the final (short) syllable is not a part of the foot.
The conjunction of these two forces straightforwardly explains the absence of words of the shape *LH, without the addition of any ad hoc rules or constraints: aligning a foot with the first syllable of an LH word would result in a degenerate foot, which would then be lengthened by the same process lengthening light monosyllables. The presence of such a phonotactic constraint—which appears somewhat unusual, but is straightforwardly derivable from general principles of foot structure—strongly confirms the existence of feet in Fataluku.

5.9 Foot Structure

Based on these pieces of evidences for foot structure, the following section describes the foot structure of words of one, two, three and four syllables of various shapes. After surveying foot structure under various phonological conditions, I outline a general analysis for the assignment of feet in Fataluku.

Footing of Monosyllabic Words

Monosyllabic content words in Fataluku form a single foot. Only vowels count for a mora, so a content word must have either a long vowel or a diphthong to constitute a well-formed foot. Function words, on the other hand (which may in fact be clitics) may have either one or two moras. Examples of each are given in table 5.7.

<table>
<thead>
<tr>
<th>Function words</th>
<th>Content words</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light</td>
<td></td>
</tr>
<tr>
<td>a 'NOM'</td>
<td></td>
</tr>
<tr>
<td>a '1.SG.NSBJ'</td>
<td></td>
</tr>
<tr>
<td>o 'also'</td>
<td></td>
</tr>
<tr>
<td>Heavy</td>
<td></td>
</tr>
<tr>
<td>ii 'POSS'</td>
<td>lee 'house'</td>
</tr>
<tr>
<td>aa '2.SG.SBJ'</td>
<td>too 'bowl'</td>
</tr>
<tr>
<td>aa 'Q'</td>
<td>naal 'mother'</td>
</tr>
</tbody>
</table>

Table 5.7: Possible monosyllabic words

Footing of Disyllabic Words

In disyllabic words with two light syllables, the foot is coterminous with the word, regardless of morphological complexity. This footing is evidenced by the intonational contour, which peaks on the second syllable in running speech, and by reduplication, since both syllables are copied when a word of this shape is reduplicated (e.g., /pohe/ ‘cook (trans.)’ becomes /pohepohe/ ‘cook (intrans.)’).
In disyllabic words with a heavy initial syllable, this syllable forms a foot by itself. In these words, the intonational peak lands on the first syllable, and only the first syllable is reduplicated (e.g. /kaur-e/ ‘scratch’ → /kau-kaur-e/, /neer-e/ ‘follow’ → /nee-neer-e/). I analyze the final syllable of these words as unfooted, since the process lengthening degenerate feet does not affect these syllables.

Disyllabic words with a light first syllable and a final heavy syllable, however, pose a problem to footing. Fataluku requires feet to be bimoraic, and also requires the first foot to be aligned with the beginning of a word. Naïvely assigning the first two moras of a word to a foot would split the second syllable into two feet, which Fataluku prohibits. Instead, Fataluku avoids disyllables which on the surface have a light syllable followed by a heavy syllable. Though long vowels are in general much rarer than their short counterparts (occurring with about one-tenth the frequency), all examples which have a heavy second syllable also have a heavy first syllable (generally a long vowel) which behaves like a foot for the purposes of reduplication and prosody. I take the otherwise lopsided and unexpected distribution of long vowels in this position as evidence for an active vowel-lengthening process (see section 4.4.1). This is illustrated in example 9. In example 9 as well as the following examples, I present underlying forms with a light first syllable for expository reasons (to illustrate the application of the lengthening process), though it is probable that the first syllable each of these words contains a long vowel underlyingly.
Words with a diphthong in both syllables are also footed into two feet.

(9) /lafai/  (la:)(fa)i ‘to be big’
/rumau/  (ru:)(mau) ‘pomegranate’
/zerai/  (ze:)(rai) ‘a trad. name’
/lohai/  (lo:)(hai) ‘tall’
/lavei/  (la:)(vei) ‘crocodile’

(10) (kiu)(kiu) ‘chirping of birds’
(rau)(rau) ‘good’

**Footing of Three-Syllable Words**
The footing of three-syllable words proceeds much the same as that of two syllable words. Though vowel length is not certain in all examples, the available data suggest that monomorphemic words with three light syllables are avoided. Like disyllabic words of the shape (L H), words of three light syllables pose difficulty for exhaustive parsing into feet. This dilemma is resolved by footing the first syllable alone and lengthening it. This footing is illustrated by the reduplication of /uukani/ ‘one’, which is reduplicated as /uu-uukani/. Several examples are given in (11). As above, I list short vowels in the underlying forms for expository clarity, in order to show the effect of lengthening, though since I have not observed any alternation in these words, it is probable that the first vowel is long underlyingly and the lengthening process applies vacuously.

(11) /hoftsava/  (ho:)(tsava) ‘master, lord’
/ukani/  (u:)(kani) ‘one’
/hinua/  (hi:)(nua) ‘in order to’
/lapusa/  (la:)(pusa) ‘spider’

The footing of three-syllable words, however, depends on morphological structure. If the final syllable of a word consists of the suffix -e ‘VB’, the first two syllables are footed together instead, as in (12). This footing is illustrated by prosody, which peaks on the second syllable, as well as by reduplication (e.g., /utu-e/ ‘three’ → /utu-utu-e/ ‘three at a time’, /tapul-e/ ‘buy’ → /tapu-tapul-e/ ‘buy repeatedly’).
If only the first syllable is heavy, it forms a foot by itself, and the last two syllables form a foot by themselves. The contrast between light and heavy initial syllables is illustrated well by the minimal pair /a>ţan-e/ ‘old’ and /aa>ţan-e/ ‘enough’. /a>ţan-e/ ‘old’ has an f0 peak on the second syllable, while /aa>ţan-e/ ‘enough’ has a peak on the first syllable. This foot structure is also shown by reduplication (/fuuleh-e/ ‘return’ → /fuu-fuuleh-e/ ‘go and come back’). While I have no direct evidence for the foot structure of the final two syllables of these words, I assume the last two syllables form a single foot, as in 13, since they constitute a valid bimoraic sequence and Fataluku exhibits a preference for exhaustive footing (illustrated by the behavior of monomorphemic words with three light syllables.).

If only the final syllable is heavy, the first two syllables form a foot by themselves, and the last syllable forms a single foot.

I am not aware of any examples of a three-syllable word in which only the second syllable is heavy. Based on the behavior of other two- and three-syllable words, I predict that, given an underlying form of this shape, the first syllable would form a foot by itself and be lengthened prosodically, the second syllable would form another foot and the last syllable would remain unfooted.
Footing of Four-Syllable Words

The footing of four-syllable words proceeds essentially the same as shorter words. Fataluku has a general preference for two-syllable words, and many words that are four syllables or longer are morphologically complex, or at least have forms which suggest fossilized morphology.

The vast majority of four-syllable words contain all light syllables, and are footed into two feet (see e.g. /mimirek-e/ 'red' → /mimi-mimirek-e/ 'reddish').

Words containing more than four moras are rare, and evidence for their metrical structure is not currently available.

5.10 Footing Parameters

In terms of Hayes's (1995) foot parameters, Fataluku’s feet are both bounded and quantity sensitive, being strictly bimoraic. In the absence of stress, distinguishing between trochaic and iambic feet is non-trivial, but there is building evidence for treating Fataluku’s feet as trochaic. The main argument for a trochaic foot structure comes from Fataluku’s behavior with reference to the generally-accepted inventory of feet, summarized in table 5.8. L represents a light syllable, H represents a heavy syllable, and σ represents any syllable.

Iambic and trochaic feet differ not only in headship, but also in what types of syllables can be footed together. Both admit a single heavy syllable, or a sequence of two light syllables, but an iambic foot allows a light syllable followed by a heavy syllable, a pattern which is not permitted.
Table 5.8: Generally accepted foot types (Hayes, 1995; McCarthy & Prince, 1995; Kager, 1999)

within a trochaic foot. For this reason, acceptance of LH feet is evidence for treating a system as iambic, while avoidance of LH feet is evidence for a trochaic analysis.

In fact, as was shown above, words consisting of a light syllable followed by a heavy syllable are split into two separate feet, with lengthening of the first vowel, as shown in example 9 (repeated here as 17).

(17) /lafai/ (la):(fai) ‘to be big’
/rumau/ (ru):(mau) ‘pomegranate’
/jerai/ (je):(rai) ‘a trad. name’
/lohai/ (lo):(hai) ‘tall’
/lavei/ (la):(vei) ‘crocodile’

Iambs containing a light syllable followed by a heavy syllable are optimal iambic feet (Kager, 1999). However, instead of forming iambic feet, Fataluku splits LH sequences into two trochees, the first of which is invalid (as a single light syllable) and must be repaired through lengthening. This footing only makes sense from the perspective of the trochee; there is no apparent motivation for an iambic foot system to breaking an optimum iamb into two suboptimal feet.

A confirmation of the trochaic analysis is that the rightmost members of feet are more susceptible to reduction than the leftmost members. Both Final Vowel Lowering (sec. 4.3.5) and Final Vowel Devoicing (sec. 4.3.4) target word-final vowels. Because of Fataluku’s preference for disyllabic words, the majority of foot-final syllables are in fact word-final as well. There are, additionally, no comparable processes for the reduction of word-initial (or foot-initial) syllables. This adds further support for the trochaic analysis, since it is much more natural to reduce the weaker member of a foot than the stronger (as would be necessary to presume in the iambic analysis).

This analysis of Fataluku feet, however, has interesting implications for the intonation. As discussed above, Fataluku has an intonational high tone which attaches to the right edge of a foot (Hft). If feet are trochaic, as I suggest here, then this intonational tone is attaching to the weak
edge of the foot. This is unusual, since the weak branch of a foot is generally seen as being more restrictive in its content, but here is apparently less restrictive.

As for word tree dominance, the fact that there must be a foot aligned with the left edge of a word, and the fact that the first foot is most prominent in the morphology and intonation suggests that it is also the first foot of a word which is dominant within the prosodic word, though in the absence of a system of primary stress to refer to, this conclusion remains tentative.

As for directionality, neither left-to-right nor right-to-left parsing algorithms are able to completely predict footing. A strictly left-to-right, context-independent footing algorithm cannot adequately foot words consisting of three light syllables underlyingly, since footing is dependent on their morphology. If the final syllable is a suffix, the first two syllables form a foot, while if the word is morphologically simple, the last two syllables form a foot. A left-to-right context-independent footing algorithm does not make the right predictions.

A strictly right-to-left footing algorithm fails for similar reasons. If a word contains all light syllables, and the last syllable is the suffix /-e/ ‘VB’, a right-to-left footing algorithm would need to look ahead to see the total number of syllables in the word to determine whether the suffix should be footed. If there are an even number of syllables, the suffix will be footed, but if there are an odd number of syllables, the suffix is left unfooted. For this reason, I propose the following statement of footing procedures.

**To assign foot structure in Fataluku**

- If possible, parse a prosodic word exhaustively into two-mora feet.
- Else, if possible, parse a morpheme exhaustively into two-mora feet.
- Else, parse a prosodic word exhaustively from the right, lengthening and footing a stray syllable.
6 SENTENCE-LEVEL INTONATION

Whereas the previous chapter dealt with word-level prosody and metrical structure, in this section, I deal with intonation above the level of the word. I recognize two prosodic phrases above the level of the prosodic word in Fataluku: the accentual phrase (AP), introduced in the preceding chapter, and the intonational phrase (IP), the largest prosodic constituent generally dealt with in the AM framework. An IP is a phrase that can stand alone, bounded by silence, and is generally accompanied by a final boundary tone and final lengthening (Jun & Fletcher, 2015). Typologically, IP-final boundary tones are rich bearers of information (Lindström & Remijsen, 2005), and are often used to indicate characteristics such as sentence type (e.g., declarative vs. question), continuation (final vs. continuing) and other sentence-level pragmatic categories.

While the preceding chapter dealt with the accentual phrase in the context of the word, this chapter begins by discussing the relationship between the accentual phrase and grammatical structure (section 6.1). Sections 6.2–6.5 present an instrumental investigation of the intonational differences between declaratives and polar questions and propose a phonological analysis to account for differences in both pitch and duration. Sections 6.6–6.8 describe the intonation of more naturalistic speech, summarizing the most common intonational contours found in texts. Sections 6.10 concludes the work, summarizing Fataluku’s prosodic grammar and presenting directions for future research.

6.1 The Effects of Grammar on AP Phrasing

Subject, Object and Verb

As mentioned in the previous chapter, the f0 contour over a word depends not only on its phonological and morphological structure, but also on its sentential context. This includes not only the surrounding words, but also their grammatical relationships. This follows the cross-linguistic expectation expressed by Jun and Fletcher (2015): while intonational structure is not identical to syntactic structure, larger syntactic breaks often entail larger prosodic breaks.

One example of this is the relationship between a verb and its arguments. As noted by Stoel (2008), there is a prosodic difference between a subject-verb pair and an object-verb pair. He claims there is a prosodic phrase boundary between a verb and its subject, though not between a verb and its object. Though there are substantial differences between our analyses, and even to some degree in our data, this observation holds robustly. I observe that overwhelmingly, a subject and a verb are parsed into separate APs, while an object and a verb are parsed into the same AP.
Figure 6.1: A subject-verb pair, realized in separate APs. Mai *ipile* ‘The eagle is flying’ (JL).

Figure 6.2: A transitive sentence, showing the object and verb in the same AP and the subject in its own AP. Mai *lō neure* ‘The eagle is chasing the cuscus (*lō*)’ (JL).
This behavior matches cross-linguistic expectations for larger prosodic breaks to occur at larger syntactic breaks, since an object and its verb are generally seen as forming a syntactic constituent to the exclusion of the subject.

Since the second mora of an AP carries a pitch peak, this distinction is revealed in the intonation: in a subject-verb pair, there is an f0 peak on the second mora of both the subject and the verb, while in an object-verb pair, there is a single f0 peak on the second mora of the object, and the pitch falls to the end of the sentence. A representative intransitive sentence is given in 6.1, while a transitive sentence is given in 6.2.

Multi-word noun phrases are generally realized as a single AP, as shown in 6.3.

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**Intonation in Serial Verb Constructions**

Serial verb complexes (SVCs) do not usually have large prosodic boundaries between them. As expected of serial verbs, they are generally realized in the same intonational phrase, under a single intonational contour; this an important typological characteristic of serial verbs noted by Aikhenvald (2006), illustrated in example 6.4.

As far as AP phrasing, Fataluku implements two common possibilities. The first is for the SVC to form a single AP, as illustrated in figure 6.5. The second is for the first verb to form an AP with its object, and for the last verb to form an AP by itself, as in figure 6.6.
Figure 6.4: Serial verbs are realized in the same IP. Ete hi’a caya ‘(It) sleeps in the tree.’ (JL).

Figure 6.5: Serial verbs realized in the same AP with one another. A lān maja ī walikina nā mīre ‘My friend sits on the table’s corner.’ The Hft tone on nā ‘on’ is marginal, and it is possible that the entire phrase ī walikina nā mīre ‘sits on its corner’ forms a single AP (JL).
Figure 6.6: Serial verbs realized in separate APs, from the sentence, *Olo=tu ete hi’a mīre a kiuki*. ‘The bird that sits in the tree sings.’ Here, *ete* ‘tree’ and *hi’a* ‘on’ form a single AP, as indicated by the falling intonation across *hi’a*, while *miire* ‘sit’ forms its own AP (JL).

This prosodic behavior of serial verbs has important implications for how they are to be analyzed. Many SVCs in Fataluku do not allow intervening material between their members, especially SVCs involving locational morphemes. (E.g., in the phrase *nā caya* ‘sleep at’, I have found no words which may intervene between *nā* ‘at’ and *caya* ‘sleep’.) For this reason, it is natural to suspect that the morphemes involved have fused into a single word. This is indeed the analysis adopted by van Engelenhoven (2009, 2010), who claims that morphemes which represent locations are prefixed to the main verb. The intonational behavior of SVCs, however, refutes this analysis.

The most important aspect of the prosodic behavior of SVCs is that they may be split into separate APs, as shown in figure 6.6, as well as figure 6.7. The accentual phrase is a prosodic unit larger than a prosodic word. The fact that components of an SVC can be split into separate APs indicates that they are separate prosodic words. While isometry between grammatical and prosodic structure cannot be assumed, an analysis which requires splitting a verb and its prefix not only into separate prosodic words, but even into separate intonationally-defined phrases lacks theoretical justification.
6.2 Declaratives and Polar Questions

The remainder of this chapter deals with the Intonational Phrase (IP), the highest unit I recognize in Fataluku prosodic structure. I begin with an instrumental analysis of the prosody of declaratives and polar questions, which establishes the importance of IP-final contours in Fataluku intonation and establishes a context for the discussion of other IP contours in following sections.

6.2.1 Question syntax

Polar questions and declaratives can be identical apart from prosody, or they can be optionally flagged with either the question marking morpheme ă ‘Q’ or the tag ana upe ‘or not’ at the end of the utterance, as in examples 1–3. There is also a particle ten which appears in some of the polar questions collected here, but whose exact function is not yet known. No substantial differences in meaning have been found between any of the different strategies for flagging questions.

Declarative/Unflagged question

(1) kinamoko a maca mahane
    child SBJ bat fear
    ‘The child was afraid of the bat.’
    or ‘Was the child afraid of the bat?’

---

1 The morpheme ă ‘Q’ is likely a shortened form of ana ‘or’
6.2.2 Stoel’s Analysis of Question Prosody

Stoel has discussed question intonation in a conference presentation, the slides of which have been made available online (Stoel, 2007b). Stoel (2007b:3) claims that “Questions have a H [high] tone associated with the last syllable, which is absent in statements.” In the example spectrogram he gives, this tone is realized as a high-falling f0 contour on the final syllable of the question. He claims that duration is also a correlate of this distinction, with the final syllables of questions lengthened and the final syllables of declaratives shortened.

Since Stoel’s slides give only one spectrogram, and do not specify either the dialect on which his analysis is based or the number of speakers, it is not clear how generalizable these findings may be. I analyze new data from three villages in the Fataluku-speaking region, providing a more detailed description of the phonetics of polar question prosody. I also present a new phonological analysis, in the AM framework, to explain the observed phonetic characteristics. I hypothesize that both the final f0 contour and the duration of the final syllable are important components of the declarative/interrogative distinction, although there may be differences between the language varieties analyzed here and the variety Stoel describes.

6.3 Methods

In order to test this hypothesis, six native speakers of Fataluku (five males, one female) were recorded reading broad-focus declaratives and polar questions. Speakers’ ages ranged from 18 to 30 years. These speakers were from three separate villages (Lospalos, Com and Muapitin), two speakers from each.

Recordings of short Fataluku sentences were made in a quiet location using a Zoom H4n or H6 solid-state digital recorder at 44.1 kHz/16bit. In most cases, a headset condenser microphone
(either the Shure WH30 or the Shure SM35) was used for higher-quality recordings. Since the extent of dialect variation was not known at the start of this study, speakers who were fluent in English were prompted with English sentences to translate into Fataluku, to ensure the Fataluku sentences collected were natural in each speaker’s own speech variety. Speakers who were less comfortable in English were given sentences written in Fataluku to read, but they were encouraged to modify any aspects of the sentences that might be unnatural for them. No substantial difference between the elicitation strategies was observed.

To control for the effects of lexical or segmental content, there was a matching set of declaratives and interrogatives. A basic set of 12 declaratives and 12 questions was recorded 2–3 times by each speaker. Sentences with substantial disfluencies were excluded from analysis, yielding a total of 133 declaratives and 162 interrogatives. Pitch contours and durations were observed using the phonetic analysis software Praat (Boersma & Weenink, 2013). Vowel duration was measured based on the presence of periodic vibrations and higher-level formants, as deducible from the waveform. A vowel was judged to end at the point at which regular vocalic vibrations were no longer discernible. A characteristic example of a duration measurement is given in figure 6.8.

![Figure 6.8: A characteristic duration measurement, from the final syllable of upe ‘not’](image)

**6.4 Results**

As hypothesized, declaratives and polar questions differ substantially in f0 and syllable duration at the right periphery of an utterance, although the basic pattern differs to a certain extent from the language variety Stoel describes. The same basic prosodic patterns were used by all six speakers, independent of gender or village. The following subsections describe the basic patterns for declaratives and polar questions.
6.4.1 **Intonational Tune: Declaratives**

Analogous to the syntax, questions and statements are very similar prosodically until the right periphery, where the primary differences are shown. In declaratives, the overwhelming pattern is
for the f0 to fall from earlier f0 peaks through the last several syllables of an utterance, ending on a final low.\textsuperscript{2} The final vowel is generally quite short, and if it follows a voiceless consonant, it may be devoiced (see section 4.3.4). Figures 6.9 and 6.10 show representative examples of declaratives.

### 6.4.2 Intonational Tune: Polar Questions

Questions are similar in intonation to declaratives until the right margin of an utterance, where polar questions are distinguished by a rising-falling pitch contour on the final syllable and a significantly lengthened final vowel. The most typical case is for the f0 to fall throughout the last few syllables, reaching a local minimum within the second half of the penultimate syllable. The f0 then rises, peaking in the first half of the final syllable and falling to the end. In the data collected here, most speakers used a mix of syntactic strategies for flagging questions, but the same prosodic pattern occurred regardless of flagging. If the final syllable has a voiceless onset, the initial rise is obscured, since the f0 track is interrupted, but these examples show the same basic pattern of low-high-low. The question tag *ana upe* ‘or not’ becomes a part of the same AP as the preceding word. Figures 6.11–6.13 show several examples of the interrogative rise-fall pattern.

\textsuperscript{2}There is an alternative prosodic pattern with rising intonation that occurred in a few of the sentences collected here, and that has been observed in narratives in contexts involving continuation. I analyze this as a distinct “continuation” contour, which I discuss further below.
Figure 6.12: A polar question flagged with a ‘Q’. *Ma’ar nami a wari ura ma’u ā.* ‘Is the man always late?’ (NP)

Figure 6.13: The latter portion of a polar question flagged with *ana upe* ‘or not’. Extracted from the sentence, *Ā rahin la’a tahi mara ana upe?* ‘Did you go to the beach yesterday or not?’ (LE)
Typically, the last high (Hft) tone is a few syllables removed from the end of the utterance, and the f0 falls gradually from the last Hft tone to a low on the penultimate syllable of the utterance, as in example 6.11. The last Hft in this utterance is on the second syllable of *maca* ‘bat’, which forms a single AP with the following verb, *mahane* ‘fear’, as is typical for object-verb pairs. The f0 then falls from the final syllable of *maca* ‘bat’ to the second syllable of *mahane* ‘fear’, before its final rise-fall.

In some examples, however, there was an Hft tone near the right margin of a sentence, which interferes with the typical realization of the interrogative intonation. For instance, in the utterance *jāmpata nēre* ‘The road is level’, there is an Hft tone on the first syllable of both *jāmpata* ‘road’ and *nēre* ‘to be level’. In the declarative condition (fig. 6.14), the pitch simply falls from the high on the penultimate syllable to the end. However, in the interrogative condition (fig. 6.15), the typical pattern is changed. There is no low on the penultimate syllable, as would typically be expected. Rather, the pitch sustains a high level throughout the first half of the final syllable before falling to the end. Although both the declarative and the interrogative involve a fall in the final syllable, they are distinguished both by their duration and by the timing of the final fall, which is substantially later in interrogatives.

![Figure 6.14: A declarative sentence with a pitch peak on the penultimate syllable. *Jāmpata nēre.* ‘The road is flat’ (LE).](image-url)
6.4.3 Duration

Figure 6.16 compares the mean duration (in milliseconds) of the final vowel of declaratives with each subcategory of polar question (flagged with a ‘Q’, flagged with ana upe ‘or not’ or syntactically unflagged). Environments were controlled as much as possible, such that each vowel came in an utterance-final open syllable. Each vowel was phonemically short (with the possible exception of ā ‘Q’, discussed below). Applying these conditions resulted in a total of 133 declaratives, 69 unflagged questions, 52 ā-flagged questions and 41 upe-flagged questions. On average, the final vowels of polar questions (274.4 ms) were 2.1 times longer than the final vowels of declaratives (132.9 ms).

Applying a linear mixed-effects model revealed that whether an utterance is a question is a significant predictor of final vowel duration, $b = 146.28$, $t(286) = 10.66$, $p < .0001$.

Morphosyntactic flagging with ā ‘Q’ was also a significant predictor of duration, $b = 21.19$, $t(286) = 2.23$, $p < .05$, although flagging with ana upe ‘or not’ had no significant effect compared to unflagged questions, $b = -19.44$, $t(286) = -1.17$, $p > .05$. 
Figure 6.16: The mean duration (in ms) of final vowels. Error bars show standard error.

Table 6.1: Linear mixed-effects model of the effects of sentence type and flagging on the duration of final vowels (in ms).

<table>
<thead>
<tr>
<th></th>
<th>b</th>
<th>SE</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>136.50</td>
<td>10.77</td>
<td>115.45, 157.55</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Question (0=decl., 1=ques.)</td>
<td>146.28</td>
<td>13.72</td>
<td>119.45, 173.10</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Flagging with á ‘Q’</td>
<td>21.19</td>
<td>9.51</td>
<td>2.59, 39.78</td>
<td>= .0267</td>
</tr>
<tr>
<td>Flagging with ana upe ‘or not’</td>
<td>-19.44</td>
<td>16.55</td>
<td>-51.80, 12.91</td>
<td>= .2411</td>
</tr>
</tbody>
</table>

6.5 Discussion

The results thus show that the contrast between declaratives and polar questions is characterized by differences in the f0 contour and the duration of the final vowel. These findings are similar to the description given by Stoel, though with some differences. Stoel’s only example of a question has a high-falling contour, which is much rarer in the present dataset than the typical rising-falling pattern. The lack of a preceding pitch valley is probably due to the same undershoot process observed here, since there is an f0 high two syllables before. At this point, it is not clear whether the high-falling pattern shown by Stoel is representative of the rest of his data; more examples are needed to determine whether the variety Stoel describes differs phonetically in crucial respects from the data collected here.

Stoel (2007b) claims the primary phonological difference between declaratives and questions is the association of a high (H) tone with the final syllable of questions. However, as stated, this
analysis does not explain the final fall present in both declaratives and questions, or the alternation between rising-falling and high-falling question contours observed here. I propose a new analysis, namely, that declaratives have a simple low boundary tone (L%), while polar questions have a low tone on the penultimate syllable and a high-low tone on the final syllable (L+HL%). The initial low of the question contour (L+) is undershot if the penultimate or prepenultimate syllable is associated with a high intonational tone, which explains the observed variation among questions.

Stoel’s analysis also provides no apparent explanation for lengthening in questions. On the other hand, I analyze final lengthening as a phonetically motivated phonological process conditioned by the boundary tone for questions. It is phonetically difficult to realize a complex tone—such as L+HL%—in a short phonetic space because of physical limitations on the vocal tract. Prosodic lengthening gives the glottis additional time to hit each pitch target sequentially. The ability of this analysis to provide a motivation for final lengthening is an additional benefit of the complex boundary tone (L+HL%) analysis proposed here.

This lengthening is clearly prosodic, rather than a lexical feature of the morphemes ā ‘Q’ or ana upe ‘or not’, since lengthening can apply to any word in the appropriate prosodic environment. I explain the slightly greater duration of ā ‘Q’ compared to the other strategies by analyzing the morpheme as having a phonemically long vowel, which is then lengthened even further prosodically. Assessing the phonemic vowel length of this morpheme directly is difficult, since I have not found any examples of the morpheme outside of the conditioning environment for prosodic lengthening, but with this addition, the analysis of boundary tones proposed here is able to explain the observed differences in intonational tune and duration between statements and questions.

6.6 Expanding to More Naturalistic Data

The remainder of this chapter expands the investigation of intonation to other sentence types, presenting a qualitative description of intonational patterns in wh- questions, utterances implying continuation, and quotation.

6.7 Wh- Questions

The data collected here indicate that the basic intonational pattern for wh- questions is the same as that for polar questions. The same pattern is used whether the wh- word is realized in situ (see fig. 6.17) or topicalized (see fig. 6.18). For this reason, I propose that the L+HL% boundary tone indicates not only polar questions, but is a general marker of “question intonation.”
Figure 6.17: An in situ wh- question, Ā ina fa’i ‘What did you do?’ (Ll)

Figure 6.18: A wh- question in which the wh- word has been topicalized, Ina’it ā ira na’en aci ‘What did you see at the water?’ (Ll)
6.8 Continuation Contours

One strategy for indicating continuation is the high-rising continuation contour. This contour is realized with an f0 that rises sharply over the last syllable of an IP, which is lengthened.

Figure 6.19: The `H% boundary tone, horu lauhe ‘live together’ (JD)

Figure 6.20: The `H% boundary tone, tawar wila unu na’e mais ‘They live in a village but, . . . ’ (LE). Because of the reduced pitch range, it is uncertain how many APs this utterance contains.
I analyze this contour as an extra-high final IP boundary tone, and represent it as H%, since it fits the description Jun & Fletcher (2015: 517) give of H, a tonal category with a “much higher f0 than the default H level (top-line of declination).” I treat the additional length of syllables with this contour as a conditioned phonological change, motivated by the need for additional time for the vocal folds to reach the high f0 characteristic of this category. Examples 6.19 and 6.20 show clear examples of this intonational pattern. The small drop at the end of the pitch contour appears regularly, but is likely a microprosodic effect below the level of consciousness for native speakers.

Another strategy for signaling continuation is to lengthen the final syllable slightly and produce a level intonational contour at a high pitch, as in figures 6.21 and 6.22. A few variations exist on this contour: the shape may vary from level to slightly rising, and the level may vary from mid to high. At this point, it is not clear whether there exists a single phonological category that is subject to phonetic variation, or whether there exist several similar continuation contours. For this reason, I remain ambivalent about the phonological analysis of these patterns (noting M% or H% as possibilities), using the term “level continuation contour” as a cover term for all such examples.

Figure 6.21: A level continuation contour in the phrase, tūtūana fa’i ‘work a plantation’ (LE:Wata)
6.9 Quotation

There are at least two ways of intonationally flagging a quotation. The first way is to end the matrix clause (e.g., “She said,”) with the L% contour, as in 6.23.

Figure 6.22: A level continuation contour in the phrase, *Mucunen hai la’a nūcece* ‘went to take a bath inside’ (LE:Wata).

Figure 6.23: An L% boundary tone in the phrase, *Ē wa’an ca’a* ‘Spoke like this’ (LE:Wata).
An alternative strategy is to use a level continuation contour, lengthening the utterance-final syllable and marking it with a level f0, as in 6.24. Note especially the difference in the duration of the final syllable of examples 6.23 and 6.24, both of which end in the verb ta’a ‘to say’ (realized as ca’a in example 6.23 because of mutation).

Figure 6.24: A level continuation contour in the phrase, *Ma’ar nami a ta’a* ‘The man said this.’ The large dip is a microprosodic effect of the glottal stop, and is not important phonologically (JL:Elicit).

6.10 Summary

To sum up, figure 6.25 shows my analysis of the prosodic structure of Fataluku. The top level is the IP, or intonational phrase, which ends in a boundary tone (T%). A few of the most common boundary tones are shown in table 6.2, along with their uses. An IP consists of one or more accentual phrases, or APs, which in turn consist of one or more prosodic words (ω). A prosodic word must contain at least one foot, which must in turn contain at least two moras. The first foot of an AP is marked with the foot-final high boundary tone Hft.

This analysis is not necessarily comprehensive, as it is likely that future research will uncover more intonational boundary tones as other communicative acts are examined. It is also possible that there exist other prosodic levels not discussed here, such as the intermediate phrase (ip) proposed for several languages, which exists between the AP and IP (see Jun, 2005c).
Figure 6.25: The prosodic structure of Fataluku. The symbol ω represents a prosodic word, FT represents a foot.

<table>
<thead>
<tr>
<th>Phonetic realization</th>
<th>Tone</th>
<th>Common Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short low</td>
<td>L%</td>
<td>Declaratives, quotes</td>
</tr>
<tr>
<td>Lengthened rising-falling</td>
<td>L+HL%</td>
<td>Polar questions, wh- questions</td>
</tr>
<tr>
<td>Lengthened rising</td>
<td>H%</td>
<td>Continuation</td>
</tr>
<tr>
<td>Lengthened level</td>
<td>H:,%?</td>
<td>Continuation, quotes</td>
</tr>
</tbody>
</table>

Table 6.2: Common IP-final boundary tones
7 CONCLUSION

7.1 Dissertation Summary

Overview
This dissertation provides a detailed phonological description of Fataluku, along with a grammar overview, wordlist and interlinear glossed text. Phonological alternations are analyzed through the lens of Natural Phonology, which highlights the distinction between phonetically-conditioned, “natural” phonological processes, and conventional rules which must be learned (Donegan & Stampe, 1979; Donegan, 1993). Prosodic structure is analyzed in the Autosegmental-Metrical theory of intonational phonology, which sees intonational structure as a series of discrete intonational tonal targets (called “tones”, though they are completely distinct from lexical tones) aligned with prominent syllables or the edges of prosodic constituents (Pierrehumbert, 1980; Ladd, 1996, 2008).

Segmental Phonology
On the segmental level, Fataluku has 5 vowels /a, e, i, o, u/ and 18 consonants (including three borrowed voiced stops) /p, (b), t, (d), k, (g), ?, ň, f, v, s, z, h, m, n, r, l, j/. Fataluku syllable structure is (C)V(V)(C); consonant clusters are rare, though they do occur in recent loan words and across morpheme boundaries in native vocabulary. Vowel length is phonemic, though it is only used for distinguishing a small number of morphemes. Both surface long vowels and surface diphthongs are represented underlyingly as sequences of vowels (identical in the case of long vowels and non-identical in the case of diphthongs). Each vowel counts for a single mora; thus, both surface long vowels and diphthongs count for two moras. Consonants are non-moraic.

Suprasegmental Phonology
On the suprasegmental level, there is no convincing evidence for tone, stress or lexical pitch accent. Pitch contours at the word level are specified by the intonation. Each word (or group of closely connected words) takes by default a single rising-falling intonational contour. I term these intonational units “Accentual Phrases” (APs), following Jun & Fletcher (2015). The intonational rise in each AP peaks on (or just after) the second mora. I analyze this peak as a High intonational tone attached to the right edge of the first foot of each AP (Hft), viewing Fataluku as having bimoraic, left-aligned feet. At present, I only recognize one prosodic unit above the AP, namely, the Intonational Phrase (IP). There are a number of intonational boundary tones which may be
associated with the right edge of an IP, including a low tone (L%) for final declaratives, a rising-falling tone (L+HL%) for questions or an extra-high tone to indicate continuation (’H%).

**Syntax**
Syntactically, Fataluku is primarily left-branching in structure, with SOV, Possessor-Possession and Noun-Determiner word order. The primary exception to the general left-branching pattern are relative clauses, which follow the head noun phrase, an exception likely motivated by processing asymmetries (see e.g. Hawkins, 1990). At present, evidence for adpositions or adjectives is limited; concepts expressed by these parts of speech in English are typically expressed with verbs in Fataluku (e.g., na’e ‘to be at’, lāfai ‘to be big’). Two strategies for linking verbs, namely switch reference and verb serialization, play a particularly large role in Fataluku’s grammatical organization, occurring frequently in texts and playing a role in several grammatical phenomena, including relativization, topicalization and causativization.

### 7.2 Contributions

**Unexpected Distribution of Voicing Contrasts**
This dissertation makes a number of contributions, to both typology and other fields. In terms of the typology of phoneme inventories, it is notable that there exists a voicing contrast between fricatives, though not among stops (excluding recent loanwords, some of which contain voiced stops). This distribution of voicing contrasts violates expectations, and occurs in a relatively small percentage of the world’s languages. In the World Atlas of Language Structures, Maddieson (2013) reports that only 6.7% of the languages of his sample have voicing as a distinguishing feature for fricatives, but not for stops. This estimate, however, includes languages in which voiced stops exist, as long as voicing is not the only distinguishing characteristic. The actual number of languages with a voicing contrast in fricatives but which have no voiced stops of any kind is thus even lower than this.

**Syntactically Conditioned “Consonant Mutation”**
Fataluku also has a particularly interesting syntactically-conditioned consonant alternation in verbs. This rule, which I call consonant mutation, causes a number of phonetically unusual alternations at the beginning of non-initial serial verbs (t → țs, s → țs, h → țs, f → p, φ → n). This rule is interesting in the first place because of the unusual series of alternations it involves, but even more so because of its environment, since it is conditioned syntactically by verb serialization.
Word-Level Prosody: Feet Condition Intonation
Fataluku word-level prosody is another particularly interesting area typologically. There exists convincing evidence for feet, in spite of the absence of stress. Furthermore, foot structure directly impacts intonational contours through the presence of a high boundary tone which attaches to the right edge of AP-initial feet (Hft). This is somewhat unexpected, since feet are generally thought of as impacting intonation through stress, rather than directly. It is further interesting that this foot final tone attaches to the weaker branch of a foot (attaching to the right edge of Fataluku’s trochaic foot). It is also interesting that several other languages (including French, Japanese, and Korean) have been reported to carry an intonational peak on their second mora (or syllable), suggesting a heretofore unexplained typological preference for foot final high intonational tones. More research is needed on this topic, especially as more intonational systems are described.

Methodology for Prosodic Fieldwork
This dissertation also contributes to ongoing discussion of prosodic fieldwork methodology. Determining the prosodic structure of an undocumented language in the field is a challenging undertaking, and concrete advice is difficult to obtain. Through its prolonged argumentation on the composition of complex segments, word-level prosody, metrical structure and intonation, this dissertation illustrates the induction of prosodic structure on the basis of both phonetic and phonological behavior. A number of new tests for distinguishing between nearly identical analyses are developed and illustrated, which have broader applicability.

Historical-Comparative Value
These results also contribute to the reconstruction of Fataluku’s ancestor, Proto-Timor-Alor-Pantar. Because of the limited available information, comparative research on underdocumented language families is typically based on a very rudimentary understanding of the phonology of the languages involved. In spite of this, since languages are products of their history, I hold that detailed synchronic research has the potential to yield significant insight about a language’s phonological history. Word-level prosody, metrical structure and morphophonological alternations all come to mind as aspects of a language with the potential to offer particular insight into a language’s phonological history; the more that is known of a family synchronically, the more solid the foundation for reconstructing its past.

Advancement of Indigenous Literacy
This dissertation also has ramifications outside the field of linguistics, contributing to the advancement of the Fataluku-speaking community. The Timorese Ministry of Education has a mission to establish mother tongue literacy programs in indigenous languages across the country. They have chosen Fataluku as one of three languages in which to pilot indigenous literacy
education at the primary school level. The languages of Timor are, however, on the whole quite underdocumented, a state of affairs which has made the development of literacy extremely difficult, since even the basic phoneme inventories of languages are often in question. By providing a detailed and robust account of Fataluku phonology, this dissertation removes impediments to the implementation of mother tongue education and advances the vision of the Ministry of Education to provide the children of East Timor with the best possible opportunity for success in education.

7.3 Limitations

Lack of Proficiency in a Contact Language

Though much has been learned through this study, this work has also been faced with a number of limitations. One substantial challenge has been my lack of proficiency in a contact language. At the start of my work, I knew none of the languages of Timor, apart from some Portuguese, which turned out to be of relatively little help. In addition to my analytic research, I have been learning to speak Fataluku. At my present level, I can carry on basic conversations in Fataluku, though metalinguistic inquiries remain for the most part beyond me. For this reason, especially towards the start of my research, most of my work took place with speakers who also knew English. I hope that continued study will help me to eventually get to the point at which I can conduct my research entirely in Fataluku, which will not only allow me to work with a much larger potential pool of speakers, but also allow study of the language on its own, without the intervening layer of a contact language.

Limited Demographic Diversity

A related limitation has been the limited demographic diversity of my consultants. Most are educated males in their 20s or 30s, and though the primary consultants have been extremely good, it would be beneficial for future work to examine a more diverse sample of speech. For instance, although I have noted no substantial differences between the speech of males and females, more in-depth investigation of female speech would be productive. Additional data from females would be especially useful for the study of intonation, since females often have larger pitch ranges, making intonational patterns more clear. It would also be very interesting to investigate the speech of older speakers, especially elderly individuals who are monolingual in Fataluku. This type of research has the potential to yield interesting insights about the degree to which Tetun and Malay loan words have been fully assimilated into the language, as well as about recent phonological changes.
Limited Geographical Diversity
A related limitation has been the geographical distribution of speakers. Most speakers with whom I had the opportunity to work were from the villages of Lospalos or Com, though I also spent some time with speakers from Muapitin or Lorehe. Dialect variation has been reported to be particularly substantial in Fataluku (Lewis et al., 2013; van Engelenhoven, 2009), though my impression has been that dialect variation is much less significant than reported. However, since no substantial dialectal investigation has been undertaken, this would be a particularly interesting and exciting avenue for future investigation.

Perceptual Difficulty
Another limitation proceeds from my own limited ability to distinguish relevant phonemic contrasts in Fataluku, particularly vowel length and the presence of the glottal stop. As has been seen, contrastive vowel length is a particularly interesting aspect of Fataluku’s phonology; however, as a native speaker of English, phonemic vowel length is sometimes difficult for me to perceive. The same is true of the intervocalic glottal stop, which is not only difficult to perceive, but is also frequently deleted. In the beginning of my investigations in this topic, I relied primarily on native speakers’ metalinguistic awareness; my ability has improved in this regard, but there are still a number of lexical items for which I remain uncertain. Though I have endeavored to be as meticulous as possible, the reader should be cautioned that more detailed future research may necessitate revision in the transcription of some lexical items, particularly in reference to vowel length and the presence of the glottal stop.

7.4 Future Work
Phonetic Analysis of Vowel Length
This dissertation has revealed a number of particularly exciting directions for future research. One particularly valuable area for future research would be the phonetic analysis of vowel length. In this dissertation, I have dealt with vowel length primarily at the phonemic level, establishing its contrastivness, its underlying representation and its role in metrical structure. However, there are also a number of interesting phonetic questions which could be asked. For instance, in production, how much longer is a long vowel than a short vowel? Are there any differences in length between underlyingly long vowels in positions in which they can contrast with short vowels and long vowels which are required to be long because of footing constraints (such as in monosyllabic content words)? Where is the perceptual cut-off point between short and long vowels for Fataluku speakers? What role does f0 play in vowel length perception? Are there any differences between older and younger speakers which might suggest that vowel length is in the process of being lost?
Effects of Syntax on Prosody
Another interesting area for future research is the relationship between intonational phrasing and grammatical phrasing. Section 6.1 begins this avenue of exploration, but there remain many unanswered questions, especially concerning the intonational structure of more syntactically complex sentences. Along these same lines, it will be interesting to examine evidence for prosodic phrases between the level of the AP and the IP, such as the Intermediate Phrase (ip) recognized in English (Veilleux et al., 2006) and Korean (Jun, 2011). It would also be interesting to analyze the interaction between syntactic topicalization and intonational focus.

Intonation in Naturalistic Speech
A third topic of interest is further examination of the types of intonational patterns that occur in running speech of various genres. The focus here has been on controlled speech, and while the latter part of chapter 6 begins extending these results to more naturalistic speech genres, the full range of intonational possibilities have in no way been plumbed. What kinds of contours are used to indicate imperatives, prohibitives, vocatives or incredulous statements? How is prosody used to indicate the flow of a monologue? What prosodic cues are used by interlocutors to control turn-taking in dialogs? In all, there exists a great amount of work left to be done, and this is a particularly exciting time for research on Fataluku and the other languages of the region.
A NEW YEAR’S TRADITIONS

This story was told by JL, a young man from Com village, describing the celebration of New Year’s in his hometown.

(1) *Hai mais-e, anter ta’a la’a*
PRF correct-VB, 1.SG say go
‘Ok ready, I can start telling you’

(2) *Timor na’-e, aya’ira miri eventu un=itu tali importante la timor mocor i*
Timor at-VB year new event INDF=SS beyond important for Timor children COP
‘In Timor, New Year’s is one of the most important events for Timorese people.’

(3) *aya’ira miri, ma’ar lafan-e=n la’a igreja mara.*
year new person many-VB=SS go church go
‘On New Year’s, a lot of people go to church.’

(4) *koun la’a igreja mara.*
night go church go
‘At night, they go to church.’

(5) *dia trinta e um koun-e tawar la’a igreja mara misa*
day thirty and one night-VB 3.PL go church go mass
‘The thirty-first at night they go to church to attend the mass.’

(6) *misa sai, familia ere, kolega ere, nita tawapela’a nita taraceru.*
mass finish family PL friend PL RECP gather RECP greet
‘When the mass is done, families and friends come together (visit each other), and greet each other.’

(7) *parabens=im nita ina, ica deskulpa ucute.*
congratulations=VAL RECP give some forgiveness ask
‘To congratulate each other, some apologize’

(8) *aya’ira ï rata maluf-e=n, nita horu ica raurau*
year POSS old forget-VB=SS RECP with feeling good
‘To leave behind (lit. forget) the previous year, to be happy with each other.’

(9) *aya’ira miri eceremu=n ï rau-ni eceremu-n*
year new think=SS POSS good-NMLZ think-NMLZ
‘To think about good things for new year.’
(10) *Fa’ifa’ini miri eceremu, sorit ī rau-ni eceremu, nita horu laulaun-e,*
    attitude new think fortune POSS good-NMLZ think RECP with chill-VB,
    mace-n una, nita tawapela’a
eat-NMLZ eat, RECP gather.
    ‘To think about a new attitude, to think about good fortune, chilling together, eating
    food, coming together.’

(11) *na’u la’a muahara tanunate.*
    completely go day until
    ‘Until the next day.’

(12) *mais, ailaci, dia trinta um, ou dia trinta, familia=ere comana nawar-e=tu, mamini,*
    but usually day thirty one or day thirty family=PL already know-VB=DS everyone
   aka’ono koun iwi hiroh-e, mamini hai pohe-pohe, pohe-pohe, lafan
    not.yet night DEM.MES arrive, everyone PRF RED-cook RED-cook much
    na’u pohe.
    completely cook
    ‘Nevertheless, often, on the thirty first or the thirtieth, families already know before that
    night everyone had cooked food, and cook a lot.’

(13) *mace-n poh-e, leura poh-e, ore poh-e, modo=ere, modo asa poh-e,*
    eat-NMLZ cook-VB meat cook-VB ore cook-VB vegetable=PL vegetable leaf cook-VB
    api poh-e=tu
    fish cook-VB=DS
    ‘Cook rice, meat, ore (a dish of rice wrapped in coconut leaves), vegetables, fish,’

(14) *prepara la’a koun horu mac-e ihini iwi hīnua*
    prepare go night with eat-VB its DEM.MES in.order.to
    ‘In order to prepare for the dinner together’

(15) *Ma’ar lafan-e=n naunuku ica raurau*
    person many-VB=SS everyone feeling good
    ‘A lot of people feel happy’

(16) *porque, aya’ira miri ma’ar timor mocor lafan-e=n fiar-e katak, sorit ī*
    because year new person timor child many-VB=SS believe-VB that luck POSS
    rau=n, ī miri em-e ma’u.
    good=SS, POSS new take come
    ‘because, many Timorese people believe that it brings good and new fortune’

(17) *fa’ifa’ini rau-n em-e ma’u=tu ma’ar eluh-e=nu, hin familia, hin*
    attitude good-NMLZ take-VB come=DS person want-VB=SS REFL family REFL
    landa apur ica raurau, celebra hīnua.
    friend.PL with feeling good celebrate in.order.to
    ‘Bringing a good attitude, so people want to celebrate it (New Year’s) with their family
    and their friends.’
i ali la’a a lata Koun na’-e
and again go 1.SG.NSBJ hometown Koun at-VB
‘Specifically (lit. coming back again to) in my village Koun (also spelled Com)’

ailaci aya’ira miri familía=ere, na’unuku lafan-e=n nita tawapela’a.
often year new family=PL everyone many-VB=SS RECP gather
‘Oftentimes, on New Year’s, many families all come altogether.’

ica lē ta’an-e, nita ceru=nu, lawan=im nita tawan-e.
some house in.each-VB RECP call=SS money=VAL REFL add-VB
‘In some houses, they invite each other to get money together.’

ou mace-mace-n=im nita tawan-e=nu horu pohepohe
or RED-eat-NMLZ=VAL RECP collect-VB=SS with cook.
‘Or, collect food to cook together.’

horu laulaune, nita tawa mac-e
with chill REFL 3.SG eat-VB
‘chilling together, eating together;’

api una porque Koun na’-e tahi karu-n-e
fish eat because Koun at-VB ocean close-LOC-VB
‘Eating fish, because Com is close to the ocean’

ma’ar lafan-e=n la’a api nail-e, meti fa’i, api i laficar=im nita
person many-VB=SS go fish catch-VB net do fish POSS big=VAL RECP
horu-n-e mac-e,
with-LOC-VB eat-VB
‘many people fish, putting together the big fish and eating.’

tour=itu arapou wāl-e, pipi wāl-e, pai wāl-e,
Everyone=REL buffalo have-VB goat have-VB pig have-VB
‘For those who have water buffalo, sheep, or pigs,’

hin pia-piapar-ana ica uca=nu horu mac-e hīnua
REFL RED-take.care-NMLZ some kill=SS with eatVB in.order.to
‘They kill some of their domestic animals (the animals they take care of), in order to eat
together.’

Tawar horu mac-e, ian ica dansa, namirara mokor, tua tutu, laulaune,
3.SG with eat-VB, while some dance, male.PL young alcohol drink chill
katuas rar o dansa
old.men PL also dance
‘They eat together, at the same time some dance, the young men drink alcohol (mostly
traditional palm wine) chilling, some old men also dance.’
Until the next day, January 1

At that time, on January first,

Many people from other subdistricts come to Com to hang out together

Because in Com, the ocean is closeby, it is such a beautiful place,

'a place that is able to attract many people to hang out,'

'swimming in the ocean, coming for a picnic, some come for dancing, some come to visit families in Com, some come to visit their friends in Com.'

'Still early morning, people from Lospalos village come'

'some from Baucau, some from Iliomar, some from Mehara, some from Asalain, some people from other places come to Com'

'To see the ocean, to look at the landscape, to look at the beauty of Com, and also to come together.'
(37) **awi ia fatahara komensa=tu na’u la’a waci is**, DEM.MES DEM.MES morning begin=SS completely go sun set
‘This is starting from the morning until the sun starts going down.’

(38) **tuku lim-e ewene ma’ar tainta ma’amini nita pati, la’a hin haliwana o’clock five-VB very? person just ? RECP separate go REFL place mara.**
go
‘at 5pm, then people just leave to their own place.’

(39) **i hala wa’an-e, tour hir-e=nu aiaira miri hai sai hai selebra isikola and only like-VB everyone wait-VB=SS year new PRF finished PRF celebrate school**
‘Just like that, people have celebrated new years, they start waiting to go to school again,’

(40) **mocor=it tour=it, Kounu lata mocor=tu Dili na’-e na’unuku ma’u, child.PL=DS everyone=DS Koun hometown child.PL=DS Dili at-VB everyone come Wila na’-e na’unuku ma’u, hir-e=nu hin upa ta’a ali=m masu pa’i=n Vila at-VB everyone come wait-VB=SS REFL upa say again=VAL well do=SS ali fuleh-e=n la’a Dili mara.**
again-VB=SS go Dili go
‘Com people who are in Dili, Com people who are in Vila (Lospalos village) are coming together in order to start packing to go back to school to go back to Dili.’

(41) **Ali siriwesi, ali isikola, hin lauh-ana imiri=tu, tawar muahara muahara fa’i again work again school REFL live-NMLZ new=DS 3.PL day day do iwi ali=m tifar-e.**
DEM.MES again=VAL run-VB
‘To go to work again, to go to school again, to run their new daily lives.’

(42) **I hala wa’an-e, iwi=t aya’ira miri Timor na’-e, i liuliu and only like-VB DEM.MES=DS year new Timor at-VB and particularly ini lata Kounu na’-e, ma’ar lauh-ana ailaci, tour ailaci fa’i 1.PL.1.NSBJ originate Koun at-VB person live-NMLZ usually everyone usually do**
‘Just like that, this is the new year in Timor, particularly in Com where people usually do like this.’

(43) **hai sai**
PRF finish
‘The end’
B  FATALUKU-ENGLISH DICTIONARY

A

a₁ first person singular nonsubject pronoun

a₂ subject marker

ā₁ second person singular subject pronoun

ā₂ yes-no question particle, which occurs clause-finally

ā cene light a fire

ā ceru call

ā he’e be stuck

ā mire sit on (something)

a’a on

a’a kule keep calling

a’a more place on, put on

a’a nāte take the place of, take the position of

a’a pa’i try, try out

a’ane be on

a’ape encounter unexpectedly, run into

aca tapin smoke

aca₁ chicken

aca₂ fire

aca ucu chicken egg

aca’acak pa’i to tease, to tease someone

acak pa’i 1 try to fix something that is broken 2 try to kill someone through supernatural means

acakne looking in the same direction, lined up

acane mature (of fruit), almost ripe

ācane enough

aca’ōp ashes

acar a type of spirit that leaves a person’s body while they are sleeping, equivalent to Tetun buan

aci see, find

aci cene hand someone something

aci lolo tell to, tell a story to

aci pura sell something to someone

aci ta’a tell someone to do something

ācimese sip (a drink), take a sip

acin finding

acu be enough, be sufficient; when everyone has the same amount

acu’acupe wander around

acuina something fits, is equal

acune be over something

acur sp. of cuscus

afa first person plural inclusive subject pronoun
afarika portion, half; slice (of food)
afi first person plural inclusive nonsubject pronoun
aficālafar crocodile (respectful); lit. 'our ancestors'
afiri first person plural inclusive pronoun, citation form
ahani mine
ahu for, for the benefit of
ailaci usually, always
ait maybe
aitana if
aitula maybe
aja 1 rain 2 rainy season; November to June
aja’ira year
ajan mu’u a type of small plantain
ajane chew
aka not
aka ono never
akan slave, slave class
akare stubborn
akatana burped up food
akate burp up
ākina firm
aku feces
ākule call (with the voice)
akumokor intestine
alah pala slash and burn farming
ale rice, uncooked rice
ale macen cooked rice
ale pohen cooked rice
alehe again
alere hit; can be used for inanimate objects
ali again
aliwana place
ami 1 breast, chest; can be applied to either men or women 2 (breast) milk
ami tapun female breast
amin louse
amir wing
ana 1 l.sg.nom
ana 2 or
anahe seek, look for
anahu for me, for my benefit
ane 1 exist 2 have
anete not hit
anukai thread
apa mountain
apa’apa pa’i naughty
ape encounter
api fish
api nail fishing pole
api naile to fish, to catch fish
api *taru* fishing line

*apur* with

*apur* scoop up

*ara* plant, tree; occurs as the second element in phrases/compounds

*arahe* be frightened

*arakafal pa’i* drop

*arakafale* drop, fall

*arakalina* earing

*arap* buffalo, water buffalo

*arap ami* milk, buffalo milk

*arapou* [Loan of unknown provenance; cf. Malay kerbau, Tagalog kalabaw, though this word was likely a loan in AN as well; see Blust & Trussel 2010 and Headley Jr. 1976:467] water buffalo; in Fataluku culture, the bride-price paid by a man to his wife’s family at the wedding is traditionally 77 buffalos

*ārohe* 1 reach, grab (as in, grab a fruit) 2 on time (not late)

*aruma* [Likely Portuguese loan] clean, tidy

*arure* cry

*aruru* crying

*āseile* rub, scour

*asir* salt

*asire* add salt

*asise* firm

*ata’atare* keep cracking

*ātanana* question

*ātane* ask, ask a question

*atare* crack (as with a machete)

*aterē* numeral classifier for humans; appears optionally after the numeral, especially when the humans are prominent in the following discourse

*atu* belly

*atu na’e* pregnant

*aur* [PAN *qapuR; cf. Kisar auru, Leti āru1] lime (the mineral), betel lime

*awion* [Portuguese Loan] plane

**B**

*baru* [Indonesian Loan] new

*ben* [Loan] band

*ben uta* play a drum (with sticks), play a drumset

*biasa* [Indonesian loan] usually

*bir* [Indonesian loan, ultimately from Dutch] beer

*bis* [Indonesian loan, ultimately from Dutch] bus

*bola* [Indonesian loan, ultimately from Dutch] ball

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1 Indonesian data are from consultants, Dr. Ulrich Kozok and http://www.indodic.com/. Etymologies relating to Austronesian languages besides Indonesian are from Blust & Trussel (2010).
**buku** [Indonesian loan, ultimately from Dutch] book

**C**

cayare be tired

ca’a fish poison

cailor cailor; the name of a tribe

cāl 1 grandparent 2 grandchild

cāl mocor decendent

cal nami grandfather; can apply to any of one’s grandfathers, regardless of whether they are from the father’s side or the mother’s side

cal tupur grandmother; can apply to any of one’s grandmothers, regardless of whether they are from the father’s side or the mother’s side

capaku cewe smoke a cigarette

capuk1 crab

capur kitchen

caruma 1 thread 2 needle

catanu sign (like a logo)

c’a’utapun head

c’a’uwari hair

c’a’uwele skin of the head

cecemālai pineapple

cecemālai ara pineapple plant

cecen pineapple

cele corn

cemaka brain, the physical brain

ceren lover, can be either boyfriend or girlfriend

ceru call; only applies to physically calling someone with the voice, not calling someone on the telephone

cerun vocation, calling; one’s set purpose from God; destiny?

cewe burn

cī thunderstorm, lightening, thunder

cicika shoulder

cicira’i play


cicira’ini toy

ci’ele walk

ci’irana heavy

ci’ire heavy

cila frog

cipicipi flower

cipito forehead

cō far

cō more be located far

cō neure chase away

coicoihana mortar and pestle

coicoihana fuka pestle

Com A place in East Timor in the northeast of the Fataluku-speaking region

coman will definitely
**comanan** definitely, sure

**cônanana** the farthest one

**cône** be far

**coro** spear

**cû** shed, hut

**cu’ale’u** a sp. of snake that is green and very poisonous

**cuare** sit

**cûl** knee

**cul seisei** knee cap

**cupu** water drop

**cupucupu** water drops

**cura** mouse, rat; can be used as an insult

**cure** wake up

**curuk** lime, lemon

**curuk ara** lime tree

**D**

**depois** [Portuguese loan] afterwards

**derepenti** [Portuguese loan] suddenly, accidentally

**designa** [Portuguese loan] designate

**dewersifika** [Portuguese loan] diversify

**Dili** [Tetun loan] Dili, the capital of East Timor

**dosi** [Portuguese loan] cake

**dôs** [Indonesian loan] box

**doutor** [Portuguese loan] doctor

**E**

**e na’e** be here

**e₁** second person singular nonsubject pronoun

**e₂** proximal demonstrative, this

**ece** two

**eceremu** think

**eceremun** thought, idea

**e’ece** two at a time

**eheni** yours

**ekehe** count

**ele** relative pronoun

**ele’elere** read, spend time reading

**eleh** husband

**elei** yeah, that’s right, right on

**elere₂** read

**élewe** be cold (of the weather)

**eluhe** want

**em ma’u** bring

**eme** take

**emere** be first

**en** proximal demonstrative, this

**enen** proximal demonstrative, this

**eni’i** this

**entaun** [Portuguese Loan] then, and then

**ere₁** chase away

**ere₂** plural marker
erēkana pumpkin vine
ereke crawl as a vine
eri scatter
ēri you
ērta you (emph. subj.)
ēru famine
esasa vegetable
esturante [Portuguese loan] student
ete tree, wood, plant; refers to logs or trees without leaves
ete ara tree
ete karan big branch (as of a tree)
ete kete small stick
ete larin root
ete lusu casava
ete pata log
ete raka small branch
ete sanak small branch
ete wele tree bark
ewen extremely, really really (more emphatic than tali)

F
fāfāte four at a time
fa’i make
fale drive (as a car)
familia [Portuguese loan] family
fanar female (only of animals)
fanawana teaching
fanawe teach
fāne to feed
fani delicious, sweet
fanu face
fanu na’e in front of, lit. at the face of
fanuhene meet, face
faru shirt, T-shirt
fata origin, simple
fatahara morning
Fataluku Fataluku
fatata ra suddenly, immediately
fāte₁ [Austronesian loan] four
fāte₂ flooded
fei pretty; can only be used of women
feinu pretty
fēl bow, bow and arrows
fel ka’u arrow
fel kete arrow
fetil fall, stumble
fiare [Portuguese loan] believe
fitu [Austronesian loan] seven
foeh grass
folo blunt
folopata dull, not sharp
fono distal demonstrative, that
fono ni’i distal demonstrative, that
fonin distal demonstrative, that
forsa [Portuguese loan] be strong
fot gun
foto [Indonesian loan, ultimately from Dutch] photo
fufulehe go back and forth
fuhu muscle
fulehe return, go back

G
goyabas [Portuguese loan] guava
goyabas ara guava tree
governo [Portuguese loan] government

H
ha’ate sharp
haca partner
hafa bone
hafa hala very thin, very skinny; lit. only bone
ha’i a species of large tree with edible seeds that are used to make perfume
hai perfective; signifies that the speaker conceives of an action as finished
hair then, well, but
hala only
hapate sprout, grow

hapatu a general term for edible roots, including e.g. bamboo and ginger
har that, which
hara be clear
harahara be clear
haran light
harus [Indonesian loan] must
hasa leaf
hau1 1 for (the benefit of) 2 toward
hau2 fog
hawarana hunting
haware hunt
he’e1 1 be stuck, difficult 2 difficult 3 scarce, hard to find
he’e2 1 lit. means be stuck 2 be difficult 3 be scarce, difficult to find
hefe know
hei hey; an informal greeting
hei kinam hey buddy, an informal greeting
helere run
heru sweat
hi’a on
hi’a ciele step on
hi’ahi’are repeatedly pay; pretend to pay
hi’amoi climb
hi’ane be on the top
hi’ape ride (as of the bus)
hi’are pay
hi’aroun pure of heart
hici located
hicine be located
hicipe be located towards
hi’ili animal trap
hīkar knife
hilahila smooth, slippery
hilate smooth, soft
hin$_1$ reflexive
hin$_2$ because of
hina braid (hair)
hinta cause, make
hinu’a in order to
hira price
hīre wait
hirohe arrive, reach (a destination)
hītu sword
ho [likely Tetun loan] and
hō yes
hō’ana burning
hocatere both
hōcawa 1 owner, lord, master 2 the Christian God
hō’e burn
hōk mud
hōke muddy
hor with
hori leave, stop
horu$_1$ horn, antler
horu$_2$ with, together
horun togetherness
horune be together
hufa spit something out of the mouth
hufarana dream
hūfina tip, top (not necessarily sharp)
hufuraka boil
hūla spoon
huluhulu on fire
humār soul
hura take food from a pan; scoop

I
i second person plural nonsubject pronoun
i na’e there
ī$_1$ the possessive marker
ī$_3$ [Portuguese loan] and
i’a road, path, way
ia$_1$ second person plural subject pronoun
ia$_2$ that
ia$_4$ path, way
ia tupur mother’s brother’s daughter
i’an while
ica feeling
ica ci’ire feel tired, feel sad; lit. a person’s feeling is heavy
ica kapare sad
ica raurau happy
ica tutu like, love
ica tutun love
icahici sometimes
ica’ini maybe (refering to something that is not known); sometimes
icauru chest
icile be tied
ifa fall (over)
ífát 1 fourth 2 Thursday
ifi worm
igilejale [Portuguese loan] church
ihaneherana Monday
ihec second (in order), Tuesday
ihemerana first
ihini his, his own
ikare be cold (of a person)
ilah sweet potato
ilah makau potato
ili huge stone
ilikuru cave
imire sit
impresta [Portuguese loan] lend
ina ko’e blind
ina first person plural exclusive subject pronoun
ina what?
ina3 then
ina4 eye
inahara seer, someone who can see something beyond
inaleo eyebrow
inawaya tears
ini first person plural exclusive nonsubject pronoun
inik sand
inikerekere petroglyph
inir first person plural exclusive pronoun, citation form
ipar dog
ipil tongue
ipilana flying, flight
ipile fly; can be used of butterflies, birds, planes, etc.
ipilira chicken.comb
ipinaka star
ipiti sea turtle
ipo but
ira water
ira ina fountain, lit. "eye of water"
ira tutun drinking water
ira’e add water
iraira wet
iri second person plural pronoun, citation form
irin forest
irise urinate
isi’isile tie
isikola [Portuguese loan] school
isikola lē schoolhouse
isile tie
istura [Portuguese Loan] study
ita near
itane near
itarapa’an greetings
it’e’ele kick
iwari same
ivi that
ivi’itu and then; formed from the mesal demonstrative and the topicalization clitic
iwini mesal demonstrative, that
iwini’i mesal demonstrative, that

J
Jaco Jaco, Jaco island; an island just off the Northeast coast of East Timor. It belongs to East Timor politically, and has become a tourist destination in recent years.
jaket [Loan, ultimately from English] jacket
javmpa’ta [Indonesian loan, from jambatan ‘bridge’] road
japatu [Portuguese loan] a pair of shoes
jatu airplane
Jawa [Indonesian loan] Java
jeitu be cool, neat
jelu ice
jen reflexive
jeu 1 wife 2 a man’s mother’s brother’s daughter, which men are traditionally expected to marry; the term can be used even if the two are not married yet
jia leg
jia fukar toes
jia lepen sole, bottom of one’s foot (analogous to the palm of the hand)
jia mu’upoko calf of leg
jia ocoh anklet
jia punar calf of the leg
jujur [Indonesian loan] honest
juka [Indonesian loan from joker, the most popular card game in Indonesia; ultimately from English joker] cards, card game
K
kayarana tiredness, effort
kayare tired
ka’are empty
kadera chair
kafa eight
kafale fall, drop (intrans.) 2 throw
kafe [Portuguese loan] coffee
kafu seed
kafur scratch
kaihe to file
kailana sinfulness
kaile be bent 2 sin
kaka older brother 2 mother’s older sister’s son, if older than oneself
kaka tupur older brother’s wife
kakal palm tree (excluding coconut palms)
kalah taro
kale throw
kaluse compete, as in a race
kama [Portuguese loan] bed
kanta1 [Portuguese loan] sing
kanta2 [Portuguese loan] song
kaparana bad, evil
kaparasi ugly
kapare 1 bad 2 severe 3 huge
kar right now
karase yellow
kare be cold
karponentu [Portuguese loan] carpenter
karu’en right now
karunana the nearest one
karune near
kastiku [Portuguese loan] punish
katak that (as a quotative)
katen thigh; the part of the leg from the hip to the knee
katuas old (person), old man
katuba [Tetun loan] a kind of rice cake consisting of rice wrapped in coconut leaves, which is traditionally eaten around Christmas
ka’u stick
kaukaure scratch
ka’ukisa small
ka’ukisela be small
kawabe short
kawe marry
ke’er ladder
ke’ile pick something with a tool
kekehana counting
kēlana laughter
kēle laugh, smile
kelici [Loan from Indonesian kelinci ‘rabbit’] rabbit
kelu not want
keos [Loan from Indonesian kios ‘kiosk’, ultimately from Dutch] kiosk
kere 1 write 2 writing
kerekere write
kerekerenana writing
kete thin, skinny (usually in reference to wood)
ketile fly through the air (after getting launched)
kiki’e bite
kila’e dirty
kilakila’e dirty
kina buddy
kiufatahara dawn
klas [Portuguese loan] class
koire stir; can only be used to refer to stirring fluids of high viscosity
kokote grow
kolega [Portuguese loan] friend
kolikolise later
kolis Indicates the near future
kolo person who is mute
komensa start
komprende [Portuguese loan] understand
konfesa [Portuguese loan] confess
kota [Indonesian loan] town
Koun A Fataluku-speaking village on the northeast coast of Timor; also spelled Com
koune dark, evening
kuandu [Portuguese loan] when
kuartu [Portuguese Loan] room
kuca [Tetun Dili kuda ‘horse’] horse
küle yell
kurakura argue, quarrel
kurisa 1 (fresh) chile pepper 2 a paste made with chile peppers, garlic and dried shrimp served as a condiment
kuru hole

L
la’a go
la’ala’a walk
lāfai be big
lāfane much, many
lafur traditional place to cook, made with 3 stones
lāhuna onion
lai cut; a specific way of cutting something
lailaine chop repeatedly
lakaran step
laki dig
lakuware black
lālāfai big
lalu high
lalune be above, be higher, be on top
laman inside
lamanu bushes, area with bushes
lān friend
lanura friends
lapusa spider
lār instance, time, repetition
larin root
larin arapou water buffalo
larunate turn around
lau clothes, blanket
lau’e melt, dissolve
lauhana life
lauhe live
lawalawan fake money
lawan money
lāware dress (trans.), put clothes on
lāwei crocodile (not respectful)
lē house
lē ho cu house and hut
lē teinu church
lēlē moko toy house
lēlēre read for fun
leman gentleman
lemesana sweet
lemese sweet
lepi kasa thin
lērana reading
leren older sister
leren kaka older sister
leren lāfai older sister
leren noko male’s younger sister
leru’e roll (intrans.)
letana in between
le’u 1 fur, hair not on the head 2 feathers
leura meat (for eating)
liare fūlehe go back and forth
lika sp. of lizard that lives in a tree
lika skinny
likalika skinniness
limar [Portuguese loan] a (metal) file
limare [Portuguese loan] to file
līme [Austronesian loan] five
līta bag
lō sp. of cuscus
lōyasu ship
lōhai 1 tall 2 long
lolo tell, tell a story
lōlōhai tall
lolon story
lolos fat
lōr heavy (as of a rainstorm)
lore 1 a hole that is made in the ground for planting seeds into 2 the large, pointed stick that is used for making holes in the ground for planting
loro a type of plant similar to a watermelon
Lospala Lospalos (a town in roughly the center of the Fataluku-speaking region of East Timor)
louke jump
lu’a monkey
luka old
luku talk (trans.)
lukuluku talk (intrans.)
lukulukun language
lukun language
lumulumure be completely green
lumure be green, blue
lutu large basin used for smashing rice

M
ma’amoko what’s up?
ma’ar person, can be male or female
ma’ar lāfai authority figure; lit. big person
ma’ar tein priest; lit. holy person
ma’ate bitter
maca bat
macamaca butterfly
mace eat
macemacen food
macen food
mahane fear, be scared of
mai eagle
mais [Portuguese loanword] but
maisana 1 something that is correct, correct thing 2 truth
maise true, straight, correct; as a greeting, can mean "good, and you?"
 maka kick
Makalero Makalero, a nearby related language
makamakase whisper
Makasa’e Makasa’e, a nearby related language
maksud [Indonesian loan] meaning
mālai [Probable loan, perhaps from Malay] 1 foreigner, stranger; can apply to foreigners from anywhere, not only to those of Malay descent 2 head of a village, king
mālete narrow (space)
malu outside
malupe go outside
mama [Possible loan] mother
mana big sister
manamana fruit
manane win, defeat
manda la’a [manda is a Portuguese loan] send
manikete neck
manimani necklace
manko [Indonesian loan] bowl
manu pa’i injure
manu1 injury
manu2 big brother
manun wounded
mara go to
marteru [Portuguese loan] hammer
masu carefully
masu cina blow on a fire to kindle it well
masu pa’i to be careful
matar stone
matare stony area
matu used
ma’u come
ma’unu arrival
mautule lazy
meimeite to be retarded, to be mentally handicapped
meja [Portuguese loan] table
menit [Indonesian loan] minute
merkadu [Portuguese loan] market
mesene show
mestri [Portuguese Loan] teacher
meti tide
mimimimireke red, very much red, always red
mimireke red
mina cooking oil
mine have
mini on the edge
mini mire sit on the edge
mini more be located near
minik nose
minine next to, beside, on the edge of
mire sit
miri new
mirimiri new, new and clean
miucia [Portuguese loan] midday
moco 1 child 2 brother’s son
moco nami brother’s son; can apply to the son of one’s older brother or younger brother
moco tupur brother’s daughter; can apply to the daughter of either one’s older brother or younger brother
moco wále bear a child
mocomoko baby
mohe run
moko small, young
mokomoco baby
mokomokor children
morisa throw, throw away
mouk cloud
mu’a ca’uwele earth
mu’a hōcawa landowner
mu’a koune evening
mu’a₁ soil
mu’a₂ day
mu’a₃ atmosphere
mu’ahaka caring
mu’ahara mu’ahara every day
mu’aharan day
mucu in
mucu cene submit, reach out and put inside
mucu co’e stuck inside
mucu he’e stuck inside
mucu hufuhufute outraged
mucune be in
mucupe into
mu’e kiss
muhare be hungry
mumina iron
muralaku take off (as of clothes)
mu’u banana
mu’u ara banana plant
mu’umālai papaya; lit. foreign banana
mu’umālai ara papaya tree
mu’upoko banana bell, banana blossom; a red bulb on the bottom of a bunch of bananas; this part is edible in some varieties of banana, and is a common food source; in my experience, it is most often prepared by cutting into small pieces and stir frying (often with other vegetables)

N
nā at
nā ceru call
nā neluhe want, lit. "want at" something
nā pale touch
nā pati distribute
na’a kēle laugh
na’e 1 to be at 2 to live, to breathe
nail taru fishing line
naile to hook out, fish
nāl 1 mother 2 father’s brother’s wife; the same word is used whether it is the father’s older brother or younger brother
nāl kaka mother’s older sister
nāl noko mother’s younger sister
nālpāl parents
nami male, man, gentleman
nana snake
nanakēle smile
nānāl big (wide)
nananana crazy
napaniki not exactly, that’s not right
nara then, and then
naru’uru buried underground
nasional [Portuguese loan] national
natal [Portuguese loan] Christmas
nāte stand
naten follow
na’u yet
na’u taya go to sleep directly
na’unope morning
na’u’uku all, everyone
na’uwara and
nawa to eat
naware 1 to know, understand 2 to know how to, to be able to
nē name
nekulana anger, frustration
nekule be angry
nēl sky, heaven
nēme [Possible Austronesian loan] six
nērana flat area
nere to follow (a person, animal or a path)
nēre flat
nerenere nāte follow
nerenu follow, follow in order to do something
neru traditional kitchen item used to thresh plants
neure to chase
nikini mesquito
ninau himself
nita reciprocal
nita kurakura argue with one another, try to undermine one another
nita uca kill each other, kill one another; generally refers to smaller quantities of people being killed than nitauta
nita uta kill each other in mass quantities, commit genocide
noko 1 younger same-sex sibling 2 the younger same-sex cousin from one’s mother’s older sister
noko tupur younger brother’s wife
nope tomorrow
nūcece wash, bathe
nutu cover

O
o also, to
obrigadu [Portuguese loan] thank you
oco1 orchard, grove
oco2 touch
ocoh bracelet
ocio cut, cut many times

192
ofote cut

okolewe hug

okon a general term for dried, edible roots; can refer to e.g. dried casava, potato or taro

olo bird

olo le’u bird’s feathers

omoke be quiet

omo’omoke be a quiet person

ono still

o’o 1 mouth 2 door

o’opira 1 (physical) lip 2 (metaphorical) edge, as in the edge of the ocean

o’ose steal

ōp ashes

oposana rotten

opose 1 rot, spoil 2 be rude

oras [Portuguese loan] hour, hours

orasesen nowadays

ore1 quarrel

ore2 1 weaving 2 the native name for katuba, a kind of rice cake consisting of rice wrapped in coconut leaves

orite 1 embarrassed, ashamed 2 shy

orama’i hide

ōruma lalaruma be loud (of people talking and chit-chatting)

ote bean

otemina peanut

P

paya1 liquid

paya2 a special type of expensive necklace given from the husband to the wife when they get married

payah mango

payah ara mango tree

payapayah necklace (in general)

pa’a a lot, much

paca1 a portion (of game, for instance) set aside for a particular person

paca2 commoner, commoner class

pacu forbid

paha slap, hit

pahale wash (clothes)

pai pig

pa’in 1 sister’s child; can refer to children of either one’s older sister or one’s younger sister; applies to both male and female children 2 mother’s older brother

pa’in matu father’s sister’s husband (whether sister is older or younger)

pa’in noko mother’s younger brother

pa’in tupur mother’s brother’s wife

paki wall
paksat [Indonesian loan, from paksa ‘force, compulsion’] force (someone to do something)

pāl 1 father 2 mother’s sister’s husband

pāl kaka father’s older brother

pāl noko father’s younger brother

pala a farm

palake stick on

palastiku [Loan from Indonesian plastik ‘plastic, plastic bag’] plastic bag

pali not exist

palise swim

pān [Portuguese loan] bread

panak heart

panake ache

panleru man who acts feminine or who dresses like a woman

pantai [Indonesian Loan] beach

papanoko uncle, but specifically refers to the mother’s brother

papasiare take a walk

papu great-grandparent; can apply to any of one’s great-grandparents, regardless of whether they are from the father’s side or the mother’s side

papu nami great-grandfather; can apply to any of one’s great-grandfathers, regardless of whether they are from the father’s side or the mother’s side

papu tupur great-grandmother; can apply to any of one’s great-grandmothers, regardless of whether they are from the father’s side or the mother’s side

para [Port. para ‘for’] so, so that

pari wind

pari olioli to whistle

pari silil breeze

parir dry season; July-October

parke [Portuguese loan] park

pasar1 [Indonesian loan] market

pasar2 week

pasiare [Portuguese loan] walk

pasta [Loan of unknown provenance] bag

pata log (from a tree)

pati to share, distribute

patin separate

patu’e cough

pelek boat

pemandana [Indonesian loan] view

pēt [Likely to be ultimately from English bed] mattress

petun [Austronesian loan] bamboo

pī a type of hard seed from a palm tree

pi’apara raise, take care of; can refer to raising children as well as taking care of domestic animals

pinta [Portuguese loan] 1 paint 2 painting
pipi goat
pirapira edge
piri lie, tell an untruth
pirin lie
piripiri be a liar
pite shine
pitine white
pitipitine white
pohe cook
pohepohe cook
po’iteke back
poki punch
polu full
po’opo’ote sick
po’ote sick
pōpō grandparent
pōpō nami grandfather
pōpō tupur grandmother
pōpoke soggy
poporawa dragonfly
por ejemplu [Portuguese loan] for example
poron be in a circle
Portuges [Portuguese loan] Portuguese
poru smooth
posi₁ cat
posi₂ push slowly
pouke to throw at and hit
pua betel nut
puhu pot
pui man who acts like a girl
puicina flatland
pu’ina roof
pulau [Indonesian loan] island
puluh [Indonesian loan] tens
pura sell
purupale take care

R
rah hundred
rahine yesterday
rakase fry
rame be fun; when a lot of people are having a
good time
ranuranu well
raparapake rough
rapu a type of leafy plant similar to spinach
rapurapu insecurity, lack of self-confidence
rarahe 1 bloom, open wide 2 twinkle (of stars)
rata old
ratan a long time ago
ratarata in a little bit
ratu 1 tribe, clan 2 ruling class
ra’u plate
rau good
ra’ulukun bowl
raurau happy
rehabi [Portuguese loan] rebuild
rehun thousand
rekise chop, cut down (for instance, a tree)
ria mother’s brother’s son
riku [Portuguese loan] riches
rohone 1 on the day before yesterday 2 in the past
rohorohone in the past
roja [Port. rosa ‘rose’] rose
ropisaro [Portuguese loan] sweet things
rotoroto onomatopoeia for breathing
rukus ring
rūmau pomegranate

S
sā [Loanword of unknown provenance] tea
sai finish
saline carry (as of a bag)
salwa [Portuguese loan] save
salwasau[Portuguese loan] salvation
sapu pomelo
sapun lung
sasake dry
sasale stupid

se [Tetun loan. Perhaps ultimately related to Portuguese sim] if
semu receive (this definition suggested and accepted by consultant)
conti [Portuguese Loan] feel
sepu watermelon
sepusepu lawn
serika little, little bit
siku [Indonesian loan] elbow
silaki grasshopper
sirike drive
sirwisi work
sīwa [Austronesian loan] nine
soele slither
somite carry (e.g., a log)
sorot book, paper
sorot hasa paper
sorot tein Bible, lit. holy book
sosike slip
sūke duck
sumurelu [Likely loan] umbrella
sune blow, as of the wind
susuka fork
sūsūke walk while ducking, walk hunched, crawl
T

taya sleep, lay down

tayan sleep (as a noun)

ta₁ despite

ta₂ in order to

ta’a talk

ta’ane ten

tafa 1 to shoot (as with a spear, gun or catapult)
  2 to pound (as with a mortar and pestle)

tahi ocean, beach

tahi ira ocean water

tahi o’opira beach

tahi wehe mocori a child of the sea, a person
  with salt water in their veins,

tahinana beauty

tahine good-looking, handsome, pretty; can be
  used of either men or women

tahun [Indonesian loan] year

tain earlier today

tali 1 beyond, surpassing 2 very

taline be beyond, past, physically over

tamba [Tetun loan] because

tamu name (someone) (something), give
  someone a name

tamu kaka father’s older sister

tamu noko father’s younger sister

tana hand, arm

tana fukar finger

tana ocoh bracelet

tanapungal bicep

tanu against

tapa don’t!; signals a negative imperative

tapalana saddle

tapule buy

tapun round (thing)

tār third person plural pronoun; rapid speech
  variant of tawar ‘3.PL’

taru₁ twine, rope

taru₂ [Indonesian loan, from taruh ‘to place,
  lay down; in the context of gambling, to
  place a bet’] gamble

tarunu gambling

tarupaha how many? how much?

tarute when?

tatu be tattooed

tatun on the day after tomorrow

taukawa fat

tawa third person singular pronoun

tawar third person plural pronoun

teane what, how

tefu’ana broken one

tefu’e broken (because someone broke it);
  refers to a long object that is broken along
  the short axis
tei holy, taboo

tele slow

teteile be slow

teku stir; can be used of fluids that have a low viscosity, like water

telewisaun [Portuguese loan] television

telira other

tena which one (used in questions)

tenen right (not left)

teni’it which

tenke [Port. tem que "must"] must, have to

terlambati [Indonesian loan] to come late, to arrive late

tetere cut grass

tewa’ane how? what is it like?

tewa’awa’ane what is it like?

tia₁ [Portuguese loan] mother’s brother’s wife

tia₂ chew (betel nut)

ti’ele kick

tifare run

tifatifale jog

tiga [Indonesian loan] three

tigri [Loanword, likely from Portuguese] tiger

timine to feel hot

timuna [Loanword from Indonesian timun ‘cucumber’] cucumber

tina blow on embers to start a fire

tini can come at the end of an imperative sentence to show respect to the individual you are commanding. The informant was not sure of its meaning.

tipal drum

tipal kakale play the drum with one’s hand

titiriri shiver

tiu [Portuguese loan] uncle, specifically, the mother’s brother

to a quotative particle, introducing a direct quote

tō cup

toko store

tomati [Port. tomate 'tomato'] tomato

tomoke soft

tomotomoke soft

totana something separated

toton observing, observation, observer

totolototo see, look at, watch

tote cut

toto see, look at, watch

totole cut

toton taken care of

totototo look at

tour na’u’uku everyone

toure be many (only of animates, such as animals or people)
**tua** [Indonesian loan, from *tuak* ‘palm wine’] 1 palm wine 2 palm tree from which palm wine is made, *Borassus flabellifer*, known as the Sugar Palm in English 3 alcohol in general

**tua harak** [Indonesian loan, from *arak* ‘distilled palm wine’] distilled palm wine

**tua pitin** white palm wine

**tuahasa** palm leaves, thatch

**tuana** plantation

**tugas** [Indonesian loan] assignment

**tuku** [Indonesian loan] o’clock

**tunangan** [Indonesian loan] fiance

**tupukur** owl

**tupur** woman

**tuputupur pa’i** to make more feminine

**turista** [Portuguese loan] tourist

**tutu**₁ drink

**tutu**₂ like, love

**Tutuala** Tutuala, a place in the Fataluku-speaking region of East Timor

**tūtūana** plantation

**tu’u** Shows respect; unclear meaning

**tu’ulere** beat to death

**U**

**u’a** under

**uan** heart

**u’ane** under, below

**uca** kill

**ucu** egg

**ucu’ete** thick

**ufale** hold

**ufane** feed

**ufarana** dream, have a dream

**ufur** body

**ufutana** froth, bubbled up stuff

**ufute** bubbling (when cooking)

**uhule** be able

**uja** [Portuguese loan] use

**ūkani** one

**uku**₁ finished 2 all

**ukusina** reachable

**ula**₁ maybe 2 about

**ulafuka** tail

**ulahuca** killer

**ulan** for (duration)

**ulawarin** hip

**ulawere** wear

**ulun** tadpole

**ulur** breadfruit

**ulure** sweep

**ulu’ulu** greedy

**uman** who?
umu die
una to eat
uname to catch (as of animals)
undani [Indonesian loan, from undang ‘invite’]
    invite
uni one
unu the indefinite article; a, one some
upe no, not, there is not
upu hicine be behind
upu na’e behind
upu₁ white soil
upu₂ back
upur a fly (the insect)
uru moon
uru’uru burn
uta₁ fall (especially of rain)
uta₂ play a musical instrument
utu co’e block, as in dirt blocking a pipe
utu₁ draw water, get water
utu₂ block, interfere
utu’e₁ to plant, sow
utu’e₂ three
utune block, interfere, block from a stationary
    position; used if the thing that is blocking is
    not moving
utupe block, interfere, block while moving;
    used if the thing that is blocking is moving;
    for instance, can be used of a car that pulls
    in front of another car and blocks it
ututefe blow, blow air
utu’utu’e₁ to pretend to plant something
utu’utu’e₂ three at a time
ū’ūkani one at a time
u’ureke green

W
waya juice (occurring after the name of various
    fruits)
wayan 1 mother’s brother’s son (same word
    whether it is the mother’s older brother or
    younger brother) 2 sister’s husband; can be
    the husband of one’s older sister or one’s
    younger sister.
wa’an 1 the same as, alike 2 like, similar to 3
    around, approximately at
wa’ane 1 be similar, be like, be the same as 2
    approximately, about
wa’awa’ane same
waci today
wacin day
wacu sun
wacu hi’amoi 1 sunrise 2 east
wacu isi 1 sunset 2 west
wacuwici afternoon
wāhe leak (as in to drip water)
wahilan male (of animals); offensive if applied to people
wahin tooth
wahu$_1$ eel
wahu$_2$ wash
wa’i carry (a baby)
waihoho sing; used of traditional songs
waihulai window
wainhira [Tetun loan] when
waka arapou [Port. vaca ’cow’] cow
wakahana lightweight
wakahiti active, athletic
walahana bride-price; gift given from the husband to the wife at marriage
walale fast
wāle to give birth
wali ear
wāli’ara side of saw
walik corner
walikana corner
walikasa ear, the physical part of your ear
walipali keep (doing), continue to (do)
Walu a place on the eastern coast of Timor, on the mainland near Jaco island
walur a particular sp. of bird, a dark blue wild dove
wani bee
wanifahu beeswax
wār dew
wāreseni clean, clear
wari$_1$ nest
wari$_2$ always
wari$_3$ hear, listen
waru sp. of tree
wasi very, really
wasitali more, very
wata coconut
wata ara coconut tree
wata ira coconut water, the juice from a coconut
wata tō coconut shell
wāwārese be clean
wehe blood
wele skin, bark
wele taru skin of a human or animal
wēlika left (not right)
wēr stream, rivers
wēteru trip, fall, stumble
wetik beating
wetike flick someone; traditional flicking a person is associated with casting a spell or a curse on them
wetiwetike be beating (as of one’s heart)
wuru oil
C ENGLISH-FATALUKU FINDERLIST

A
a, an - unu
able - uhule, naware
ache - panake
add water - ira’e
afternoon - wacuwici
afterwards - depois
again - ali, alehe
against - tanu
airplane - jatu
alcohol - tua
aligned - acakne
allow - kaure
already hai
also - o
always - wari
and - na’uwara, ho, í
anger - nekulana
angry - nekule
anklet - jia ocoh
approximately - ula, wa’a’ne
argue - kurakura, nita kurakura
arrival - ma’unu

arrive - hirohe
arrow - fel ka’u, fel ketet
ashes - ōp, aca’ōp
ask - ātane
assignment - tugas
at - nā
at breathe - na’e
athletic - wakahi
atmosphere - mu’a
aunt (father’s older sister) - tamu kaka
aunt (father’s younger sister) - tamu noko
aunt (mother’s brother’s wife) - pa’in tupur, tia
aunt (mother’s older sister) - nāl kaka
aunt (mother’s younger sister) - nāl noko
aunt (wife of older brother) - kaka tupur
authority figure - ma’ar lāfai

B
baby - mokomoco
back - po’iteke, upu
bad - kapare, kaparana
bag - lita, pasta
bag (plastic) - palastiku
ball - bola
bamboo - petun
banana - mu’u
banana bell - mu’upoko
banana plant - mu’u ara
band - ben
bark of a tree - ete wele
basin - lutu
bat - maca
bathe - nucece
beach - tahi o’opira, pantai
bean - ote
bear child - moco wäle
beat - tu’ulere
beating - wetik
beating (as of one’s heart) - wetiwetike
beauty - tahinana
because - tamba
because of - hin
bed - kama
bee - wani
beer - bir
beeswax - wanifahu
behind - upu na’e, upu hicine
believe - fiare
belly - atu
bowl - ra’ulukun, manko
box - dōsi
boyfriend ceren
bracelet - ocoh, tana ocoh
braid - hina
brain - cemaka
branch, small - ete raka, ete sanak
bread - pān
breadfruit - ulur
break - ka’une
breast - ami
breast, female - ami tapun
breast milk - ami
breathing noise - rotoroto
breeze - pari silil
bride-price - walahana
bring - em ma’u
broken - tefu’e
broken one - tefu’ana
brother (older) - kaka
brother - noko
bubbling - ufute
buddy - kina
buffalo - arap, arapou
buried - naru’uru
burn - hō’e, uru’uru, cewe
burning - hō’ana, huluhulu
burp up - akate
burped up food - akatana
bus - bis
bushes - lamanu
but - ipo, mais
butterfly - macamaca
buy - tapule

C
cake - dosi
calf (of leg) - jia punar, jia mu’upoko
call continually - a’a kule
call - ceru, nā ceru, ākule
call to (someone) - ā ceru
calling - cerun
cards - juka
careful - masu pa’i
carefully - masu
caring - mu’ahaka
carpenter - karpenteru
carry - saline, somone, wa’i
casava - ete lusu
cat - posi
catch - uname
cause - hinta
cave - **ilikuru**
chair - **kadera**
chase away - **cō neure**
chase - **ere, neure**
chest - **icauru**
chew - **ajane, tia**
chicken - **aca**
chicken comb - **ipilira**
child - **moco**
children - **mokomokor**
chile - **kurisa**
chile paste - **kurisa**
chop - **lailaine, rekise**
Christmas - **natal**
church - **lē teinu, igilejale**
circle - **poron**
class - **klas**
classifier for humans - **atere**
clean, tidy - **aruma**
clean - **wāwārese**
clear - **hara, harahara**
climb - **hi'amoi**
clothes - **lau**
cloud - **mouk**
coconut - **wata**
coconut juice - **wata ira**
coconut shell - **wata tō**
coconut tree - **wata ara**
coffee - **kafe**
cold (of a person) - **ikare**
cold (of the weather) - **ēlewe**
Com (place) - **Com, Koun**
come - **ma’u**
commoner - **paca**
compete - **kaluse**
confess - **konfesa**
continue to - **walipali**
cook (trans.) - **pohe**
cook (intrans.) - **pohepohe**
cooking place - **lafur**
cool - **jeitu**
corn - **cele**
corner - **walik, walikana**
correct (thing) - **maisana**
cough - **patu’e**
count - **ekhehe**
counting - **kekehana**
cousin (mother’s brother’s daughter) - **jeu**
cousin (mother’s brother’s son) - **ria**
cousin (mother’s brother’s son) - **wayan**
cousin, female - **ia tupur**
cover - **nutu**
cow - waka arapou
crab - capuk
crack - atare
crack continually - ata’atare
crawl - sūsūke
crazy - nananana
crocodile - aficālafar, lāwei
cry - arure
crying - aruru
cucumber - tīmuna
cup - tō
cuscus species - acur
cuscus species - lō
cut - lai, ofote, ofo’ofote, tetere, tote, totole

death - umu
difficult - he’e
dig - laki
Dili - Dili
dirty - kila’e, kilakila’e
distribute - nā pati
diversify - dewersifika
do - fa’i
doctor - doutor
dog - ipar
don’t - tapa
dove - walur
dragonfly - poporawa
draw - utu
dream - ufarana, hufarana
dress - lāware
dried root - okon
drink - tutu
drive - sirike, fale
drop - arakafal pa’i
drum - tipal
drum, to play - tipal kakale
drums, to play - ben uta
dry - sasake
dry season - parir
duck (vb.) - sūke, sūsūke

dawn - kiufatahara
day after tomorrow - tatun
day before yesterday - rohone
day - mu’a, mu’aharan, wacin
decendent - cāl mocor
definitely - coman, comanan
delicious - fanī
designate - designa
despite - ta
dew - wār
dull - folopata

eagle - mai

ear - wali, walikasa

earing - arakalina

earlier today - tain

ear - mu’a ca’uwele

east - wacu hi’amoi

eat - mace, nawa, una

edge - pirapira

edge, to be on an - mini

edible root - hapatu

eel - wahu

egg - ucu, aca ucu

eight - kafa

elbow - siku

embarrassed - orite

empty - ka’are

encounter - a’a’pe

enough - ācane, acu

equal - acuina

evening - mu’a koune

every day - mu’ahara mu’ahara

everyone - na’u’uku

example, for example - por ejemplu

exist - ane

eye - ina

eyebrow - inaleo

face - fanu

fake money - lawalawan

fall - kafale

fall - ifa

fall (of rain) - uta

family - familia

famine - eru

far, be located - cō more

far - cō, cōne

farm - pala

farthest one - cōnana

fast - walale

fat, to be - taulkawa

fat (noun) - lolos

Fataluku - Fataluku

father - pāl

fear - arahe, mahane

feather - olo le’u

feces - aku

feed - fāne, ufane

feel - senti
feeling - ica
female - fanar
fiancé - tunangan
file (verb) - limare, kaihe
file (noun) - limar
finding - acin
finger - tana fukar
finish - sai
fire - aca
firm - asise, ākina
first, to be - emere
first one - ihemerana
fish (vb.) - naile
fish (noun) - api
fishing, to go (with a rod and reel) - api naile
fishing pole - api nail
five - lime
fix - acak pa’i
flat - nēre
flat area - nērana
flatland - puicina
flick - wetike
flooded - fāte
flower - cipicipi
fly (insect) - upur
fly (vb.) - ipile
flying - ipilana, ketile
fog - hau
following - nerenu
follow - naten, nere, nerenere nāte
food - macen, macemacen
for - ahu, hau
for (duration) - ulan
forbid - pacu
force - paksat
forehead - cipito
foreigner - mālai
forest - irin
fork - susuka
fountain - īra ina
four - fāte
four at a time - fāfāte
fourth - īfāt
friend - kolega, lān
friends - lanura
frog - cīla
front of - fanu na’e
froth - ufutana
fruit - manamana
fry - rakase
full - polu
fun - rame
fur - le’u
future, be in the future - kolis

gamble - taru
gambling - tarunu
gecko - lika
gentleman - leman
girlfriend ceren
give - aci cene
give birth - wâle

go back and forth - fufulehe, liare fulehe
go (intrans.) - la’a
go to (trans.) - mara
goat - pipi
God hocawa
good - rau
good-looking - tahine
government - gowerno
grandfather - cål nami, pōpō nami
grandmother - cål tupur, pōpō tupur
grandparent - cål, pōpō
grass - foeh
grasshopper - silaki
great-grandfather - papu nami
great-grandmother - papu tupur
great-grandparent - papu
greed - ulu’ulu
green - lumure, lumulumure, u’ureke
greetings - itarap’an
grow - ereke, kokote
guava - goyabas
guava tree - goyabas ara
gun - fôt
hair - ca’uwari
hammer - marteru
hand - tana
happy - ica raurau
have - mine
head - ca’utapun
head skin - ca’uwele
hear - wari
heart - panak, uan
heavy - ci’ire, lôr
heavy - ci’irana
here - e na’e
hey - hei
hey buddy - hei kinam
hide - oroma’i
high - lalu, lalune
himself - ninau
hip - ulawarin
his - ihini
hit - alere
hold - ufale
hoe - lore
hole - kuru, lore
holy - tei
honest - jujur
hook out naile
horn - horu
horse - kuca
hot - timine
hour - oras
house - lē
house and hut - lē ho cu
how - teane
how many - tarupaha
how? - tewa’ane
hug - okolewe
hundred - rah
hungry - muhare
hunt - haware
hunting - hawarana
husband - eleh
hut - cū

I
ice - jelu
if - aitana, se
in front of fanu na’e
in order to - hinu’a, ta
in - mucu, mucune
injure - manu pa’i
injury - manu
insecurity - rapurapu
inside - laman
intestine - akumokor
into - mucupe
invite - undani
iron - mumina
island - pulau

J
jacket - jaket
Jaco - Jaco
Java - Jawa
jog - tifatifale
juice - waya
jump - louke
K
kick - maka, iti’ele, ti’ele
kill - uca
kill each other - nita uta, nita uca
killer - ulahuca
kindle well - masu cina
kindle - ā cene, tina
kiosk - keos
kiss - mu’e
kitchen - capur
knee - cul
knee cap - cul seisei
knife - hikar
know - hefe, naware
Koun - Koun

L
ladder - ke’er
landowner - mu’a hōcawa
language - lukun, lukulukun
late - terlambati
later - kolikolise
laugh - kēle, na’a kēle
laughter - kēlana
lawn - sepusepu
lazy - mautüle
leaf - hasa
leak - wāhe
left - wēlika
leg - jia
lend - impresta
liar, to be a - piripiri
lie (an untruth) - pirin
lie (tell an untruth) - piri
life - lauhana
light - haran
lightening cī
lightweight - wakahana
like what? - tewa’awa’ane
like - tutu, ica tutu
lime (citrus) - curuk
lime tree - curuk ara
lime, mineral - aur
line - api taru
line (for fishing) - nail taru
lip - o’opira
liquid - paya
little - serika
live - lauhe
located towards - hicipe
located - hici, hicine
log - pata, ete pata
tall - lōhai
long ago - ratan
look at - totototo
Lospalos - Lospala
loud - òruma lalaruma
louse - amin
love - ica tutun
lover - ceren
lung - sapun

M
mahu - pui, panleru
Makalero - Makalero
Makasa’e - Makasa’e
make feminine - tuputupur pa’i
male (of animals) - wahilan
man nami
mango - payah
mango tree - payah ara
many - toure
market - merkadu, pasar
marry - kawe
mattress - pêt
mature - acane
maybe - ait, aitula, ica’ini, ula
meaning - maksud

meat - leura
meet - fanuhene
melt - lau’e
mesquito - nikini
midday - miucia
milk - arap ami
mine - ahani
minute - menit
Monday - ihaneherana
money - lawan
monkey - lu’a
moon - uru
more - wasitali
morning - fatahara, na’unope
mortar - coicoihana
mother - mama
mother - nāl
mountain - apa
mouth - o’o
much - lāfane, pa’a
mud - hōk
muddy - hōke
muscle - fuhu
must - harus, tenke
mute - kolo

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N
name - nē, tamu
narrow - mālete
national - nasional
naughty - apa’apa pa’i
near - ita, itane, karune, mini more
nearest one - karunana
neck - manikete
necklace - manimani, payapayah
necklace - paya
nephew - moco nami
nephew (sister’s child) pa’in
nest - wari
never - aka ono
new - baru, miri, mirimiri
next to - minine
niece - moco tupur
niece (sister’s child) - pa’in
night - koune
nine - sīwa
nose - minik
not - aka
not exactly - napaniki
not exist - pali, upe
not hit - anete
not want - kelu
now - kar, karu’en
nowadays - orasen
O
o’clock - tuku
observation - toton
ocean - tahi
oil - mina, wuru
old - luka, rata
old (of people) - katuas
on top hi’ane
on - a’a, a’ane, hi’a, hi’ane
one at a time - ū’ūkani
one (numeral) - ūkani
one, a, an - uni
onion - lāhuna
only - hala
or - ana
orchard - oco
origin - fata
other - telira
outraged - mucu hufuhufute
outside - malu
outside, to go - malupe
over - acune
owl - tupukur
owner - hōcawa

P
paint - pinta
painting - pinta
palm nut - pī
palm tree - kakal
palm wine - tua
palm wine (distilled) - tua harak
palm wine (white) - tua pitin
papaya - mu’umālai
papaya tree - mu’umālai ara
paper (sheet) - sorot hasa
parents - nālpāl
park - parke
partner - haca
past (in time) - rohorohone
path - ia
pay - hi’are
pay repeatedly - hi’ahi’are
peanut - otemina
perfective marker - hai
person - ma’ar
pestle - coicoihana fuka
petroglyph - inikerekeke
photo - foto
pick - ke’ile
pig - pai
pineapple plant - cecemālai ara
pineapple - cecemālai, cecen
pl. marker - ere
place - aliwana
place on - a’a more
plane - awion
plant sp. - loro
plant (noun) - ara
plant (vb.) - utu’e
plantain - ajan mu’u
plantation - tuana, tūtūana
plate - ra’u
play the drums - tipal kakale
play - cicira’i
play (instrument) - uta
please - tini
poison for fish - ca’a
politeness particle - tu’u
pomegranate - rūmau
pomelo - sapu
portion - afarika, pacu
Portuguese - Portuges
possessive marker - ī
pot - puhu
potato - ilah makau
pound - tafa
pregnant - atu na’e
pretend to plant - utu’utu’e
pretty - fei
price - hira
priest - ma’ar tein
pumkin vine - erekana
punch - poki
punish - kastiku
pure - hi’aroun
push - posi
put in mucu cene

rat - cura
reach - ārohe
reachable - ukusina
read for fun - lēlēre
read - elere, ele’elere
reading - lērana
really - ewen
rebuild - rehabi
receive - semu
reciprocal pronoun - nita
red - mimireke
reddish - mimimimireke
reflexive marker - hin
reflexive pronoun - jen
rel. pronoun - ele
remove - muralaku
replace - a’a näte
retarded - meimeite
return - fūlehe
rice cake - katuba
rice (uncooked) - ale
rice (cooked) - ale macen, ale pohen
riches - riku
ride - hi’ape
right - tenen
ring - rukus
road - i’a, jämpata
roll (intrans.) - leru’e
roof - pu’ina
room - kuartu
root - larin, ete larin
rope - taru
rose - roja
rot - opose
rotten - oposana
rough - raparapake
round (thing) - tapun
rub - āseile
rude - opose
ruling class - ratu
run - helere, mohe, tifare

S
sad - ica kapare
saddle - tapalana
salt - asir
salt (vb.), add salt - asire
salvation - salwasaun
same - wa’ane, wa’awa’ane
sand - inik
save - salwa
scarce - he’e
scatter - eri
school - isikola
schoolhouse - isikola lē
scoop - hura, apure
scratch - kafur, kaure, kaukaure
second - ihec
see - aci, toto
seed - kafu
seek - anahe
seer - inahara
sell - pura
sell to - aci pura
send - manda la’a
separate - patin
separated - totana
seven - fitu
severe - kapare
share - pati
sharp - ha’ate
shine - pite
ship - lōyasu
shirt - faru
shiver - titiriri
shoes - japatu
shoot - tafa
short - kawa
shortly - ratarata
shoulder - cicika
show - mesene
sick - po’ote, po’opo’ote
side of saw - wāli’ara
sign - catanu
similar - wa’anе
sin - kaile
sinfulness - kailana
sing - kanta, waihoho
sip - ācimese
sister (older) - leren kaka, leren lāfai
sister (younger) - leren noko
sister-in-law (younger brother’s wife) - noko
tupur
sister - leren, mana
sit on - ā mire
sit on the edge - mini mire
sit - cuare, imire, mire
six - nēme
skin - wele, wele taru
skinniness - likalika
skinny - lika, hafa hala
sky - nēl
slap - paha
slashing - alah pala
slave - akan
sleep (vb.) - taya
sleep (noun) - tayan
slip - sosike
slither - soele
slow - teile, teiteile
small - ka’ukisa, ka’usila, moko
smile - nanakēle
smoke - aca tapin
smoke a cigarette - capaku ceve
smooth - hilahila, poru
snake - nana
snake species - cu’ale’u
so - para
soft - hilate, tomoke, tomotomoke
soggy - pōpoke
soil - mu’a
soil that is white - upu
sole - jia lepen
sometimes - icahici
song - kanta
soul - humār
spear - coro
spider - lapusa
spinach - rapu
spit - hufa
spoon - hūla
sprout - hapate
stand - nāte
star - ipinaka
start - komensa
steal - o’ose
step - lakaran
step on - hi’a ciele
stick on - palake
stick - ka’u, ete kete
still - ono
stir (thin liquids) - teku
stir (thick liquids) - koire
stone - ili, matar
stony area - matare
stop - hori
store - toko
story - lolon
straight - maize
stream - wēr
strong - forsa
stubborn - akare
stuck - he’e, ā he’e
stuck inside - mucu co’e, mucu he’e
student - esturante
study - istura
stupid - sasale
submit - mucu cene
suddenly - derepenti, fatatara
sun - wacu
sunrise - wacu hi’amoi
sunset - wacu isi
sweat - heru
sweep - ulure
sweet potato - ilah
sweet - lemesa
sweets - ropisaro
swim - palise
sword - hītu

T

table - meja
tadpole - ulun
tail - ulafuka
take - eme
take care - purupale
take off muralaku
taken care of - totonana
talk - luku, lukuluku, ta’a
tall - lōhai, lōlōhai
taro - kalah
tattooed - tatu
tea - sā
teach - fanawe
teacher - mestri
teaching - fanawana
tears - inawaya
tease - aca’acak pa’i
television - telewisaun
tell to - aci lolo
tell - lolo, aci ta’a
ten - ta’ane
tens - puluh
thanks - obrigadu
that (quotative) - katak
that (mesal) - iwi, iwini’i
that (distal) - foni, fonini’i
thatch - tuahasa
then (next) - entaun, iwi’itu
then (if . . . then) - nara
there - i na’e
thick - ucu’ete
thigh - katen
thin - kete, lepikasa
think - eceremu
this - e, en, eni’i
thought - eceremun
thousand - rehun
thread - anukai
thread - caruma
three at a time - utu’utu’e
three - utu’e
thresher - neru
throw - kale, pouke, morisa
thunderstorm - cī
tide - metī
tie - isile, isi’isile
tied - icile
tiger - tigri
time (instance) - lār
tired - kayare, ica ci’ire
tiredness - kayarana
today - waci
toes - jia fukar
together - horune
togetherness - horun
tomato - tomati
tomorrow - nope
tongue - ipil
tooth - wahin
top - hūfina
top, on - hi’ane
touch - oco, nā pale
tourist - turista
town - kota

toy - cicira’ini

toy house - lēlē moko

trap - hi’ili

tree sp. - ha’i

tree sp. - waru

tree - ete, ete ara

tribe - ratu

trip - wēteru

try - a’a pa’i

turn - larunate

turtle - ipiti

Tutuala - Tutuala

two - ece

two at a time - e’ece

U
ugly - kaparasi

umbrella - sumurelu

uncle - papanoko

uncle (father’s older brother) - pāl kaka

uncle (father’s sister’s husband) - pa’in matu

uncle (father’s younger brother) - pāl noko

uncle (mother’s brother) - tiu

uncle (mother’s older brother) pa’in

uncle (mother’s younger brother) - pa’in noko

under - u’a, u’ane

understand - komprende

understand - naware

urinate - irise

use - uja

used - matu

usually - ailaci, biasa

V
vegetable - esasa

very - tali, wasi

view - pemandana

W
wait - hīre

wake up - cure

walk - la’ala’a, ci’ele, pasiare, papasiare

wall - paki

wander - acu’acupe

want - eluhe, nā neluhe

wash (trans.) - pahale, wahu

water (vb.) ira’e

water drop - cupu

water drops - cupucupu

water for drinking - ira tutun

water - ira

water, salt - tahi ira
waterbuffalo - larin arapou
waterman - tahi wehe mocori
watermelon - sepu
wear - ulawere
weaving - ore
week - pasar
well - ranuranu
wet - iraira
west - wacu isi
what - ina
what's up? - ma'amoko
when - tarute, kuandu, wainhira
where - tena’e
which - tena, teni’it
while - i’an
whisper - makamakase
whistle - pari olioli
white - pitine, pitipitine
who? - uman
wife - jeu
win - manane

wind - pari
window - waihulai
wing - amir
witch - acar
with - apur, hor, horu
woman - tupur
work - siriwisi
worm - ifi
wounded - manun
write - kere, kerekere
writing - kerekerenana

Y
yea - elei
year - aja’ira, tahun
yell - kule
yellow - karase
yes - hoh
yesterday - rahine
yet - na’u
you - eiri, eri
yours - eheni
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