

A PHONETIC, PHONOLOGICAL, AND MORPHOSYNTACTIC ANALYSIS OF
THE MARA LANGUAGE

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ABSTRACT

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by Michelle J. Arden

This thesis presents a linguistic analysis of the Mara language, a Tibeto–Burman language spoken in northwest Myanmar and in neighboring districts of India. Data has been gathered through interviews with a native speaker. The analysis includes a full phonetic segment inventory of the dialect and a phonological analysis of contrastive sounds and contextual variants. Sound files embedded in the document illustrate the phonetic system. Mara’s distinctive phonetic features include the loss of word–final consonants, a set of voiceless sonorants, pre– and post– aspirated nasals, and lowered and unlowered vowel pairs. The morphosyntax of Mara pronominal words demonstrates a split–ergative case marking pattern. A deictic hierarchy of pronominal words accounts for variations in pronominal word presence and order.

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1. Introduction

This thesis presents a linguistic analysis of the Mara language, spoken in northwest Myanmar (Burma)¹ and in the neighboring Indian state of Mizoram. Mara is little-studied, particularly those dialects spoken in Myanmar. The Mara dialect described here is one of Myanmar; it is sometimes known as “Sabeu.” Among other Mara dialects of the region, Sabeu is at significant risk of disappearance due to Myanmar’s currently repressive regime. This study documents some of the distinguishing characteristics and sounds of the language, with the hope of encouraging further fieldwork in order to preserve knowledge about these endangered dialects of Mara.

The analysis sets forth a phonetic segment inventory of the language, a phonological analysis of contrastive sounds and contextual variants, and the morphosyntax of the Mara pronominal word system. Data has been gathered through a series of interviews with a native speaker of the language. The speaker’s knowledge of the written form of the language was used in certain cases to influence the interpretation of

Mara's phonetic, phonological, and morphosyntactic structure. The conventions of the International Phonetic Alphabet (IPA) are employed throughout; IPA is presented in the IPA Kiel font typeface (i.e., IPA Kiel: $\hat{a}ip^h\hat{e}ik^hit$) in order to clearly differentiate phonetic from non-phonetic representations. Sound files are embedded throughout the work in order to illustrate phonetic segments. If a sound file is included, the text of the associated IPA representation is shown in brown. When reading the electronic document using Adobe Reader version 6 or later, the sound file may be heard by moving the mouse or pointer over the brown IPA representation and clicking, e.g., $\hat{a}ip^h\hat{e}ik^hit$. Most sound files included were recorded in the SJSU Linguistics phonology lab under controlled conditions; a few were recorded in less controlled environments.

The subsequent section places the language in its physical context by locating Mara speakers in both India and Myanmar. Section 3 discusses published research on Mara. Section 4 discusses how this thesis adds to the body of published work on Mara and Tibeto-Burman

languages. Section 5 presents a phonetic inventory of consonants, vowels, and tones, concluding with a comparison with Lorrain's phonetic inventory. Section 6 continues with a description of Mara's phonology, discussing contrastive sounds and contextual variants. Section 7 concludes the presentation of data with a morphosyntactic analysis of Mara's system of pronominal words within intransitive and transitive sentence structures. A final section summarizes the findings and touches upon potential new areas of research for Mara.

Abbreviations, end-notes, and a bibliography precede the appendices. Appendices 1 through 3 comprise IPA consonantal and vowel phonetic inventories and a sound distribution table based on an elicited Swadesh vocabulary list². Appendix 4 contains detailed data on formant levels for the vowel pairs discussed in Section 5.2.1. Appendix 5 lists the sound files included with this study. Appendix 6 documents the Human Subject Institutional Review Board approval for the use of the data gathered from the Mara consultant.

The Mara language did not possess a written form until the late 19th century, when, arriving in 1884, missionary Rev. Reginald Arthur Lorrain (1951) and Rev. Fred W. Savidge (1908) documented the language and created a roughly phonetic transcription of Mara using the Roman alphabet. Although tonal, tones are generally not represented orthographically.

2. Distribution of Mara Speakers

Mara is spoken in the Mara Autonomous District of Mizoram, India, sometimes referred to as *East Maraland*, and in the south Haka sub-Division of the Chin Hills of Myanmar (Zohra, 2008), sometimes referred to as *West Maraland*. As of the 1998 census, the population of East Maraland was 47,984 (Zohra, 2008); that of West Maraland was 28,000 (Ngo Cho Le, 2006)³. The people refer to themselves and their language as *Mara*; the exonym *Lakher* for the Mara people and language is from Lushei, a neighboring Tibeto-Burman language; it is often used to refer to Mara in published research. (Lehman (1970) states that the source of the name *Lakher* is the word for a Mara-manufactured cotton gin that was popular in neighboring language communities.) Entering Mara territory from the Lushei direction, the British adopted the denomination *Lahker* during the course of the area's British occupation starting in 1886 (Lehman, 1970), as is evident by the use of the denomination in the seminal works on Mara by Englishmen Lorrain (1951), Savidge (1908), and Parry (1932).

The Mara language is now an official language of the Indian Mara Autonomous District and is taught in primary and middle schools; it has no such status in Myanmar and would be considered a language under threat of disappearance in that region. The maps in Figures 1, 2, and 3 show the areas of India and Myanmar where Mara is spoken (Vawkaitha, 2008; Zohra, 2008). The roughly interlocking boundaries between the Indian and Burmese political boundaries in Figures 2 and 3 indicate how the two regions connect.

In Figure 3, the East Maraland region of Myanmar, the village of Ngephepi can be seen near the western boundary of the Sahmo Tlâh or Sahmo township. Ngephepi is the native village of the consultant interviewed for this thesis.

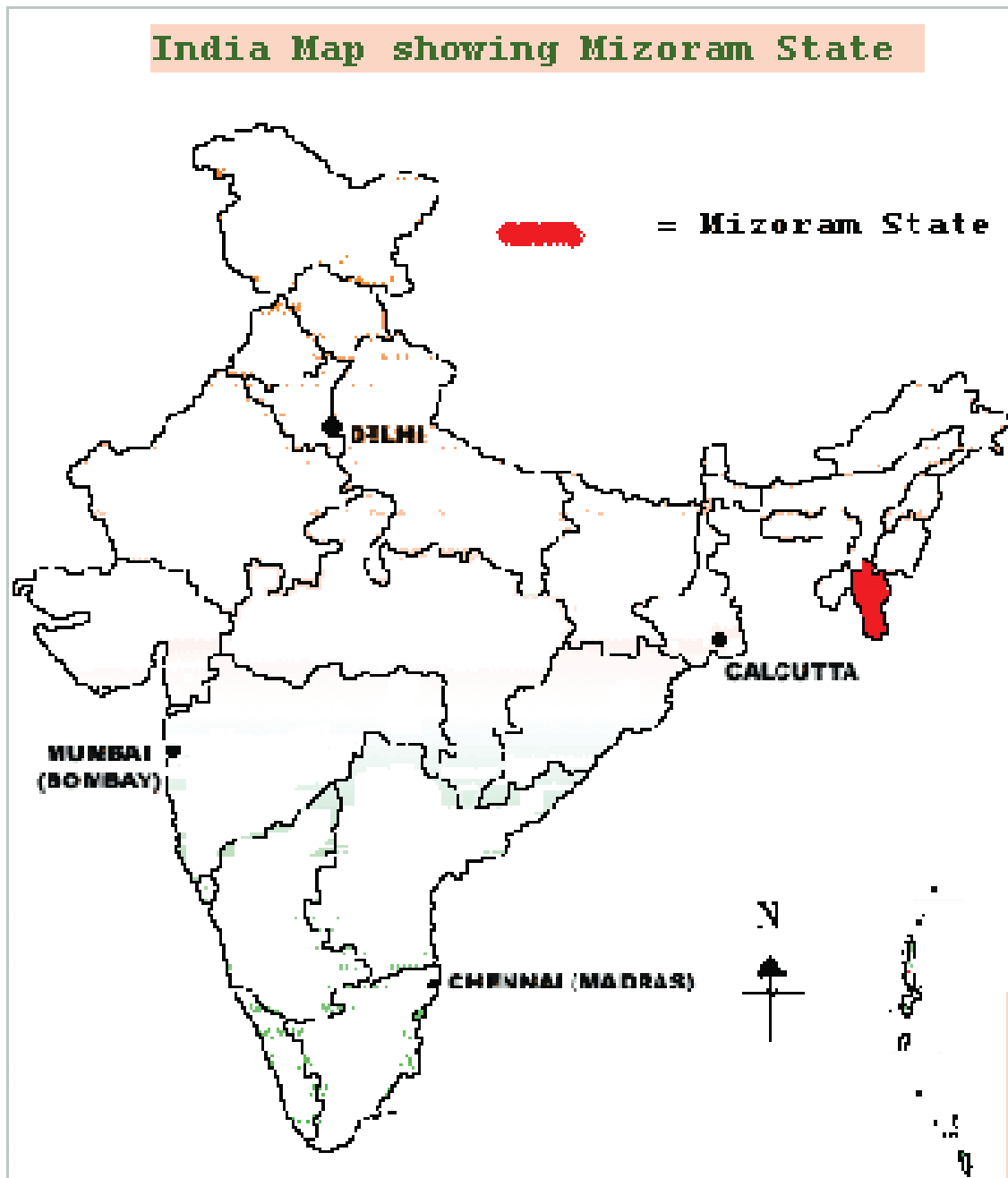


Figure 1. India Map showing the Indian Mizoram State highlighted in red. Mara is spoken in the Mara Autonomous District of Mizoram; see Figure 2 for additional detail.

3. Research on Mara

3.1. Language Classification

Ethnologue (Gordon, 2005) classifies Mara according to the hierarchy of Tibeto-Burman language families presented in Table 1, placing Mara in the group of Southern Chin languages. In some contradiction, however, Ethnologue also adds that Mara is a subgroup of Lushei, one of the Central Chin languages. (Note: Burmese Mara speakers are geographically located between the central and southern areas.)

Table 1: *Ethnologue's Linguistic Hierarchy for Mara*

Sino-Tibetan
 Tibeto-Burman
 Kuki-Chin-Naga
 Kuki-Chin
 Southern Chin
 Mara
 Central Chin
 Chin, Haka (Lai)
 Mizo (Lushei)

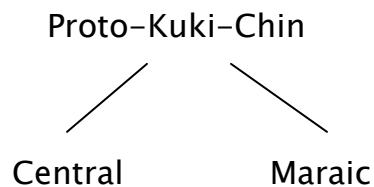
Lehman (1970) also concludes a Central Chin grouping for Mara through his comparison of archaic Haka to Mara as well as a comparison

of Haka and Mara ritual ceremony and language. Despite significant phonetic differences between Haka and Mara today, Lehman asserts the discovery of data indicating that a recent Haka sound shift has caused these differences, and that earlier Haka dialects and Mara were mutually intelligible. Ceremonial commonalities buttress his conclusion linking Haka and Mara in a shared linguistic and cultural history.

However, analysis of more recent data (VanBik, 2009)⁴ rebuts the categorization of Mara as a Central Chin language, placing it in a separate group, similarly to Ethnologue with its Southern Chin designation.

VanBik presents phonological evidence suggesting that the Maraic group of languages is a sister group to the Central Chin languages in his Proto-Kuki-Chin hierarchy, shown below in Table 2.

Table 2: *(A Minimal Subset of) VanBik's Schema for Proto-Kuki-Chin*



VanBik's data indicates that historic changes in the Maraic group of languages render them clearly distinct from Central Chin languages such as Haka (Lai) or Mizo (Lushei).

3.2. Seminal Mara Research

The first and most extensive research as yet published on the Mara language was performed by English missionaries Lorrain (1951) and Savidge (1908) during their work for the Baptist Missionary Society from the late 1800's until Lorrain's death in 1944. Since their time, no researcher has published as thorough an analysis of any Mara dialect. Contemporary researchers, among them VanBik (2009), Dryer (2008a), Bedell (2004), Van Driem (1993), as well as other earlier scholars, rely substantially on the linguistic foundation established by Lorrain and Savidge.

Both missionaries were originally posted in the Indian Lushei hills west of West Maraland, first in Aijal (now Aizwal), then in Lungleh (Lorrain, 1934); the predominant language spoken there was Lushei. In 1907, Lorrain (1905) subsequently moved to the area he describes as

Sherkor in West Maraland, which appears to be close to present-day N. Saiko in the map in Figure 2. Although published at very different times, Lorrain's and Savidge's grammars include a large amount of overlapping material. It is probable that the bulk of this published work was developed jointly when both men were teaching in the Lushei Hills between 1884 and 1905. The authors include very similar inventories of sounds, described by their closest English analogies, and almost identical orthography. Lorrain very briefly describes the Mara tri-tonal system but many of his tonal examples are incorrect.⁵

These bibliographic and geographic details are cited in order to stress that these early researchers investigated Mara speakers near or in West Maraland, the Indian region of Mara speakers, rather than East Maraland, the Chin hills of Myanmar. Parry (1932) first classified five Mara dialects: Tlongsai, Zeuhnang, Hawthai, Sabeu, and Lushei (Parry, 1932:503). Tlongsai is the dialect he identifies as having been documented by Lorrain and Savidge. The consultant used as the primary source of data for this paper speaks a dialect he calls *ɲjãp^hjà*, named

after his village Ngephepi. This dialect is more formally known as Sabeu (Parry, 1932:503), Fàbàu (Löffler, 2004:66), or Saby (Lorrain, 1951, cited in Löffler, 2004:65). The nomenclature Sabeu will be used here. Among the dialects described by Parry, Sabeu is alone in including the voiceless labiodental fricative *f* in its phonetic inventory.

While Lorrain and Savidge's work on Mara Tlongsai is used here as an important reference, some of their research is not relevant to the study of the Mara Sabeu dialect. Parry (1932) provides a short vocabulary list comparing the five Mara dialects; lexical differences among them are significant. Löffler (2004) contrasts the phonological evolution of Tlongsai and Sabeu, showing how the sounds of these dialects have diverged. Morphosyntactic differences are also evident between the speech of this study's consultant and the Lorrain and Savidge grammars.

3.3. Contemporary Phonological and Phonetic Research

Most recent phonological research on Mara has been done with the primary objective of reconstructing ancestral Kuki-Chin or Tibeto-Burman languages. VanBik (2009) does an extensive analysis of twelve

Chin and Mara languages in order to track the lineage of the language family subgroups and their Proto-Kuki-Chin ancestry. VanBik's investigation of the Mara language references data gathered by Luce during his tour of Chin Hills in 1954 (Luce, 1985, cited in VanBik, 2009), and fieldwork performed with a native Mara speaker in 2001 (VanBik, 2009:51). Nonetheless, although his primary objective was historical reconstruction, VanBik makes observations on Mara phonetics and phonology that are highly relevant to current-day Mara.

Matisoff and VanBik's tonal annotations (n.d., unpublished) to Lorrain's dictionary (1951) are among the few such annotations; their annotated dictionary also includes a brief phonological inventory. Löffler refers to another tonally annotated Lorrain dictionary in his references (Khawlhing, A., n.d., cited in Löffler, 2004:87). With a few exceptions, Mara orthography does not specify tones.

Löffler (2004, 2002) provides a critique of Lorrain's and Savidge's orthographic representations of Mara vowels and introduces a revised system of representation that he feels more accurately represents its

vowel sounds. This system is, unfortunately, not expressed in IPA, and is difficult to follow. He then proceeds to discuss a possible partial reconstruction of a Proto–Mara language using comparisons between the Mara Lushai and Sabeu dialects and the Central Chin language Lai. Löffler’s objective is, however, the discovery of a proto–Mara language from which Sabeu and other dialects derive rather than a phonological analysis such as that presented here.

3.4. Morphosyntax

While Lorrain and Savidge remain the most comprehensive morphosyntactic sources of information on Mara, more recent work has built upon their grammatical foundation. Dryer (2008a) reviews word order patterns in Tibeto–Burman VO (verb–object) and OV (object–verb) languages, examining the word order features of noun–adjective, relative clause and noun, noun–demonstrative, numeral–noun, degree and adjective, and negative and verb. Mara is among the languages he examines; an interesting finding is that Mara is uncommon in splitting its demonstratives in a DemNDem structure (Dryer, 2008a:42), as does the

Central Chin language Mizo (Lushei), perhaps supporting an argument for their common grouping. Dryer does not discuss the morphosyntactic structures reviewed here, but he does provide a valuable syntactic taxonomy of pronominal affixes (Dryer, 2008b), which informs the terminology used in this study when discussing the Mara pronominal system. Although Dryer (2008a) is among the more recent of the references cited in this study, he still depends upon Lorrain (1951) and Savidge (1908) as his primary data sources for Mara word order features.

In an analysis of Proto-Tibeto-Burman verbal agreement systems, Van Driem (1993) summarizes Mara particle (here termed “pronominal word”) agreement systems described by Lorrain (1951), Savidge (1908), and Weidert (1985). In an earlier analysis of Proto-Tibeto-Burman languages, DeLancey (1989) also references Weidert for his conclusion that the Mara verbal agreement paradigm reflects the onset of a subject-object model typical for Kuki-Chin languages. Bedell (2004) briefly reviews intransitive and transitive pronominal words in the summary of a conference presentation. The present study expands upon these

previous works by including a full matrix of pronouns, pronominal words, and an extensive list of sentence structures with required and optional elements.

A morphological analysis of the pronominal words in the current data is here compared with Weidert's (1985) morphemic analysis of these same words. While some individual morphemes do have independent consistent meaning, too many morphological and phonological exceptions are present to make a case, as Weidert does, for the semantic consistency of these morphemes.

As a phenomenon, deixis has been extensively explored in Tibeto-Burman languages. It may be defined as "the pointing or specifying function of some words (as definite articles and demonstrative pronouns) whose denotation changes from one discourse to another" (Merriam-Webster, 2009). Readers will be familiar with the use of "this", "that", "I", "you" as common deictic forms in English. Delancey (1985) and Soe (1994) discuss the deictic use of verbal auxiliaries in a number of Tibeto-Burman language families in order to add a directive, aspectual,

or type of motion sense to a main verb. Beckwith (1992), surveying deictic class marking in Tibetan and Burmese, cites DeLancey's concept of *pronominalization* whereby "pronominal affixes on the verb refer to animate arguments irrespective of syntactic functions; when two arguments are involved, a hierarchy rule is invoked" (DeLancey, 1989, cited in Beckwith, 1992:1). In order to account for some of the syntactic complexity of the Mara pronominal system, this study proposes a limited deictic hierarchy of pronominal words motivating this syntax, based on the person of the sentence participants rather than their roles as agent or object.

4. New Observations

This thesis seeks to add to the published research on Mara in the following ways. First, the work is based on the Mara Sabeu dialect from West Maraland; other than VanBik (2009), Löffler (2004), and Parry (1932), published research has concentrated on the East Maraland dialects explored by Lorrain and Savidge. A proposed phonetic inventory for Lorrain, together with the inventory composed for this work, will serve others who seek to compare Sabeu with other Mara dialects.

A phonetic segment inventory documents the sounds of the language, supported by waveforms, spectrograms, and embedded sound files; no comparable inventory has been published elsewhere. Discussion of the lowered/unlowered vowel pair system and the voiceless central approximant are also distinctive to this study. VanBik (2009) and Löffler (2004, 2003) have explored the phonology of Mara with a view towards understanding Proto-Kuki-Chin, but neither focuses narrowly on Mara's contrastive sounds and contextual variants. As mentioned above, several authors have reviewed Mara's pronominal word system, based on the

data provided by Lorrain's and Savidge's research. However, until now, a comprehensive inventory of pronominal words and their combinations, together with examples, has remained unpublished. This thesis attempts to fill these gaps.

5. Phonetic Inventory

This section reviews Mara's phonetic segments and discusses salient features of the language. Recorded examples of distinctive sounds are included as embedded sound files. The primary purpose of this section is to set forth the language's phonetic inventory. Section 6 discusses the evidence for Mara's contrastive sounds and contextual variants.

Table 3 and Figure 4 give Mara's inventory of consonants, vowels and tones. Distinctive in the diachronic loss of non-glottal word-final consonants, Mara has post-aspirated obstruents, pre- and post-aspirated nasals, a set of voiceless sonorants, and a primarily low-mid-high three-tone system. A broad spectrum of back vowels complements a cluster of front and central close and close-mid vowels. Diphthongs reflect a pattern of movement towards front-close and back-close. Unusually, Mara has a contrastive lowered rounded $\underset{\cdot}{u}$, a contrastive lowered spread-lip $\underset{\cdot}{i}$ and a contrastive lowered spread-lip $\underset{\cdot}{\alpha}$, in addition to unlowered instantiations of these vowels.

Table 3: *Mara Phonetic Inventory*

	Bilabial	Labio dental	Dental	Alveolar	Alveo Palatal	Palatal	Velar	Uvular	Glottal
Plosive	p p ^h b		t̪ ^h t̪ t̪ ^h t̪ d				k k ^h	q q ^h	ʔ
Nasal	m m ^h hm		n n ^h hn				ŋ		
Trill			r r̥						
Tap or Flap									
Fricative		f v		s z	ç ʒ				h
Affricate					tç tç ^h dz				
Lateral fricative									
Approximant	w			ɹ		j			
Lateral approximant				l l̥					

5.1. Consonants

This section describes Mara’s inventory of consonants, considering, in turn, glottal stops, obstruents, nasals, trills, and approximants, together with their qualities of aspiration. With the exception of the glottal stop, consonants are absent in word-final position. Segmental contrast for these consonants is discussed in Section 6.

5.1.1. Glottal stops

Mara glottal stops differ from other stops in their extreme prevalence and their restriction to word-final position. Glottal stops can, however, occur as onsets as a result of morphological combinations. Examining such an onset best illustrates the characteristics of this stop since a transition from the stop into the following vowel can be seen in addition to a vowel-stop transition. The recording in (1) and Figure 5 show the Mara word “kheita-e”: a combination of two morphemes, where a glottal stop is present at the morphemic boundary. The waveform in Figure 5 shows an abrupt drop in amplitude during the glottal stop’s articulation, together with a lowered periodicity. During that same

timeframe the spectrogram's lighter vertical bars demonstrate a drop in amplitude; the increase in bar separation suggests a frequency change. Since the position of the articulators is not altered when the stop is made at the glottis, the shape of the vocal tract is unchanged, and hence there is no formant movement out of or into the two adjoining vowels (Olive et al., 1993). (A reminder: If reading the electronic document on a computer, moving the mouse or pointer over the brown IPA representation of "kheita-e" below and clicking will cause the sound recording to be played in a default media player.)

1) how k^hèitāʔé

The lack of formant movement during the glottal stop, shown by the spectrogram in Figure 5, can be compared with the adjoining voiceless alveolar stop, where the second formant F2 moves up into the α as the t is released, marking an alveolar articulation.

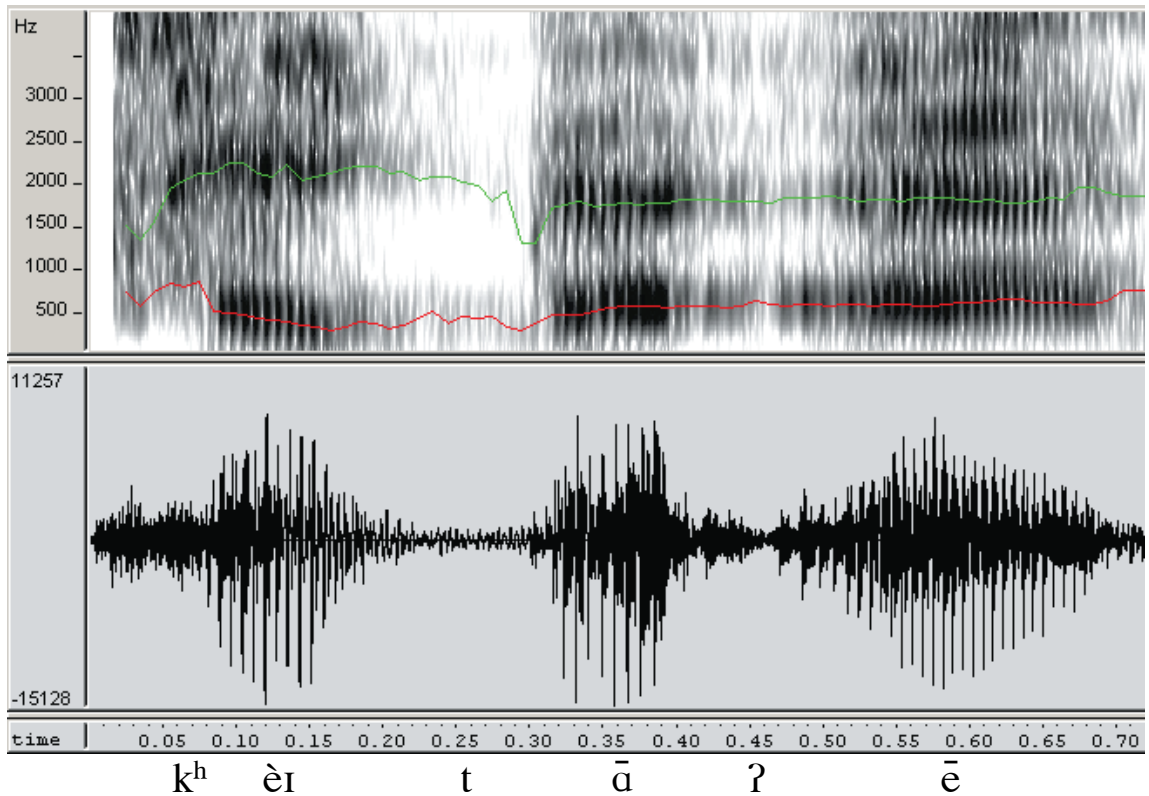


Figure 5. Waveform and spectrogram of glottal stop onset. The waveform's drop in amplitude and lowered periodicity signal the presence of the glottal stop. The red line in the spectrogram indicates F1, the green F2. The glottal stop is characterized by a lack of formant movement during its articulation.

5.1.2. *Obstruents: stops, fricatives, affricates*

Mara includes both voiced and voiceless realizations of obstruents; an obstruent inventory is found below in Table 4. Bilabial and alveolar plosives, labiodental and alveolar fricatives, and alveopalatal fricatives all contain voiced and voiceless pairs. Velar and uvular stops are voiceless only. The lack of voiced back obstruents is not surprising since it is difficult to maintain voicing due to the small volume of air available to vibrate the glottal folds behind the oral occlusion.

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Table 4: *Phonetic Inventory of Mara Obstruents*

	Bilabial	Labio dental	Dental	Alveolar	Post alveolar	Alveo Palatal	Velar	Uvular	Glottal
Plosive	p p ^h b		t ^h t	t ^h t d			k k ^h	q q ^h	ʔ
Fricative		f v		s z		ç ʒ			h
Affricate						tç tç ^h dz			

Section 6.7 presents supporting evidence that while dentalization is common, it is not contrastive.

5.1.3. Aspiration: plosives and affricates

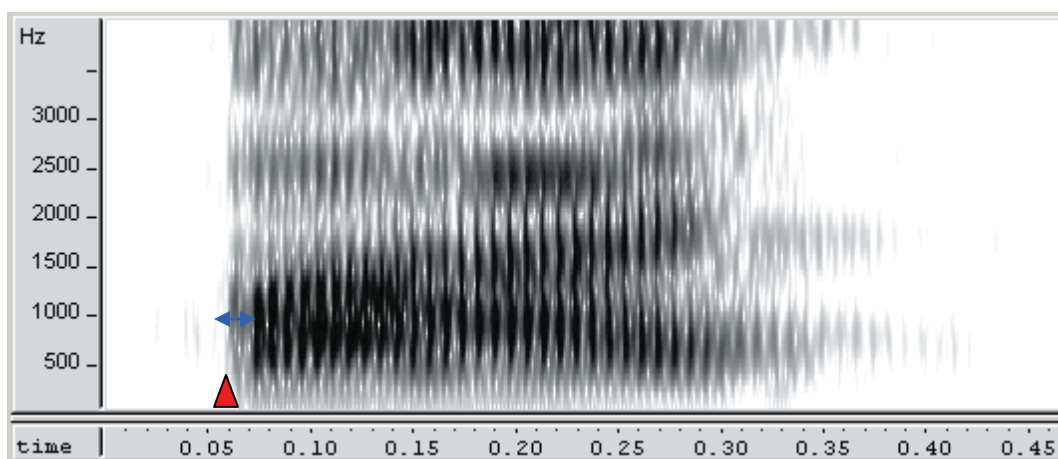
All voiceless plosives and affricates present in the language occur contrastively in both aspirated and unaspirated forms. Examples (2–5) give IPA transcriptions and associated recordings.

2) Labial plosive – unaspirated and aspirated

pipe p^hai

brush off p^hai

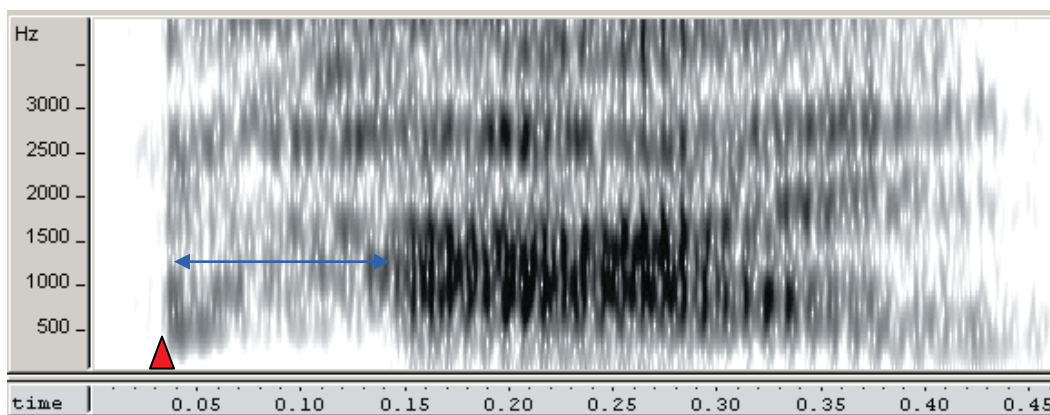
Spectrograms in Figures 6 and 7 show the stop burst for each of the labial plosives. Aspiration of the second plosive is illustrated by the noise energy following the stop burst; its dispersed pattern of noise distribution is [h]–like (Kent & Read, 1992).



p

áɪ

Figure 6. Spectrogram of unaspirated labial. The red triangle indicates the stop burst, the blue arrow the period of articulation of the stop. The onset of the vowel is almost immediate after the stop.



p^h

áɪ

Figure 7. Spectrogram of aspirated labial. The red triangle indicates the stop burst, the blue arrow the period of aspiration prior to the voiced vowel. During aspiration, dispersed noise energy somewhat like an [h] is evident.

3) Velar plosive – unaspirated and aspirated

hand k̄uʔ

when kʰáʔitáʔé

4) Uvular plosive – unaspirated and aspirated

throw āqá

bitter áqʰɿ

5) Alveopalatal affricate – unaspirated and aspirated

cold áʦ̣̟̟kwā

bad áʦ̣̟̟ʰpá

5.1.4. Nasals: pre-, post- and unaspirated

Table 5: *Phonetic Inventory of Mara Nasals*

	Bilabial	Alveolar	Palatal	Velar
Nasals	m m ^h hm	n n ^h hn		ŋ

Table 5 gives the phonetic inventory of Mara’s bilabial, alveolar, and velar nasals. The bilabial and alveolar nasals have three different realizations: unaspirated, pre-aspirated, and post-aspirated. Section 6 discusses evidence for the alternation of the two aspirated forms based

on word-initial or word-medial position; the examples given in (6) and (7) also support such a conclusion.

6) Bilabial nasal – pre- and post-aspirated, word- initial and word-medial

blow **hmɛúʔ**

I blow **ēm^hɛúʔ**

The aspiration in m^h tends to be murmured.

7) Alveolar nasal – pre- and post-aspirated, word- initial and word-medial

nose **hn̄p̄l̄s̄ū**

near **ān^hj̄ɛ̄p̄āʔ**

The velar nasal ŋ occurs both word-initially and word-medially, but is never aspirated. (Researchers do not agree on the existence of velar nasal aspiration in Mara: Löffler (2002) asserts its absence; Savidge (1908) includes velar nasal aspiration in his sound inventory, but with no examples. Matisoff & VanBik (n.d., unpublished) similarly include hŋ in their phonological inventory of onsets, but cite no examples.)

Mara's pre-aspiration of word-initial nasals and post-aspiration of word-medial nasals has a phonetic rationale. In languages where there is a series of voiceless nasals, the timing of aspiration and voicing is staggered, otherwise it would be very difficult to distinguish one nasal from another. Most languages have place of articulation contrast among nasals, and if aspirated, they are usually pre-aspirated. In the case where nasals are pre-aspirated word-initially, as in Mara, voicing is more effective following the word-initial nasal because there is no preceding vowel (hnV): modally-voiced formant transitions into the following vowel from the word-initial nasal help distinguish the place of nasal articulation. The medial nasal can be post-aspirated since there are formant transitions into the nasal from the preceding vowel (Vnh) that provide additional clues as to the place of articulation (Silverman, 1996). Silverman adds that murmur is often found among these post-aspirated nasals ("post-murmured"), resulting in breathy voicing.

Figures 8 and 9, spectrograms for "nose" and "near", show aspiration preceding the word-initial nasal and following the word-

medial nasal. Pre-nasal aspiration is evident in “nose” while absent in post-nasally aspirated “near.”

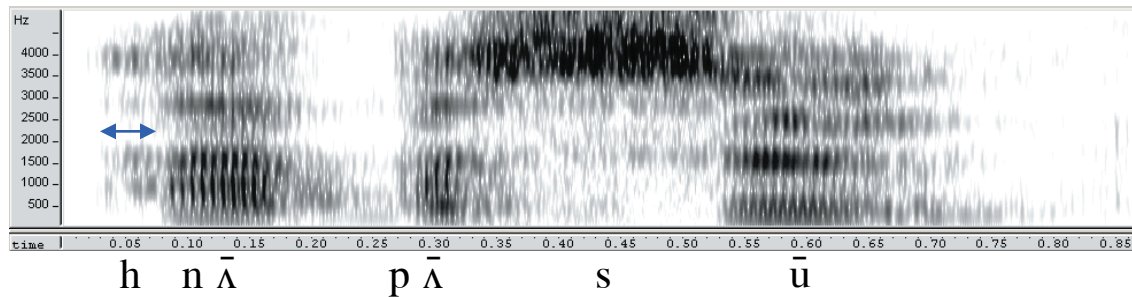


Figure 8. Spectrogram of pre-aspirated nasal. The blue arrow indicates the period of aspiration; noise energy is evident.

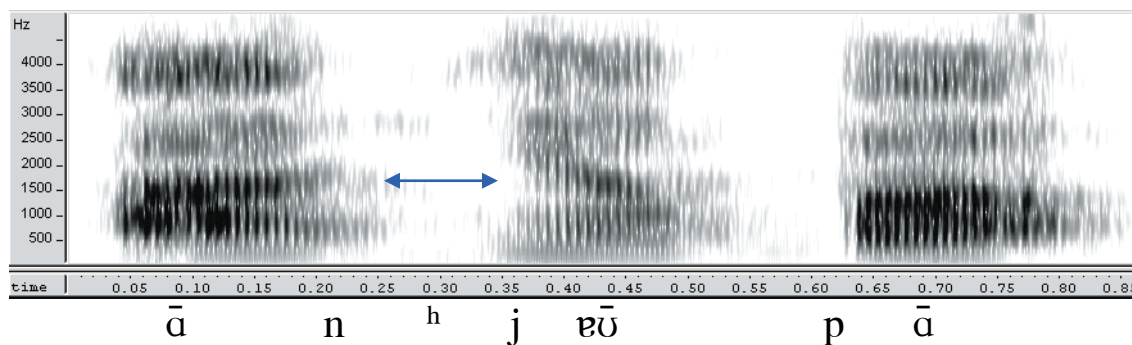


Figure 9. Spectrogram of post-aspirated nasal. The blue arrow indicates the period of time immediately following the articulation of the nasal. The relative absence of noise energy in the area indicated contrasts with the pre-aspiration shown in Figure 9 above.

Ladefoged & Maddieson (1996) explore the contrast of voiceless nasals with voiced nasals, giving examples of Burmese, Mizo (another Central Chin language), and Angami, a Tibeto-Burman language spoken near East Maraland. They note that these voiceless nasals are produced

with an open glottis, and can also be called aspirated, rather than voiceless, particularly since voicing does tend to occur for some significant period of the oral closure.

5.1.5. Trills and non-palatal approximants

The inventory of Mara trills and approximants, shown in Table 6, includes an unusual set of voiceless sonorants: voiced and voiceless trills, voiced and voiceless lateral approximants, and a voiceless central approximant. (The palatal approximant is addressed in Section 5.1.6.)

Table 6: *Phonetic Inventory of Mara Trills and Approximants*

	Bilabial	Alveolar	Palatal
Trill		r ṛ	
Approximant	w	ɻ	j
Lateral approximant		l ḷ	

Examples (8–10) give examples and recordings of these trills and approximants.

8) Voiced and voiceless alveolar trills

dizzy	ῖῑῑ	pari
animal	ῑῑῑ	sahroh
other	ῑῑῑῑῑ	ahropa

9) Voiceless alveolar central approximant

green	ῑῑῑῑῑ	ahropa
-------	-------	--------

10) Voiced and voiceless lateral approximant

straight	ῑῑῑῑῑ	apalapa
round	ῑῑῑῑῑῑῑ	apahlopa

Minimal pairs “other” and “green” in (7) and (8) show the contrast between the voiceless alveolar trill and voiceless alveolar approximant.

This contrast is rare, and will be discussed further in Section 6.8.1.

Figures 10 through 14 give spectrograms and waveforms, where relevant, for these trills and approximants.

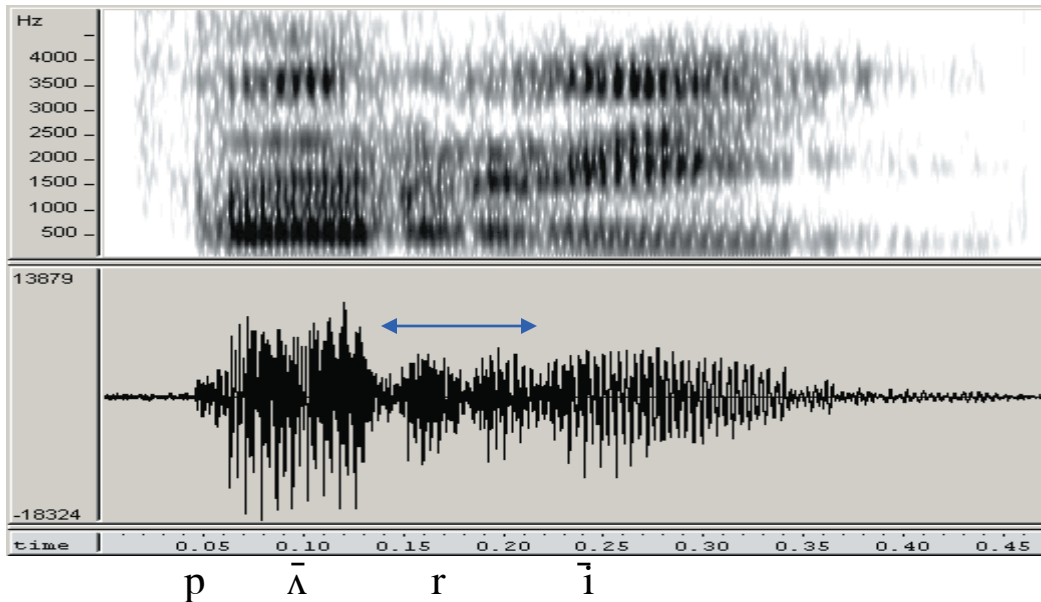


Figure 10. Spectrogram and waveform of voiced trill. The duration of the trill is shown by the blue arrow. A voicing bar during the trill's articulation is present, while the periodicity of the waveform during the trill indicates two periods of vocal fold vibration.

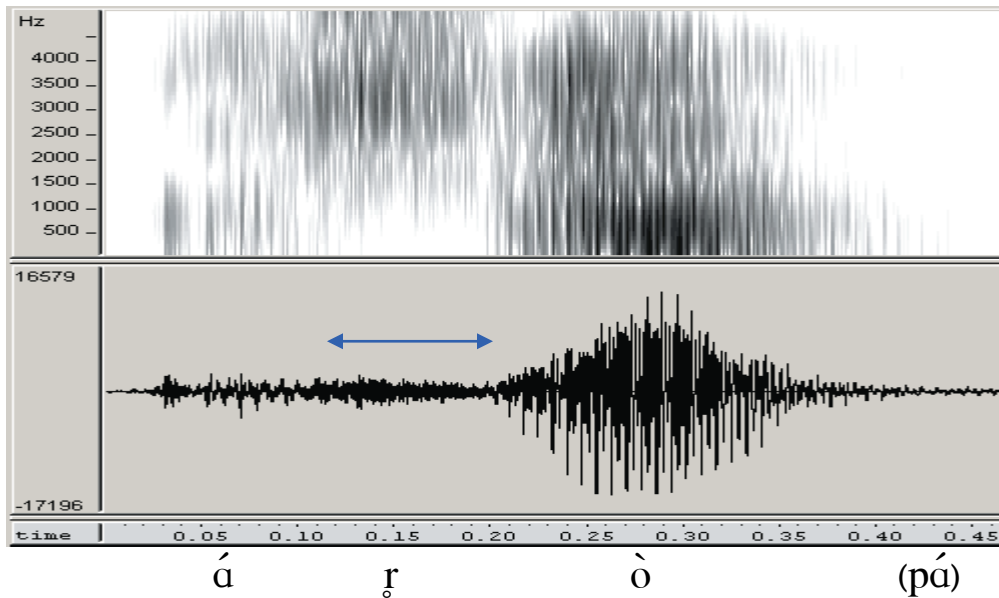


Figure 11. Spectrogram and waveform of voiceless trill (last syllable omitted). The duration of the trill is shown by the blue arrow. Voicing is absent; expected periodicity is also notably absent.

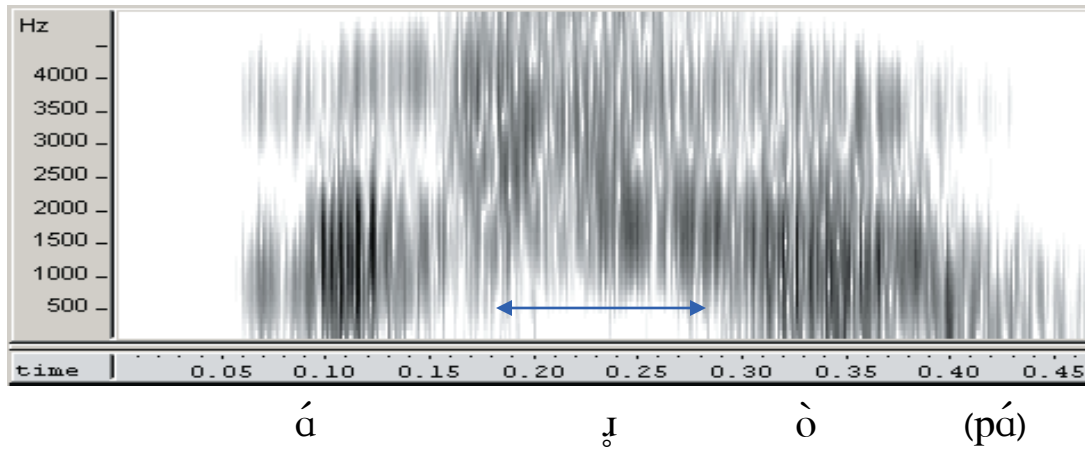


Figure 12. Spectrogram of voiceless central approximant (last syllable omitted).

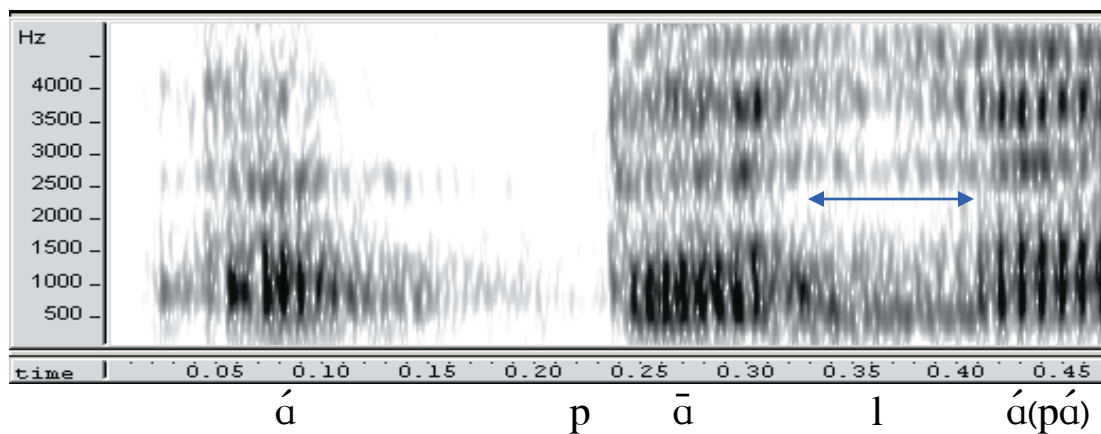


Figure 13. Spectrogram of voiced lateral approximant (last syllable omitted). The duration of the approximant is indicated by the blue arrow. A prominent voicing bar is present.

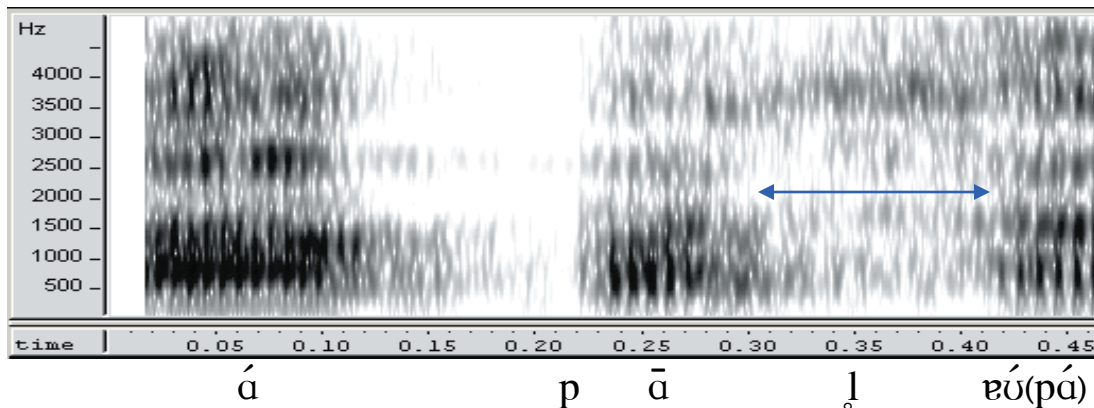


Figure 14. Spectrogram of voiceless lateral approximant (last syllable omitted). The duration of the approximant is indicated by the blue arrow.

Nasals and liquids differ with respect to the need to stagger voicing, as discussed previously. Since liquids have no contrast in place of articulation it is not crucial to maintain voicing during any part of that lateral to maintain contrast, unlike the more widely distributed nasals (Silverman, 1996).

The voiceless trill and the voiceless central approximant were perhaps the most challenging segments to both identify and differentiate in the Mara phonetic and phonological inventories. While clearly distinct from the voiced trill, the voiceless trill itself does not show the expected periodicity of a trill. The voiceless central approximant $\underset{\cdot}{\text{ɹ}}$ is absent in

other researchers' phonetic inventories of Mara, and it is not distinguished orthographically from the voiceless trill r̥ . There is no consistent differential formant behavior. However, in most articulations, these two segments are audibly differentiated. The voiceless trill sounds more "buzzy"; the voiceless approximant sounds more "breathy" or aspirated. The consultant was adamant that these two segments were contrastive.

Ladefoged and Maddieson (1996) note the similarities between rhotics and approximants, listing an apical alveolar voiceless approximant among the segments of Burmese. Could the voiceless central approximant j̥ perhaps be a rhotic approximant? Aperture shape and size or tongue position could play a role in determining what precisely defines and differentiates these two problematic segments. Precise measurement of the positions of the tongue and jaw during articulation through use of an articulograph could prove or disprove these theories; this is left to a further study.

5.1.6. Palatal approximant

The palatal approximant or semivowel *j* is also absent in other phonetic inventories for Mara (VanBik, 2007; Matisoff & VanBik, n.d.; Löffler, 2002; Lorrain, 1951; Savidge, 1908). Instead, as the palatal approximant is always followed by the low vowel *ɑ*, these researchers include the IPA vowel pair *iɑ* in their inventories or dictionaries.

However, either interpretation is valid; Silverman suggests that it is highly unlikely that any language has a minimal contrast between the semivowel and high front vowel in such sentences (Silverman, discussion, August 10, 2009). The perceived difference lies in their duration and degree of construction. Kent & Read (1992) state:

The glide *j* stands midway between the alveolar stop *d* and a transition from vowel *i* to another vowel. The formant patterns for the three utterances (*du*, *ju*, *iu*) are similar in their frequency extent but different in the time taken to accomplish the shift in frequency. The

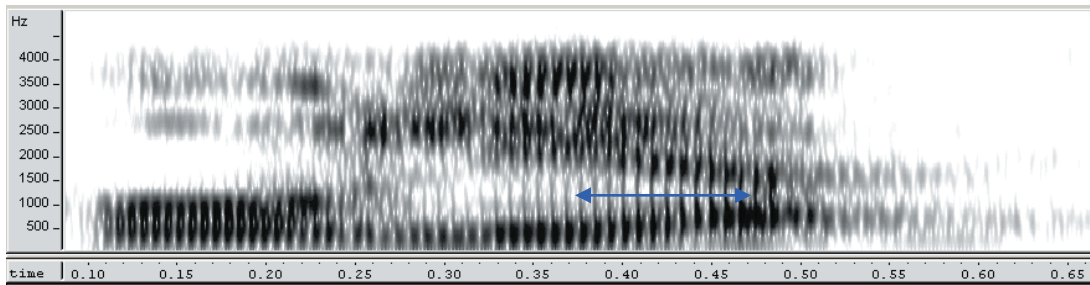
transition is briefest for stop d, longer for the glide j and longer yet for the vowel + vowel utterance (Kent & Read, 1992:137).

Listener perception experiments referenced by these authors indicate that when the length of the formant transition between the first phoneme and the subsequent vowel is less than 40–60 ms, a stop was perceived; when the length exceeds 40–60 ms but is less than 100–150 ms, a glide is perceived, and when it exceeds 100 ms, a vowel–vowel sequence is perceived. All of these perceptions were tempered by the speech rate (Liberman et al., 1956, cited in Kent & Read, 1992)

Figures 15 and 16 show formant transitions between the glide and the following vowel varying from 75 ms to 145 ms. An argument could thus be made for inclusion of either a glide–vowel pair or a vowel–vowel pair in the phonetic inventory. In the present study, these sounds are documented as palatal glide–vowel combinations rather than vowel–vowel combinations.

English IPA Mara orthography

11) there húl̩jā? haolia

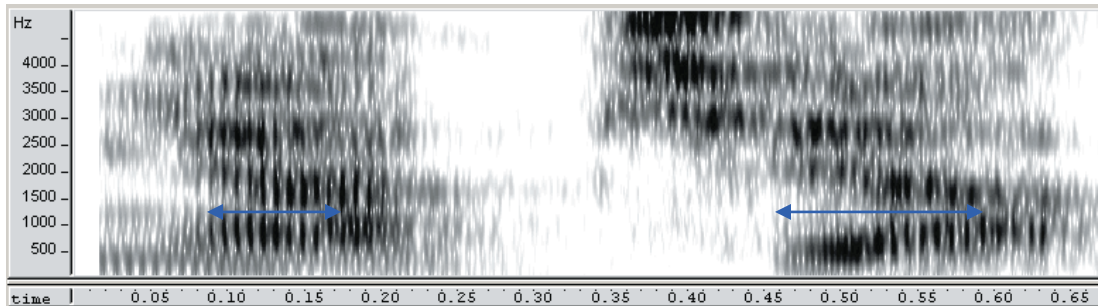


h ú l j ā

Figure 15. Glide–vowel formant transition period. The blue arrow marks the duration of the glide–vowel formant transition, approximately 100 ms. According to Kent and Read, this segment pair could thus be perceived either as a glide–vowel combination or a vowel–vowel combination.

English IPA Mara orthography

12) Ngiaphia (dialect) ŋjāp^hjā Ngiaphia



ŋ j ā p^h j ā

Figure 16. Glide–vowel formant transition period. The blue arrow marks the duration of the two glide–vowel formant transitions. The duration of the first is about 75 ms, which would generally be perceived as a glide–vowel transition; the duration of the second about 145 ms, more likely to be perceived as a vowel–vowel transition.

5.2. Vowels

The Mara vowel system, shown in Figure 17, is composed of a set of back vowels from open to close, and a more clustered set of front-center-close-mid set of vowels.

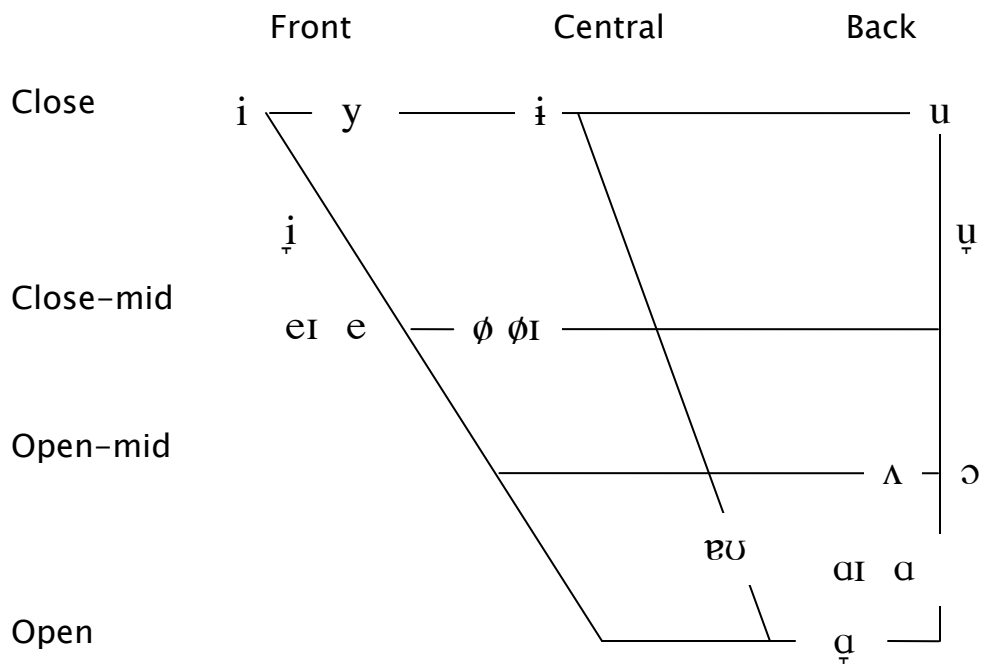


Figure 17. Mara vowel inventory

The sound distribution charts in Appendix 3 show that the back low vowel ɑ occurs in the most contexts, appearing before and after every consonant except the bilabial glide, which it follows. Diphthong ɐʊ

is the next most frequently occurring, and it appears that lowered $\underset{\cdot}{u}$ and $\underset{\cdot}{i}$ occur in the next highest variety of contexts.

5.2.1. Lowered and Unlowered Vowel Pairs

Mara has a lowered u , here represented as $\underset{\cdot}{u}$, a lowered i , here represented as $\underset{\cdot}{i}$, and a lowered $\underset{\cdot}{\alpha}$. Each pair exhibits differing relative degrees of lip rounding and movement. The high u is less rounded than its lower counterpart $\underset{\cdot}{u}$; the high i is less spread than its lower counterpart $\underset{\cdot}{i}$. (The lowered $\underset{\cdot}{i}$ was recognized as distinct from i and introduced into the writing system in the 1960–70s as orthographic “ie.”) $\underset{\cdot}{\alpha}$ is articulated with a wide–spread lip, consistent with the lip position for the lowered $\underset{\cdot}{i}$. Unlike α , lowered $\underset{\cdot}{\alpha}$ never varies with Λ in running speech; it is almost always pronounced with a high tone, and is represented orthographically with a circumflex marking. Lowered $\underset{\cdot}{\alpha}$ is never found word–initially; its typical duration is about fifty percent longer than α .

VanBik (2009) asserts that orthographic “u”, here presented as u , in is in fact an unrounded back vowel $\underset{\cdot}{\omega}$ and that orthographic “ao”, here

presented as u̥ , should be interpreted as the high back rounded vowel u . While u̥ is indeed more rounded than u , the latter vowel does exhibit distinct lip rounding. Formant characteristics of these vowels, examined below, support VanBik's assertion that u , or orthographic "u" is slightly more front than u̥ , orthographic "ao." Lorrain (1951) and Löffler (2002) call u̥ (or "â" in Mara orthography) a long vowel, or one differentiated from a only in length.

Examples of unlowered and lowered vowel pairs are shown below in (13), together with recordings and the associated Mara orthography.

	<u>English</u>	<u>IPA</u>	<u>Mara orthography</u>
13)	uncle	p̄āp̄ú	papao
	grandfather	p̄àp̄ū	papu
	medicine	çí	si
	slave	ş̄ı	sie
	salt	āl̄əʊ?	aloh
	not	tç̄áʋè?	châvei

Formant values were measured for ten values of each of these vowels; the detailed results are found in Appendix 3. In order to validate results, formant means were also generated with and without the vowels with the highest and lowest formant values, and then secondly without vowels with the highest standard deviations for formant values. No significant differences were found between these two means and the arithmetic mean. Table 7 shows the mean F1 and F2 formant values for all of the vowel pairs.

Table 7. *Mean Formant Values for Lowered/Unlowered Vowel Pairs*

	F1 (Hz)	F2 (Hz)
ɹ̥	377	848
u	326	1287
ĩ	329	1907
i	294	2127
ɹ̥	816	1478
ɑ	760	1382

Figure 18 shows the acoustic vowel space for all three vowel pairs by graphing F1 values against F2 values.

F1 is lower for u than ɹ̥, suggesting a longer throat cavity. u may therefore be considered to be higher than ɹ̥. F2 is higher for u than ɹ̥, indicating a shorter mouth cavity; this is consistent with the high degree of lip-rounding in the articulation of ɹ̥. u may therefore be considered more “front” than ɹ̥.

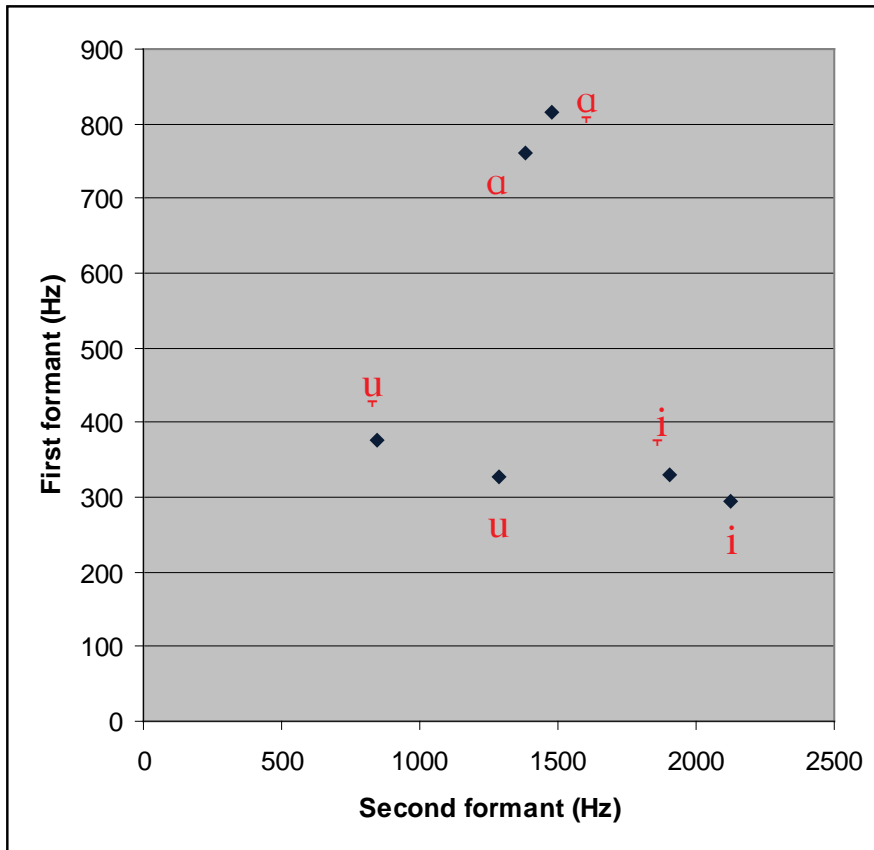


Figure 18. Formant values for lowered and unlowered vowel pairs. First and second formant values show higher F1 and lower F2 for lowered vowels.

Although the formant value differences are slighter for *i* and *ɪ*, the relative F1 and F2 values also suggest that *i* is both higher and more “front” than *ɪ*. The lip-spreading that is evident in the articulation of the lowered vowel is apparently not significant enough to cause raising of F2 relative to the higher vowel.

ɑ and ɔ̄ show a somewhat different pattern. F1 is higher for ɔ̄ similarly indicating that ɑ is the higher of the pair. However, unlike the other lowered vowels, the F2 for ɔ̄ is slightly higher than that for ɑ, probably as a consequence of lip-spreading resulting in a shorter mouth cavity. Unlike the other two pairs, the lowered ɔ̄ appears to be “fronter” than its higher counterpart ɑ.

5.3. Three-tone System

The Mara language is primarily a three-tone system, although some exceptions exist. Our speaker characterized the tones as a low-mid-high “do-re-mi” scale.

14) do re mi d̀ò rē mí

There is ample evidence that all three tones are contrastive. Despite the prevalence of this three-tone system, some exceptions were found with high-mid contour tones together with what seems to be an unusually long vowel. Our speaker indicated that these tones were

unusual in Mara words. Section 6.3 discusses the evidence for tonal contrast and examines these high–mid contour tones further.

5.4. Comparison with Lorrain's Inventory

Given the importance of Lorrain's work to the body of Mara research, it is potentially illuminating to compare this study's inventory with his.

The inventory discussed here contains 37 consonantal segments and 17 vowel segments, where four are diphthongs. Four tones are present, one a contour tone which exhibits some positional variation. By his count, Lorrain's inventory contains 13 consonants and 10 vowels, including diphthongs, and two "sounds" which do not correspond to letters. However, the actual number of his phonetic segments is considerably larger, since he indicates stop aspiration and devoicing of trills, nasals and approximants by following them with the symbol "h." His orthographic system also includes other recurring vowel combinations not described as diphthongs. Lorrain presents his phonetic inventory in descriptive form, for example (Lorrain, 1936:3):

- O o like ounɡ in the English word young only the ɲɡ is a nasal half sound and not the ɲɡ of the English full sound, this sound needs a lot of studying to pronounce it correctly,
- H h like h in the English word hope. When it is placed at the end of a syllable or word it denotes that the preceding word must be abruptly shortened.⁶

Table 8 and Figure 19 present IPA “interpretations” of Lorrain’s phonetic inventory based both on his textual descriptions and comparisons of his dictionary entries with similar words phonetically analyzed for this study. Although certainly imperfect, this posited inventory permits a gross comparison of this study’s phonetic inventory and Lorrain’s.

Further, in order to assist future researchers who may reference Lorrain’s widely-used orthographic representations, Table 9 juxtaposes his orthographic representations with the derived Lorrain phonetic inventory and this study’s inventory. Lorrain did not orthographically represent a number of phonemes presented in this study.

In his consonantal space, Lorrain does not recognize the differentiation between pre- and post-aspirated voiceless nasals, and

omits uvular stops, the voiced alveopalatal affricate, and central approximants. Almost all of these omissions are for segments that are contextual variants. Section 6.6 shows that pre- and post-aspirated voiceless nasals are in alternation. Sections 6.5.3 and 6.5.5 show that the uvular stops and the voiced alveopalatal affricate are conditioned by their environments. Lorrain does omit the voiceless central approximant, and Section 6.8.1 asserts that this segment is not a contextual variant, but the difficulties in describing this segment have already been discussed in Section 5.1.5. Section 5.1.6 discusses the similarities of the palatal approximant to the high front vowel *i*, accounting for its absence in Lorrain's inventory. The same equivalence can apply between the bilabial approximant *w* and the high back vowel *u*. Lorrain's lack of the voiceless labiodental fricative *f* can be attributed to the fact that his work dealt with the Tlongsai dialect of Mara, which does not contain this segment, rather than the Sabeu dialect, which does.

Relative to this study's inventory, Lorrain's vowel space omits vowels y , α , Λ , \dot{i} , and the diphthongs eI , αI , and $\emptyset I$. Although he does not include \dot{i} , eI , or αI in his phonetic inventory, he does represent them orthographically as vowel combinations as "ie", "ei", and "ai." Lorrain adds an $\dot{i}u$ diphthong (represented by him as "yu")⁷; Savidge (1908) represents this same segment very differently as "eo." Savidge's inventory omits y , but includes orthographic equivalents for segments α , Λ and ϵ . As discussed in Section 6.9.3, α and Λ are likely to be contextual variants, and the diphthong $\emptyset I$ monophthongizes in running speech.

Reconstructing an IPA equivalent from a written text is far from reliable. However, it appears that Lorrain's phonetic inventory is closer to a phonological inventory than a phonetic inventory.

Table 8: *Lorrain's Consonantal Inventory in IPA*

	Bilabial	Labio dental	Dental	Alveolar	Alveo Palatal	Palatal	Velar	Uvular	Glottal
Plosive	p p ^h b		t t ^h d				k ^h k		ʔ
Nasal	m m ^h		n n ^h				ŋ		
Trill			r r̥						
Tap or Flap									
Fricative		v		s z					h
Affricate					tʃ tʃ ^h				
Lateral fricative									
Approximant									
Lateral approximant			l l̥						

Lorrain's orthographic representation	IPA Equivalent
a	ɑ
aw	ɔ
y	ɨ
ai	ɑɪ
e	e
i	i
ô	øʊ
ao	ɔ̄
yu	ɨu
o	o
u	u

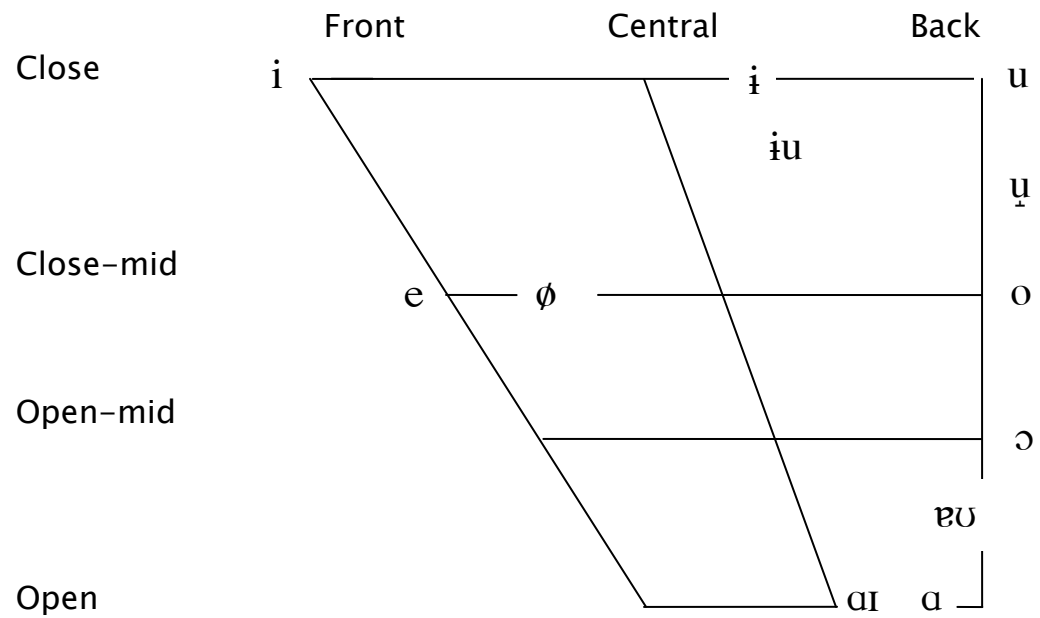


Figure 19. Lorrain's vowel inventory in IPA

Table 9: *Lorrain's Orthographic Representations and IPA Equivalents*

Lorrain's representations	Lorrain IPA (derived)	Arden IPA
a	ɑ	ɑ or ʌ
â	long ɑ	ɑ̃
aw	ɔ	o or øʊ or ɔ
y	ɨ	y or øɪ or ø
ai	ɑɪ	ɑɪ
e	e	e
i	i	i or j (before ɑ)
ô	øʊ	øʊ
ao	ɯ	ɯ
yu	ɨu	øʊ
o	o	øʊ
u	u	u
b	b	b
ch	tʃ	tʃ or dʒ
chh	tʃ ^h	tʃ ^h
h	h and ʔ	h or ʔ
k	k	k or q
kh	k ^h	k ^h or q ^h
l	l	l
hl	l̥	l̥
m	m	m
hm	m ^h	hm or m ^h
n	n	n
hn	n ^h	hn or n ^h
ng	ŋ	ŋ
p	p	p
ph	p ^h	p ^h
r	r	r
hr	r̥	r̥ or ɹ̥
s	s	s or ç
t	t	t or t̥
th	t ^h	t ^h or t̥ ^h
v	v	v
z	z	z or ʒ

6. Contrastive Sounds and Contextual Variants

Having documented a phonetic inventory, it is now possible to discuss contrastive sounds and contextual variants. Armed with the Mara sound distribution table in Appendix 3 and a list of both true and near-minimal pairs, it is possible to form hypotheses and draw some conclusions about contrastive sounds. This section will examine each of the prominent features of the language: word-terminal glottal stops, the tone system, aspiration, voicing, pre- and post-aspiration of nasals, and dentalization. Employing minimal pairs and the property of transitivity, a vowel contrast table is shown that suggests which vowels are likely to be contextual variants and which in free variation. Vowel harmony is likely to be the cause of vowel raising in both isolated words and in running speech. Diphthongs tend to disappear in running speech.

6.1. Speaker Attitude

Linguistic field methods permit the consideration of a native speaker's intuitions, although those intuitions are not definitive. For example, it is not uncommon for speakers to think that sounds are the

same when they are linguistically different. (Silverman (2006) gives an illustrative example of “phone” fɒn vs. “phone book” fɒm bʊk̚, where a speaker may be unaware of the nasal assimilation taking place in the compound and deny any difference in the two nasal articulations.) However, Sapir’s argument for the psychological reality of phonemes would claim that speakers will not confuse one phoneme for another (Sapir, 1949).

In describing the contrastive sounds of Mara, this section respects Sapir’s assertion of phonemic instinct by reporting speaker attitude while also seeking to support conclusions with more factual data. Speaker opinion provides but one data point among several.

6.2. Glottal Stops

Mara words are either terminated by a glottal stop or a vowel; word-final glottal stops are very common. VanBik (2009) traces how Proto-Kuki-Chin final stops (*-p, *-t, *-k) became Maraic glottal stops. Is this glottal stop contrastive with its absence? Lorrain (1951) provides an orthographic representation of the glottal stop, representing it as “h”;

this representation has since disappeared in the written language. He states that “it has no value in itself save to shorten the previous vowel sound” (Lorrain, 1951:3). Löffler confirms a lack of contrast for the glottal stop, although adds the comment that “they are a sign of “rough” (that is impolite, for instance, angry) language” (Löffler, 2002:125).

This study concludes that glottal stops are not contrastive. It is unusual for a language to have a word-final distinction for glottal stop presence or absence, since the distinction is not very salient. The lack of minimal pairs, that glottal stops can be contextually conditioned, and that they disappear in rapid speech support a lack of contrast. Speaker attitude and the absence of specific orthographic representation offer additional substantiation. Each of these factors is discussed in turn below.

6.2.1. Minimal pairs

Minimal pairs show that, where the glottal stop might possibly indicate contrast, there is always a tonal difference. As shall be seen in Section 6.3, tones are unambiguously contrastive. The pairs below in

(15) illustrate typical tonal differences found in combination with glottal stop termination.

15) meat	sáʔ		
rice	sà		
night	àzɛ̄	slave	síʔ
fly	āzɛ̄ʊʔ	go	sīʔ
turn	pālīʔ		
tongue	pālī		

6.2.2. Environmental conditioning

Word-final glottal stops are more likely to occur when the preceding vowel carries a high or mid tone. For example, in the minimal pairs in (16), the glottal stop follows a low vowel with a mid or high tone, but is omitted in the last word with a low-toned nucleus.

16)	meat	sáʔ
	hair	sāʔ
	rice	sà

The co-occurrence of this high pitch with a glottal stop is physically plausible. High tones are made with more tense vocal folds than low tones; there is thus more likelihood of them tensing to the point of stopping.

6.2.3. Rapid phrasal articulation

An additional observation, supportive of non-contrastiveness, is that glottal stops disappear in the rapid phrasal articulation of a fast phrase. In (17), the word, “when”, if articulated alone, ends with a clear glottal stop. However, if in a phrase and spoken at normal conversational speed, the glottal stop is omitted, as (18) shows.

17) when kʰɪtɪtʰáʔ

18)	kʰɪtɪtʰá	rā	eīmā	sī	ò
	Khatitae	rah	eima	sie	aw?
	When	forest/hunt	we	go	future?
	(When do we hunt?)				

6.2.4. Speaker attitude, orthography

Speaker attitude and orthography support the hypothesis that glottal stops are not contrastive. Unlike the case of aspiration, the consultant often hesitated before deciding whether a word was terminated by a glottal stop; his answer frequently required a thought process and he would occasionally change his mind. In Lorrain's original orthographic system, a word-final orthographic "h" indicated a glottal stop termination. However, current-day Mara orthography has lost any indication of a word-final glottal stop.

6.3. Tones

Mara has predominantly three tones, as discussed in Section 5.3.

Tonal contrast is evident. Löffler (2002) asserts that the levels of word-final tones are remnants of Proto-Mara medial long and short vowels before final stops in Mara were lost, contrast in vowel length also disappearing over time. The minimal pairs below show contrast between all tonal pairings: high-mid, high-low, and mid-low; recordings are included for “night” and “tickle.”

19)	meat	sáʔ	night	zāʔ
	rice	sà	tickle	záʔ
	hair	sāʔ	massage	ná
	die	āt ^h ĩ	shove	nà
	kill	āt ^h ĩ	injure	hmàʔ
	sleep	àmēʊʔ	score	hmáʔ
	they	áméʊʔ	tongue	pālĩ
			turn	pālĩ

Tones and segments can be interdependent. Tones can condition segments: Section 6.2.2 discussed how low tones often condition the presence of non-contrastive glottal stops. Segments can condition tones: Section 5.2.1 mentions in passing that the lowered \bar{q} is almost always marked by a high tone.

6.3.1. Falling contour tones

Mara also shows evidence of falling contour tones, as shown in (20) and in Figure 21. (The tonal characteristics of the terminal vowel also appear to be influenced by the previous falling tone by taking on its contour.)

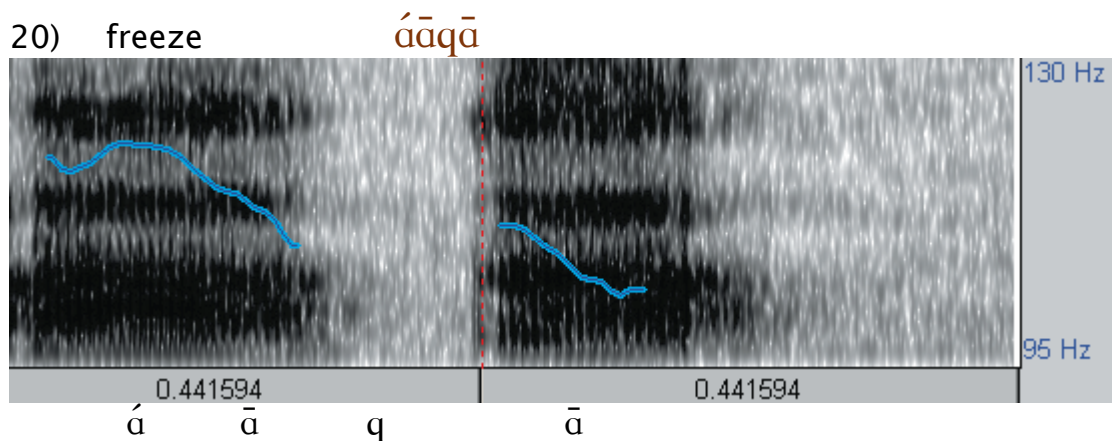


Figure 20. Pitch contour showing falling contour tone and subsequent “level” tone, influenced by the preceding contour.

The falling tone in Mara is regular but rare in lexical contexts. More commonly, it appears in morphologically derived contexts. Such tones occur regularly in at least three constructions: possessives, demonstratives, and marker–verb cliticization. In possessives, a consonant alternates with zero resulting in a falling contour tone. In demonstratives, a consonant alternates with zero and vowel tonality is reversed. Both result in a vowel pair with high and low tones, effectively creating a long vowel with a falling tone. In the third case, a vowel–vowel sequence across a morpheme boundary causes an apparent long vowel with a contour tone.

Löffler mentions his contact with a Burmese refugee who had developed his own orthographic and tonal marking system for Mara; this speaker also documented “sandhi effects resulting in contour tones” (Löffler, 2004:65).

Example (21) shows that, in the case of certain possessive constructions, the medial consonant (here, *m*) can disappear. The surrounding tones are preserved to form a falling tone.

21) Possessive constructions

námà	í?	or	náà	í?
you	dog		you	dog
(Your (sg.) dog)				

In some demonstrative constructions, as in (22), the medial consonant (here, *h*) can disappear and the surrounding tones change to form the equivalent of a falling tone. (In the second “that” construction, the *u* is also lowered to the contrastive *ɯ*.) Silverman comments that the loss of a medial *h* is quite common cross-linguistically (Silverman, D., personal communication, May 15th, 2009).

22) Demonstrative constructions

that	hùhú
That dog	hɯ̀ɯ̀ í?
this	hèhé
This dog	héè í?

In a final case, where a vowel-final verbal agent marker precedes a vowel-initial verb, the marker cliticizes with the verb, causing what appears to be a “long” vowel with an apparent contour tone. Example

(23) shows the cliticization of agent pronominal word “a” to the verb “azaw”, resulting in a falling vowel contour over the combined vowels.

23) Vowel–tone elision

ḗ	á	ḥ	á	è
ḗ	á	ḥ	á	è
ḗ	á	ḥ	á	è
ḗ	á	ḥ	á	è
ḗ	á	ḥ	á	è

Pavaw cha chhikao chapia pata a–azaw
Bird topic.mark window through 3ps.agent.pw–fly
(The bird flew through the window.)

6.4. Obstruent Aspiration

Section 5.1.3 provides very good evidence for contrast in the aspiration of plosives. There are clear minimal pairs, the Mara sound distribution table in Appendix 3 indicates aspiration and non–aspiration in overlapping environments, Mara orthography unambiguously indicates aspiration, and the consultant was adamant about the correctness or incorrectness of an aspirated or unaspirated articulation for a given word. This section includes near–minimal and minimal pairs that illustrate contrast for the voiceless labial plosive; comparable examples can be found for other obstruents.

6.4.1. Plosives

The following minimal pairs show contrast in labial plosive aspiration:

	<u>English</u>	<u>IPA</u>	<u>Mara orthography</u>
24)	give	p _ɪ	pie
	take off	p ^h _ɪ	phie
	pipe	p _{ai}	pai
	brush off	p ^h _{ai}	phai

The consultant was insistent upon the difference between aspirated and unaspirated plosives, correcting the mode of aspiration immediately without pausing for thought. (Mis-aspiration was “wrong”, whereas omitting a glottal stop rarely elicited a complaint.) Mara orthography includes a consonant-following “h” which consistently indicates aspiration of the preceding consonant. The Mara sound distribution table in Appendix 3 also shows that aspirated and unaspirated plosives occur

in the same environments, although the aspirated forms are generally found in fewer environments word-medially than word-initially.

6.4.2. Affricates

Aspirated and unaspirated affricates follow the same pattern of contrast as plosives. Word-initially, the aspirated voiceless alveopalatal affricate $t\zeta^h$ occurs in overlapping contexts with $t\zeta$, indicating contrast. Similarly, unaspirated and aspirated segments appear word-medially in overlapping contexts. Table 10 shows voiceless affricate distribution.

Table 10: *Distribution of Alveopalatal Affricates*

Word-initial	Following
$t\zeta$	$\underset{\cdot}{a} \ \underset{\cdot}{\lambda} \ \underset{\cdot}{a} \ \underset{\cdot}{a} \ \underset{\cdot}{i} \ \underset{\cdot}{?} \ \underset{\cdot}{o} \ \underset{\cdot}{e} \ \underset{\cdot}{y} \ \underset{\cdot}{i} \ \underset{\cdot}{i}$
$t\zeta^h$	$\underset{\cdot}{u} \ \underset{\cdot}{o} \ \underset{\cdot}{i} \ \underset{\cdot}{i}$

Preceding	Word-medial	Following
$\underset{\cdot}{a} \ \underset{\cdot}{\lambda} \ \underset{\cdot}{u} \ \underset{\cdot}{?}$	$t\zeta$	$\underset{\cdot}{\emptyset} \ \underset{\cdot}{u} \ \underset{\cdot}{e} \ \underset{\cdot}{y} \ \underset{\cdot}{\lambda} \ \underset{\cdot}{u} \ \underset{\cdot}{a} \ \underset{\cdot}{i} \ \underset{\cdot}{u} \ \underset{\cdot}{a} \ \underset{\cdot}{i}$
$\underset{\cdot}{a}$	$t\zeta^h$	$\underset{\cdot}{i} \ \underset{\cdot}{o} \ \underset{\cdot}{a} \ \underset{\cdot}{\emptyset} \ \underset{\cdot}{u}$

	English	IPA	Mara orthography
25)	not	tɕávéʔ	chavei
	bad	átɕ ^h ípa	achhiepa
	smooth	átɕāràlēɪpáʔ	achahrleipa
	night	zātɕ ^h ánèʊ	za-chha-no night-aspect-day

As with plosives, Mara orthography differentiates both word-initial and word-medial aspiration for affricates by adding an “h” after the aspirated affricate, e.g., as in aspirated “chhaota” above, compared to unaspirated “châvei.” Aspiration is thus consistently contrastive across all non-continuant obstruents.

6.5. Obstruent Voicing

Voiced obstruents in Mara are relatively rare. The following subsections review contrastive evidence for unvoiced and voiced plosives, fricatives, and affricates.

6.5.1. *Labial plosives*

The Mara sound distribution table in Appendix 3 has a single example of word-initial **b**, preceding the rounded lowered **u̟**; the voiceless labial is much more prevalent both word-initially and word-medially. However, consultation of dictionaries from Savidge (1908) and Lorrain (1951) show many instances of word-initial and word-medial **b** and in the same environments as voiceless and aspirated labials. While historical change in language, lack of sound recordings, and difference in dialect could all be factors, the accumulation of past data is too definitive to ignore. Voiced and voiceless labials are highly likely to contrast both word-initially and word-medially.

The voiceless labial plosive **p** is extremely prevalent; this is the most common of all consonantal sounds in Mara. (The glottal stop is more common but occurs only word-finally or at morphemic boundaries).

6.5.2. *Alveolar plosives*

Voiced, unaspirated voiceless, and aspirated voiceless alveolar stops occur in the same environments word-initially and word-medially,

indicating contrast. The voiceless unaspirated alveolar stops are the only (non-glottal) consonants preceding lateral approximant *l* and *l̥* as shown in (26); Ladefoged and Maddieson (1996) terms such homorganic stop–fricative combinations lateral affricates.

	<u>English</u>	<u>IPA</u>	<u>Mara orthography</u>
26)	fall	t _ɸ lú	thlu
	mountain	t _ɸ lâ	tla

6.5.3. *Velar and uvular plosives*

Mara contains only voiceless instances of the velar and uvular stops. This is aerodynamically plausible; the further back in the mouth that a stop is articulated the more difficult it becomes to maintain stop voicing.

The uvular stop never occurs word-initially, indicating that there is a conditioned alternation between the velar and uvular stops, as discussed below. Mara orthography does not recognize an orthographic difference. Table 11 illustrates velar and uvular stop distribution.

Table 11: *Distribution of Velar and Uvular Stops*

Word-initial	Following
k	j e i u øʊ ʌ øɪ
k ^h	ɑ i i ʌ ʊ e u

Preceding	Word-medial	Following
øʊ ɑ ʌ	k	ɑ w øʊ i i ʊ o øɪ j
ɑ ɑɪ	k ^h	ɑ u øʊ o
ɑ i	q	ɑ o
ɑ	q ^h	ɑ i

Table 11 is somewhat misleading in that it might be interpreted to state that the uvular stop could occur in the absence of the low vowel; in fact, a low vowel must either precede or follow the segment for uvularization to occur. Example (27) gives examples of four stop instantiations.

	English	IPA	Mara orthography
27)	hit	āk ^h øú	akhaw
	bitter	áq ^h ɪ	akheu
	wide	míqāʔ	akawpa
	horn	sákī	saki

Uvularization is absent in word-initial position. While the velar and uvular stops can appear in the same word-medial environment, they span a significant “middle ground.” It is highly doubtful that there is a real contrast between them; rather, they are susceptible to environmental conditioning. When the velar stop is followed by a glide, it is much more fronted than when followed by a vowel. When it is followed by a low vowel, it is generally quite uvularized. A limited conclusion is that the velar stop has a strong tendency to uvularize in the context of a low vowel.

6.5.4. Fricatives

Labiodental fricatives

Voiced and voiceless labiodental fricatives *f* and *v* are part of the phonological inventory. The inclusion of segment *f* signals that the speaker is speaking the Sabeu dialect; Parry (1932) and Löffler (2006) discuss the fact that Sabeu is the only Mara dialect that includes it. The “standard” Mara dialect, Tlongsai, inventoried by Lorrain (1951), Matisoff & VanBik (n.d.), and discussed by Parry (1932) and Löffler (2006)

substitute the voiceless alveolar fricative s for the voiceless labiodental f; Interestingly, Savidge (1908) does include “f” in his phonetic inventory; unlike Lorrain, he must have encountered the Sabeu dialect. However, he commonly uses “sh” or voiceless postalveolar fricative ʃ in lieu of “f.” For example, in a word such as “sand”, below, Savidge’s dictionary records the Mara orthography to be “sha-di.”

	<u>English</u>	<u>Sabeu</u>	<u>Tlongsai</u>	<u>Mara orthography</u>
28)	sand	f̄ɻdí	s̄ɻdí	fadi/sadi
	swell	āfò		afao
	pencil	tɕáfò		châfoh
	bird	p̀ɻvóʔ		pavaw

This study’s data shows that f̄ and v occur in different intervocalic environments. Coupled with the fact that Parry’s Sabeu vocabulary list (Parry, 1932:504) shows these voiced and voiceless segments in the same environments, it may be concluded that the voiced and voiceless

labiodental fricative contrast both word-initially and word-medially in the Sabeu dialect.

Alveolar and alveo-palatal fricatives

Table 12 gives the distribution of alveolar and alveo-palatal fricatives.

Table 12: Alveolar and Alveo-Palatal Fricatives

Word-initial	Following
s	ɑ ɔ ʌ ø I u o ʌ i
z	ɑ
ç	i
ʒ	y

Preceding	Word-medial	Following
ɑ y ʌ i e ɔ	s	i i u ɑ ɔ o ɑɪ eɪ øʊ øɪ
ɑ	z	øʊ o
ɔ y	ç	i j

Alveolar fricatives s and z occur in the same environment both word-initially and word-medially, indicating their contrast. (s occurs in such a wide variety of environments word-medially that it would be very unlikely to be conditioned by its environment.)

These sibilants palatalize before high front vowels, as (29) and (30) confirm. Example (29) shows that alveolar sibilant s is in complementary distribution with palatal sibilant ʃ when preceding a high front vowel or glide. Example (30) shows the same distribution of z and ʒ. Sibilant palatalization before the high front vowel i is a common phenomenon. Lack of palatalization before the lowered vowel ɪ is another indicator of its differentiation from the higher i.

29) Complementary distribution of s with ʃ before high front vowel/glide

English	IPA	Mara orthography
grass	ʃínháʔ	sihnâ
star	óʃī	awsi
medicine	ʃíʔ	si
slave	síʔ	sie
horn	sákī	saki
dresses	tʃýʃjá	chysia

30) Complementary distribution of *z* with *ʒ* before high front vowel

English	IPA	Mara orthography
all	<i>z̥ydwáʔ</i>	zydua
night	<i>zāʔ</i>	za

6.5.5. *Affricates*

The alveo-palatal affricate *tʃ* occurs both word-initially and word-medially; its voiced counterpart occurs only precedes the high front vowels *i* and *y*. Table 13 shows affricate distribution.

Table 13: *Distribution of Voiced and Voiceless Affricates*

Word-initial	Following
<i>tʃ</i>	<i>ʌ ɑ̣ ɑ̣ ɑ̣ ʔ ʊ̣ o e y i ị</i>
<i>tʃ^h</i>	<i>ʊ̣ o i ị</i>
<i>dʒ</i>	<i>y i</i>

Preceding	Word-medial	Following
<i>ɑ̣ ʌ ʊ̣ ʔ ị</i>	<i>tʃ</i>	<i>ɐʊ e y ʌ ʊ̣ ɑ̣ ị u ɑ̣</i>
<i>ɑ̣</i>	<i>tʃ^h</i>	<i>ị o ɐʊ ɑ̣</i>
<i>ɑ̣</i>	<i>dʒ</i>	<i>y</i>

The evidence for the existence of the voiced affricate *dʒ* is scant; when voicing was detectable, it was present only on part of the segment.

Mara orthography does not differentiate voiced and voiceless affricates. $tʃ$ and $dʒ$ almost certainly vary contextually, with a correlation between possible voicing and a following high front vowel.

Example (31) gives examples of both word-initial and word-medial voiced and voiceless alveo-palatals.

	English	IPA	Mara orthography
31)	right	$tʃ̄tʃ̄əlāʔ$	chachala
	few	$áʃ̄ȳtáʔ$	achyta
	bad smell	$r̄eʊ tʃ̄ʰípa$	reu chiepa
	man	$dʒ̄ȳsáʔ$	chysa

Section 6.4.2 provided evidence for the contrastive states of the unaspirated and aspirated articulations of the alveo-palatal affricates. An aspirated $tʃ̄^h$ contrasts with both the voiced and voiceless articulations.

6.6. Nasals

The distribution of nasals indicates contrast between aspirated and unaspirated nasals. However, affixation patterns make it clear that pre-

and post- aspirated nasals alternate.

Table 14 shows the distribution of aspirated and unaspirated nasals in overlapping environments, with very strong evidence of word-medial overlap.

Table 14. *Distribution of Aspirated and Unaspirated Nasals*

Word-initial	Following
m	i əʊ ʌ
hm	o ʊ
n	ɑ i əʊ ʊ
hn	ʌ o əʊ

Preceding	Word-medial	Following
ɑ eɪ øɪ	m	əʊ ɑ ɑɪ ʊ
ɑ ʌ ɔ	m ^h	i əʊ
ɑ ə i eɪ	n	əʊ o ʊ i

As with the aspirated obstruents, Mara orthography recognizes nasal aspiration with an orthographic “h”, but as a prefix rather than a suffix. Matisoff and VanBik’s tonally annotated dictionary include a number of aspirated and unaspirated minimal pairs illustrating the orthographic difference, such as (32).

	<u>English</u>	<u>IPA</u>	<u>Mara orthography</u>
32)	rotten	hmý	hmy
	to cease, forget	mý	my

Section 5.1.4 discusses the different realizations of the voiceless nasals word-initially (pre-aspirated) or word-medially (post-aspirated). The affixation patterns in (33) show that pre-aspirated nasals alternate with post-aspirated realizations; the former found word-initially, the latter intervocalically. Pre-aspirated and post-aspirated nasals are thus phonologically the same entity.

33)	blow	hmɐúʔ
	I blow	ém ^h ɐú

Löffler (2002) makes the observation that high vowels *i* and *u* are uncommon after nasals, and are only found after bilabial nasals due to historical changes related to the loss of final consonants. The data in this study supports his observation that high vowel *i* is only found after the bilabial nasal; no data was observed for high vowel *u*.

6.7. Dentalization

Many alveolar plosives are dentalized. Table 15 indicates clear contextual overlap in the dentalized variants word-medially. Word-initially, there is some overlap observed with the unaspirated *t* and its dentalized equivalent (each formed a consonant cluster with the lateral approximant). While no overlap was observed for *t^h* and *t̪^h*, such overlap is highly likely, due to the speaker's lack of insistence on contrastive dentalization, the omission of any dentalization indicators in Mara orthography, and the absence of any discussion of dentalization in any literature published on Mara.

Word-initially, dentalization may be more common before high front vowels or consonant clusters where the point of articulation of the second consonant is alveolar or further forward. The tongue is then in a better position to execute dentalization. Table 15 shows that examples of such dentalization are found both word-initially (before *i*, *y*, and *l*) and

word-medially (before *i* and *j*), but dentalization can also occur before lower and back vowels.

Table 15: *Distribution of Alveolar Plosives*

Word-initial	Following
t	i u ɔ aɪ l l̥
t ^h	əʊ eɪ u j l
t̪	l y
t̪ ^h	ɑ i aɪ j

Preceding	Word-medial	Following
ɑ i i eɪ ɔ ʊ ʌ ɔ	t	eɪ u i əʊ ø y l̥
ʌ ɑ əʊ	t ^h	i ʌ
əʊ ɔ ɑ ʊ ʌ	t̪	ɑ i əʊ
əʊ ʌ ɑ	t̪ ^h	i j

6.8. Trills and Approximants

6.8.1. Trills and central approximant

Sound distribution data, indicated in Table 16, shows that trills *r* and *ʀ* occur in the same environments word-medially, and that the two trills and the central approximant occur in the same environments word-medially.

Table 16: *Distribution of Trills and Central Approximant*

Word-initial	Following
ɾ	eɪ i o øʊ ɑ u
ɾ̥	øʊ

Preceding	Word-medial	Following
ʌ øʊ ɑ	ɾ	ɑ i o
ɑ ʌ u i	ɾ̥	ɑ o i i
ɑ	ɾ̥	o

The data contains near-minimal pairs for ɾ̥, ɾ, and r, shown in (34).

English	IPA	Mara orthography
34) other	áɾópàʔ	ahropa
green	áɾòpáʔ	ahropa
heavy	áɾìpáʔ	ahripa
white	āɾápā	arapa

(The voiceless trill and voiceless central approximant are both indicated in Mara orthography by a preceding orthographic “h.”)

Sound distribution, speaker attitude, and near-minimal pairs support a conclusion that the two trills contrast. Although other researchers have not isolated the voiceless central approximant as a

	<u>English</u>	<u>IPA</u>	<u>Mara orthography</u>
35)	head	l̥ù	lu
	abundant	hl̥ù	hlu

The lateral approximant follows the voiceless alveolar stop in one of the few consonant clusters in Mara (disregarding aspirated onsets such as hm and hn), all others preceding the approximants w and j. Example (26) illustrates such clusters.

	<u>English</u>	<u>IPA</u>	<u>Mara orthography</u>
26)	fall	t̥l̥ú	thlu
	mountain	t̥l̥à	tla

Table 18 shows that the labio-velar approximant w and the palatal approximant j never occur word-initially. w is always preceded by an obstruent and j by a lateral, nasal or velar stop. The frequency of the lax vowel ɔ after the labio-velar approximant (and the lack in this combination of its tense counterpart o) suggests that the labio-velar approximant conditions an alternation of ɔ with o. This suggestion

anticipates a discussion in Section 6.9.2 of the likelihood of variation or environmental conditioning of these two vowels.

Table 18: *Word-medial Distribution of Approximants w and j*

Preceding	Word-medial	Following
d b k p	w	ɑ ɔ
l n ^h k	j	ɑ

6.9. Vowels

This section reviews the evidence for contrast among Mara vowels.

Figure 21 reiterates the Mara vowel inventory.

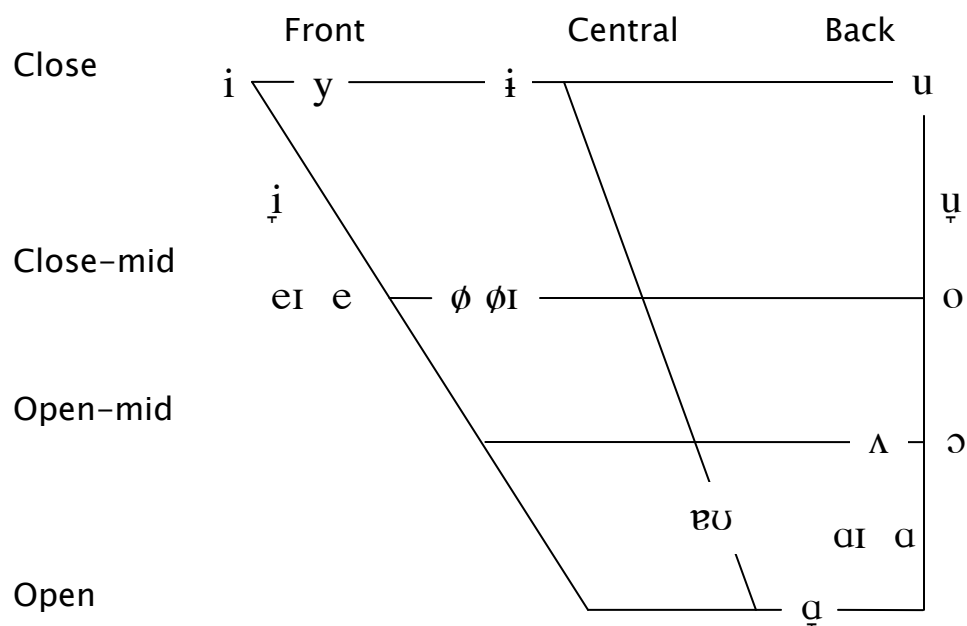


Figure 21. Mara vowel inventory

6.9.1. Contrasts through minimal pairs

Several recorded minimal pairs indicate vowel contrast. Since tonal contrasts are independent of segmental contrasts, “near-minimal” pairs with tone differentiation can also provide valid contrast information. As neither dentalization nor glottal stops are contrastive, those

differentiations are also allowable. Table 19 shows the minimal pairs and the contrasts that they denote.

Table 19: *Minimal Pairs*

English	IPA	Contrasts
go	s̄ĩʔ	ĩ with øI
suck	søĩʔ	
to cut	ĩʔ	ĩ with i
dog	ĩʔ	
now	nò	o with ʊ and a
elephant		
tusk	nù	
you	ná	a with i
tickle	záʔ	
tart/sour	zí	a with e
river	tc̄l̄v̄àʔ	
not	tc̄ávn̄èʔ	
I	kéimáʔ	a with øʊ
we	kéiméʊʔ	
year	kø̄	u and øI and o
hand	kūʔ	
back	køĩʔ	
too much	kōʔ	ĩ with øʊ
eat	n̄ĩ	
push	n̄ø̄ʊʔ	

English	IPA	Contrasts
grandfather	p̄àp̄ū	u with ʊ
uncle	p̄àp̄ú	
wash clothes	p̄l̄s̄ōʔ	o with i
Wash dishes	p̄l̄s̄ĩʔ	
freeze	áāqā	contour aa with a
move away	āqā	
red	ásāip̄áʔ	aI with eI
long	àsèip̄āʔ	
husband	ánáp̄àʔ	a with i
sky	āv̄āp̄ĩʔ	
river	tc̄l̄v̄àʔ	ʌ with a
not	tc̄ávn̄èʔ	
play	p̄l̄l̄úʔ	i with ʊ and with ĩ
vomit	p̄l̄líʔ	
turn	p̄l̄líʔ	
wash	p̄l̄s̄ó	o with øʊ
stick	p̄l̄s̄ø̄ʊʔ	
throw	t̄ȳʔ	y with i
water	t̄ĩʔ	

Table 20 shows a mechanical contrastive analysis based on the minimal pairs in Table 19 and the principle of transitivity, that is, if A contrasts with B, and B contrasts with C, then A contrasts with C.

Table 20: *Contrasts from Minimal Pair Analysis*

	i	i̇	y	ɨ	u	u̇	o	ɔ	ʌ	ɑ	ɑ̇	ɑɪ	ɸʊ	eɪ	e	∅	∅ɪ
i		C	C	C	C	C	C			C			C		C		C
i̇	C		C	C	C	C	C			C			C		C		C
y	C	C		C	C	C	C			C			C		C		C
ɨ	C	C	C		C	C	C			C			C		C		C
u	C	C	C			C				C			C		C		C
u̇	C	C	C	C	C		C			C			C		C		C
o	C	C	C	C	C	C				C			C		C		C
ɔ																	
ʌ											C						
ɑ	C	C	C	C	C	C	C			C			C		C		C
ɑ̇									C								
ɑɪ														C			
ɸʊ	C	C	C	C	C	C	C			C			C		C		C
eɪ												C					
e	C	C	C	C	C	C	C			C			C				C
∅																	
∅ɪ	C	C	C	C	C	C	C			C			C		C		

The letter “C” in each table cell indicates that there is either evidence of direct contrast from the minimal pairs, or that indirect contrast can be inferred by applying transitivity.

The kind of mechanical analysis captured by Table 20 is flawed, in that if one transcription error indicates contrast where there is none, the error quickly cascades through the table. For example, if, through a transcription error, α were mistranscribed as ɔ , the result showing an apparent contrast between α and ɔ , then ɔ would “inherit” all the contrasts that were discovered for highly contrastive α , filling out almost an entire row and column for ɔ . Also, there is no direct evidence that lowered/unlowered vowel pairs α and ɔ contrast, although this seems likely from other evidence.

However, the results can be surprisingly predictive. Specifically, the lack of plentiful evidence of contrastiveness for Λ , \emptyset , eI , ɔ , and ɔI , and, the absence of any contrastive evidence for ɔ lead to questions about whether these sounds might alternate or be in free variation with others.

6.9.2. *Free variation*

Examples in (36) below show that it is reasonable to surmise that ɔ, ɶ, and ɔ̄ are in free variation. Note the orthographic similarities but the phonetic differences in the first three words, then the last two.

	<u>English</u>	<u>IPA</u>	<u>Mara orthography</u>
36)	bird	p̀l̀v́ɔ̄ʔ	pavaw
	swim	t͡ɕīāzɛ́ɔ̄ʔ	(ti)azaw
	snow	d̄āh́ɔ̄ʔ	dahaw
	blow	hmɛ́ɔ̄ʔ	hmo
	sun	nɛ́ɔ̄p̄í	nopi

No obvious triggers for environmental conditioning are evident.

VanBik (2009) also states that ɔ and ɔ̄ do not contrast. He notes also that the appearance of the Mara diphthong ɶ for orthographic “-o” can be conditioned by Proto-Kuki-Chin historical residue not visible in the contemporary language. While not making claims for Mara today, VanBik traces how a Proto-Kuki-Chin rime of [ay] can be reflected in

Mara by any of eĩ, i, or aĩ (the equivalent of eɪ, i, and aɪ in this study).

VanBik’s historical evidence is consistent with the relative lack of contrast found for the two diphthongs eĩ and aɪ in Table 20, buttressing an argument for their free variation.

6.9.3. *Vowel harmony*

Vowels ʌ and ɑ also appear to co-vary under the influence of vowel harmony. Vowel harmony with following higher vowels may tend to raise the low back vowel ɑ to ʌ, as (37) illustrates.

	<u>English</u>	<u>IPA</u>	<u>Mara orthography</u>
37)	yes or “ok”	tɕátà	chata
	tie	tɕātyʔ	chaty
	fog	mādíʔ	madi
	ice	ādāʔ	ada

However, vowel harmony is sporadic; there appears to be some free variation of ʌ with ɑ. Example 38 shows a near-minimal pair for ɑ and ʌ word-medially. Although the terminal vowel in “river” is low,

the medial vowel is still realized as a higher Λ . No comparable vowel realization takes place in “not”, strengthening a case for contrast between α and $\underset{\cdot}{\alpha}$.

	<u>English</u>	<u>IPA</u>	<u>Mara orthography</u>
38)	river	$t\bar{\epsilon}\bar{\Lambda}v\grave{\alpha}?$	chavae
	not	$t\bar{\epsilon}\underset{\cdot}{\alpha}v\grave{\epsilon}?$	châvei

6.9.4. Diphthongs disappear in running speech

As is common in many languages, some Mara diphthongs disappear in running speech. For example, in isolation, word-final close-mid vowel ϕ is always diphthongized as ϕI . Figure 22 shows the spectrogram for (39) spoken in isolation. As the close-mid front vowel ϕ moves upwards to the higher, fronter I , the first formant drops and the second formant rises in a classic diphthong.

39) party $b\bar{\phi}I$

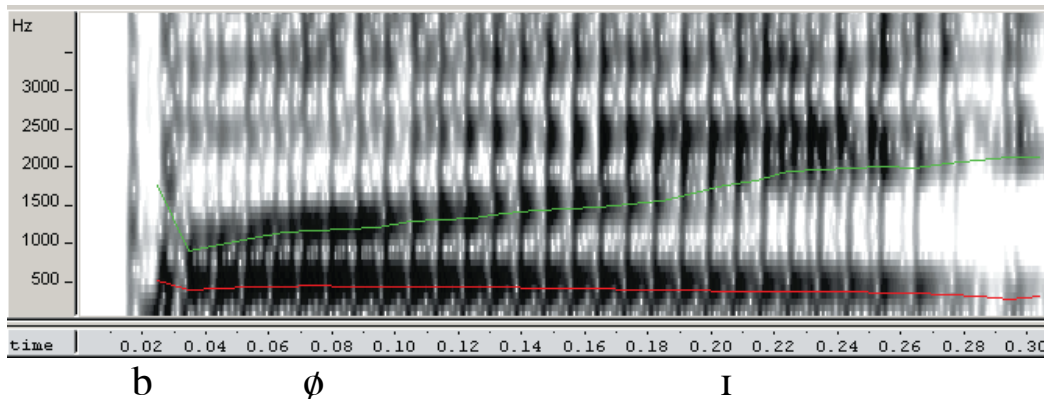


Figure 22. Spectrogram of vowel diphthong in isolated word. The first syllable is not shown. F1 is in red and F2 is in green. The decline of F1 and the rise of F2 show the transition of the vowel to a higher fronter vowel in a diphthong.

However, in the sentence in (40), the phrase-terminal vowel monophthongizes in running speech.

- 40) $\bar{b}\bar{a}\bar{r}\bar{o}\bar{m}\bar{a}$ $t\grave{e}ut\bar{a}$ \acute{i} $v\bar{\phi}$
 Burma tawta ei vy
 Burma from 1 sg.agent.pw come
 (I came from Burma.)

The recording of (40) above incorporates the full sentence. The recording in (41) is a clip excerpting only the last word of the phrase. Figure 23 contains a spectrogram of the final word “vy” in the above phrase, showing little formant movement on the final vowel.

Phonemes ϕ and ϕI are thus environmentally conditioned in running speech. Unsurprisingly, pronominal word “ei” also appears to be

environmentally conditioned in running speech; it is then often articulated as a high front vowel rather than the diphthong $\acute{e}i$.

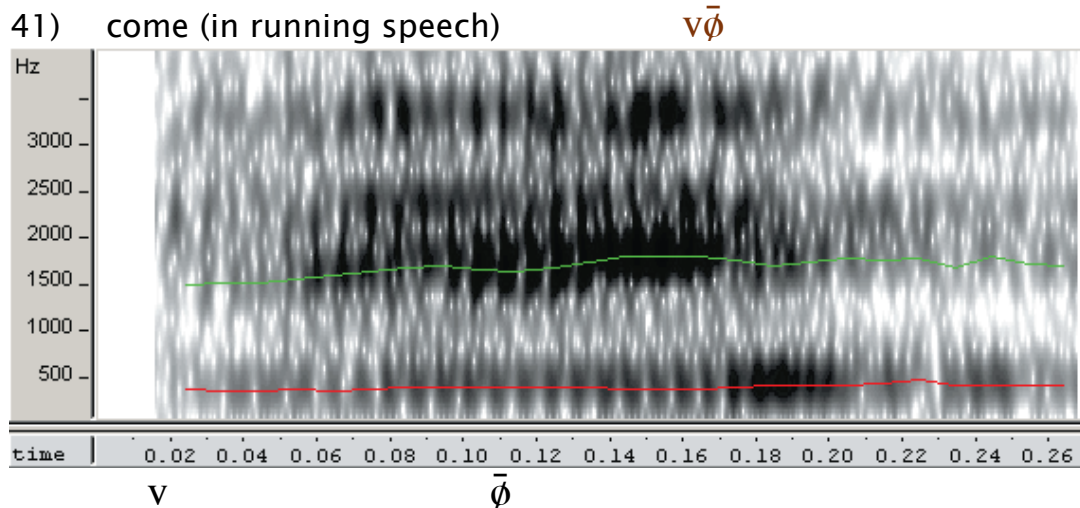


Figure 23. Spectrogram of previous vowel in running speech. The labiodental fricative is only slightly present. F1 is in red and F2 is in green. The diphthong is no longer in evidence.

6.9.5. Vowel harmony and alternation

Vowel harmony is also evident in running speech. In (42), when the word “vao-sa” is articulated independently, the terminal vowel is articulated as α . However, when included in a sentence in running speech, the same vowel rises and rounds into the mid-close front rounded vowel ϕ : α is exhibiting vowel harmony with the preceding higher rounder \bar{u} .

English IPA Mara orthography

42) pig meat vù-sáʔ vao-sa

tɕā-kʰáɪ-tā-tā vù-sʰ kʰá kʰì-só-zʰ á-pí éɪ
 Chakhaitawta vao-sa kha khisaw-zy a-pie ei
 then pig meat top.mark village-PLU 3sg.pw-give ind.pl
 (And he gave the pig-meat to the villagers)

In Table 21, formant levels for the vowel in “sa” in both isolated and running speech show that F1 drops and F2 rises in running speech, raising the vowel from α to ϕ .

Table 21: *Formant Levels for “a” in “sa” in Isolated and Running Speech.*

	IPA	F1	F2
“a” in isolated speech	α	691	1364
“a” in running speech	ϕ	554	1427

Note: Vowel harmony causes raising of the vowel from α to ϕ in running speech.

6.10. Phonological Inventory

Section 6 has focused on Mara's contrastive sounds and contextual variants. Figure 24 and Table 22 summarize Mara's phonological inventory of vowels and consonants. Underlying representations are those which occur in the widest variety of environments.

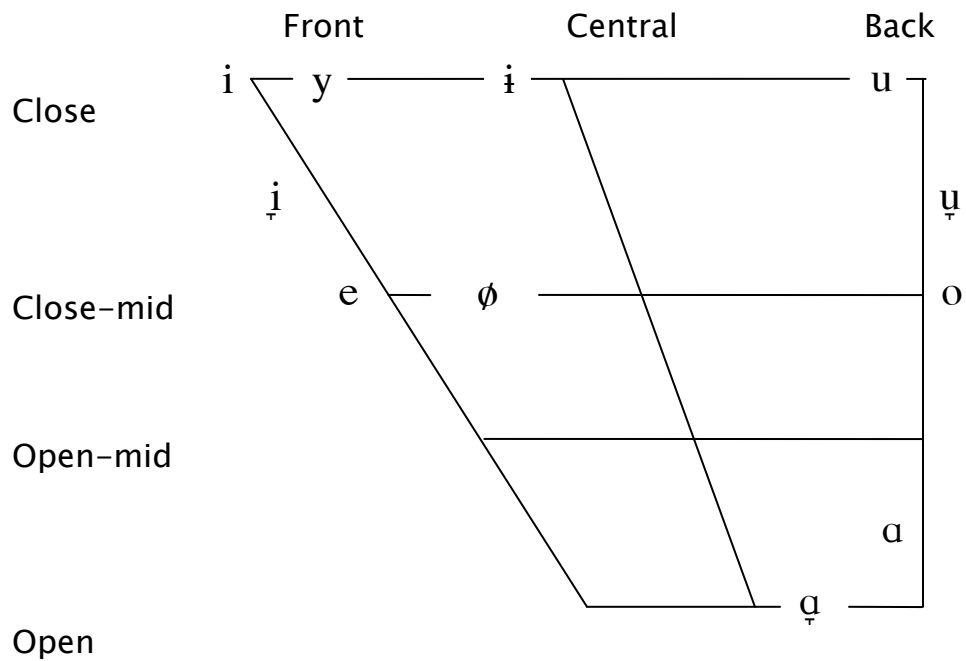


Figure 24. Mara vowel inventory

Table 22: *Phonological Inventory of Mara Consonants*

	Bilabial	Labio dental	Dental	Alveolar	Alveo Palatal	Palatal	Velar	Uvular	Glottal
Plosive	p p ^h b		t ^h t d				k k ^h		
Nasal	m m ^h		n n ^h				ŋ		
Trill			r r̥						
Tap or Flap									
Fricative		f v		s z					h
Affricate					tʃ tʃ ^h dʒ				
Lateral fricative									
Approximant	w		ɹ			j			
Lateral approximant			l l̥						

Sections four and five have set forth the phonetic inventory of the Sabeu dialect of the Mara language and introduced its contrastive sounds and contextual variants. The following section of this study explores the morphosyntactic properties of Mara's pronominal word system.

7. Morphosyntax of Pronominal Words

This section focuses on a narrow but distinctive area of Mara morphosyntax: the pronominal word system. Mara makes extensive use of pronominal words to specify both person and case of sentence participants. The syntax that the pronominal system imposes on the sentence varies depending on the person or persons participating.

A question of terminology is first addressed; researchers have used differing nomenclature for pronominal words in Tibeto–Burman languages. The structure of intransitive sentences is then presented, together with the set of personal pronouns and subject pronominal words. A set of intransitive examples illustrates both required and optional pronouns and pronominal words. Transitive sentences are then discussed, both examples and structure, with the focus being on the effect of combinations of agent and object pronominal words. The pronominal words themselves are then examined in more detail. A morphemic analysis of these words compares Weidert's (1985) IPA transcriptions and associated semantics to those detailed in this

study. Pronominal word syntax is then examined for its relevance to a case marking pattern influenced by word order. The section concludes by proposing a deictic hierarchy of these pronominal words based on their order and placement relative to the verb.

IPA transcriptions are presented for pronouns and pronominal words in Sections 7.2.1 and 7.5.4. However, the sentence and syntactic examples elsewhere in this section are given using Mara orthography, glosses, and English translations.

7.1. Terminology

In discussing Mara's pronominal word system, Weidert (1985) refers to pronominal actants or markers, DeLancey (1989) to prefixes and suffixes, Van Driem (1993), Beckwith (1992), to affixes or pronominal affixes, and Bedell (2004) to subject agreement particles or affixes. Dryer (2008b), however, provides a comprehensive taxonomy of the expression of pronominal subjects that influences the terminology used here. Dryer discusses a category of languages "where the expression of pronominal subjects is by means of

pronominal words that occur in a syntactic position distinct from that of nominal subjects. This includes both languages where the pronoun normally co-occurs with the noun and languages where it does not” (Dryer, 2008b:6). Mara is one such language where the pronominal words occur in a syntactic position distinct from the subject, agent, and object; as shall be seen, these pronominal words may either co-occur with the noun or not. Dryer cites an example in Hakha Lai, another Tibeto-Burman language, where such pronominal words are considered affixes (Dryer, 2008b:2). However, in Mara, with the occasional exception of the 3sg form, pronominal words are phonologically distinct and can be viewed as discrete parts of the verbal complex.

The terms “subject,” “agent” and “object” are used in this section as follows: the “subject,” or “S,” is the only argument of an intransitive verb, the agent, or “A,” the most agent-like argument of an transitive verb, and the object, or “O,” the least agent-like argument of a transitive verb.

7.2. Intransitive Sentences

This section reviews intransitive sentence structure, first introducing pronouns for both intransitive and transitive sentences, then continuing with a presentation of the intransitive sentence structure. A series of intransitive sentence examples closes the section.

7.2.1. Personal pronouns and pronominal words

Table 23 lists personal pronouns. Table 24 lists subject and agent pronominal words; both pronouns and pronominal words take the same form in both intransitive and transitive sentence structures. Bedell (2004) confirms these pronominal words.

Table 23: *Personal Pronouns*

Person		Pronouns	IPA
I	1 sg	kei/keima ⁸	kéi/kéimáʔ
you	2 sg	na/nama	ná/námà
he	3 sg	ano	ánèʊʔ
she	3 sg	ano/anono	ánèʊʔ/ánònèʊ
it	3 sg	ano/a	ánèʊ/á
we	1 pl	keimo	kéiméʊʔ
you	2 pl	namo ... V ... ei	námèʊʔ ... V ... eī
they	3 pl	amo ... V ... ei	áméʊʔ ... V ... eī

Both pronouns and pronominal words appear to be meaningfully composed of morphemes indicating person and number. In the case of pronouns, “kei” indicates first person, “na” second person, “a” third person, with suffix “mo” showing plurality. A similar regularity can be seen in Table 24 for subject and agent pronominal words, with “ei” indicating first person, and “ma,” or “mo” plus the plural marker “ei” indicating plurality. However, when object pronominal words are added, the morphemic regularity of the pronominal word system degrades, particularly when phonetic realization is taken into account.

Section 7.5.4 returns to this topic with a morphemic comparison of pronominal words to Weidert’s (1985) findings.

Table 24: *Subject and Agent Pronominal Words*

Person	Pronominal Words	IPA
I 1sg	ei	eī
you 2sg	na	ná
he 3sg	a	á
she 3sg	a	á
it, ComN 3sg	a	á
we 1pl	eima	éiméu?
you 2pl	namo ...V...ei	námèu? ...éi
They 3pl	ama ...V...ei	ámá? ...éi

In both intransitive and transitive structures, subject, agent, and object pronouns are often omitted in speech, pronominal words and word order providing the necessary semantics. By contrast, pronominal words are essential with the exception of the 3p object pronominal word, absent in most cases (See (59), (65), (70), and (75) for examples of the absent3p object pronominal marker.)

The nominative particle “ta” may be omitted; nonetheless, if this particle is present, a subject or subject pronoun must be explicit.

Example (43) gives three allowable variants of “I laughed.” Required elements are in red, optional elements are in green. If nominative particle “ta” is present, a pronoun must be explicit.

43)	I laugh			
(Kei	ta)	ei	pahnie	
(Keima	ta)	ei	pahnie	
(Kei)		ei	pahnie	
1 sg.pronoun	nom.part	1 sg.subj.pw	laugh	

7.2.2. Intransitive sentence structure

Mara’s intransitive sentence structure is shown below. Optional elements are parenthesized in green, required elements are shown in red, and elements that are necessary depending on the semantics of the phrase are shown in blue.

(Subj/pron) (ta) subject-pronominal-word verb (tense) (plural marker)

Verb tense markers are not discussed in detail here, but if included, as in (44), they follow the verb and precede a plural marker, if both exist.

44)	They laughed			
ama	pahnie	haw	ei	
3pl.subj.pw	laugh	past	subj.pl	

7.2.3. Intransitive sentence examples

Examples (45–50) show intransitive sentences with all persons as the subject. The same color schema used above is used below to indicate required vs. non-required elements; required elements are in red.

45) I laugh

(Kei	ta)	ei	pahnie
(Keima	ta)	ei	pahnie
(Kei)		ei	pahnie
1 sg.pronoun	nom.part	1 sg.subj.pw	laugh

46) you (2sg) laugh

(Na	ta)	na	pahnie
(Nama	ta)	na	pahnie
(Na/Nama)		na	pahnie
2sg.pronoun	nom.part	2sg.subj.pw	laugh

47) he/she laughs

(Ano/anono	ta)	a	pahnie
(Ano	ta)	a	pahnie
(Ano)		a	pahnie
3sg.pronoun	nom.part	3sg.subj.pw	laugh

48) we laugh

(Keimo	ta)	eima	pahnie
(Keimo)		eima	pahnie
1 pl.pronoun	nom.part	1 pl.subj.pw	laugh

As (49) and (50) show, the plural marker “ei” is included after the verb to indicate the second and third person plural. Section 7.4 discusses the plural marker in more detail.

49) you(pl.) laugh

(namo	ta)	nama	pahnie	ei
(namo)		nama	pahnie	ei
2pl.pronoun	nom.part	2pl.subj.pw	laugh	subj.pl

50) they laugh

(amo	ta)	ama	pahnie	ei
(amo)		ama	pahnie	ei
3pl.pronoun	nom.part	3pl.subj.pw	laugh	subj.pl

3sg subject pronominal words may cliticize to the verb. The Sabeu consultant sometimes combined these 3sg pronominal word-verb combinations into one phonological or syntactic element, and sometimes not. Weidert (1985), those who reference his work, and Bedell (2004) regard all Mara pronominal words as clitics; Lorrain (1951) and Savidge (1908) do not. According to this study’s data, all

pronominal words with the exception of the 3sg retain separate lexical status.

Nominative particle “ta” need not be present in an intransitive sentence with a non-pronominal subject, but may be included. The subject pronominal word must, however, always be included. “The bird died,” and “The bird sleeps” in (51) and (52) illustrate both structures.

51) The bird died

pavaw	a	thí-haw
bird	3sg.subj.pw	die-past

52) The bird sleeps

pavaw	ta	a	amô
bird	nom.part	3sg.subj.pw	sleep

7.3. Transitive Sentences

The transitive sentence form illustrates variation in pronominal word shape and order depending on both the individual person of a participant as well as specific combinations of participants. Perusing a list of sentences containing all word combinations can be daunting. Presentation of the transitive sentence is therefore broken down into

three sections: Sections 7.3, 7.4, and 7.5. After a brief discussion of the requirement for transitive structures, Section 7.3.2 first exposes the reader to a complete set of sentence examples to concretely illustrate the form. Section 7.4 reviews the plural markers; only then does Section 7.5 return to the transitive sentence form to discuss pronominal word combinations and, finally, to introduce the five possible syntactic variations in transitive sentence structure. Section 7.5 concludes with a discussion of a possible deictic hierarchy of these pronominal words and a morphological examination of their shape and semantics when decomposed.

7.3.1. Required transitive structure

Transitive sentence structure is often required in Mara when it might not be in other languages. For instance, the phrases “I sing,” “I eat,” or “I cut,” where an object is omitted from the sentence, are untranslatable in Mara. Instead, these sentences must be expressed in a transitive form with explicit objects. The first two sentences can be expressed as “I sing a song” and “I eat (a type of) food.” In the case

of “to cut,” as in others, there is a semantic rationale: the verb varies depending upon the object being cut, thus the object must be mentioned. The consultant explained this vividly (consultant, personal communication, 7/01/09, edited for clarity)

“The meanings of ‘cut’ in Mara are as below:

- In Mara reih (language), ‘cut’ is ‘tai’ but what is Professor Dan going to cut? If Michelle wanted Professor Dan to cut ‘a stick’, then ‘cut’ is ‘tai’ or ‘tai pachho’.
- If Vien wants Lani to cut some fruits, in Mara reih ‘cut’ is ‘pachhah’.
- If Kyle wants Denice to cut the meat, in Mara reih ‘cut’ is ‘a chai’.
- If Gerard wants Laurie to cut the meat into small pieces, in Mara reih ‘cut’ is ‘saza’.
- And if Lydia asks Nicole to please cut some vegetables to fry a dinner for the party, in Mara reih ‘cut’ is ‘ae’.

Finally, if JP himself cuts his finger, in Mara reih ‘cut’ is ‘ae’.”

Mara thus lexicalizes the event of cutting and the category of the affected entity.⁹

7.3.2. Transitive sentence inventory

The following examples illustrate all simple transitive sentence patterns; the list attempts to be exhaustive in order to illustrate the several syntactic sequences driven by different combinations of agent and object pronominal words. Optional elements are parenthesized in green and required elements are shown in red.

Since the list is exhaustive, parsing it as an introduction to the transitive structure may be tedious. The reader may wish to briefly scan this section, review the discussion of the plural marker in Section 7.4, and then move forward to the transitive structure and the discussion of pronominal words in Section 7.5 returning to this list of examples as desired.

In transitive structures, the agent pronoun and object pronoun are optionally included.

53) I thank you (sing.)

(Kei ta) (nama) ei cha ly
1 sg nom.part 2sg.obj.pron 1 sg.agent.pw 2sg.obj.pw thank

54) I thank him

(Kei ta) (ano) ei ly
1 sg nom.part 2sg.obj.pron 3sg.agent.pw thank

As (54) illustrates, 3p object pronominal words are never present; if no object pronominal word is present, the object is assumed to be 3p. If clarity is required, the object pronoun “ano,” “anono,” or “a” can be used.

55) I thank you (pl.)

(kei ta) (namo) ei cha ly ei
1 sg nom.part 2pl.obj.pron 1 sg.agent.pw 2sg.obj.pw thank obj.pl

56) I thank them

(kei ta) (amo) ei ly ei
1 sg nom.part 3pl.obj.pron 1 sg.agent.pw thank obj.pl

In (56) the object is interpreted as 3p even though no 3p object pronominal word is included. The object plural marker indicates the plurality of the object.

57) You (sg.) thank me

(na/nama ta) (keima) eina ly chi
2sg nom.part 1ps.obj.pron 1sg.obj.pw thank 2sg.agent.pw

Example (57) has the most distinctive syntax of Mara's five transitive structures, where the agent pronominal word follows the verb. It is rare for any syntactic elements other than tense or plural markers to follow the verb. The structure is invoked only with the combination of a 2p agent and 1sg object.

58) You (sg) thank you (sing)

(na/nama ta) (nama) na cha ly
2sg nom.part 2sg.obj.pron 2sg.agent.pw 2sg.obj.pw thank

59) You (sg) thank him

(na/nama ta) (ano) na ly
2sg nom.part 3sg.obj.pron 2sg.agent.pw thank

60) You (sg) thank us

(na/nama ta) (keimo) mania na ly
2sg nom.part 2pl.obj.pron 2pl.obj.pw 2sg.agent.pw thank

61) You (sg) thank you (pl)

(na/nama ta) (namo) nama cha ly
2sg nom.part 2pl.obj.pron 2pl.obj.pw 2sg.agent.pw thank

62) You (sg) thank them

(na/nama ta) (amo) na ly ei
2sg nom.part 3pl.obj.pron 2sg.agent.pw thank obj.pl

63) He thanks me

(ano ta) (keima) a eina ly
3sg nom.part 1sg.obj.pron 3.sg.agent.pw 1sg.obj.pw thank

Example (63) shows the one form where the 3sg agent pronominal word may be omitted. It may not be omitted from the forms shown in (64)–(68).

64) He thanks you (sing)

(ano ta) (nama) a cha ly
3sg nom.part 1sg.obj.pron 3sg.agent.pw 2sg.obj.pw thank

65) He thanks him

(ano ta) (ano) a ly
3sg nom.part 1sg.obj.pron 3sg.agent.pw thank

66) He thanks us

(ano ta) (keimo) mania a ly
3sg nom.part 1pl.obj.pron 1pl.obj.pw 3sg.agent.pw thank

67) He thanks you (pl)

(ano ta) (namo) a cha ly ei
3sg nom.part 1pl.obj.pron 3sg.agent.pw 2sg.obj.pw thank obj.pl

68) He thanks them

(ano ta) (amo) a ly ei
1sg nom.part 1pl.obj.pron 3sg.agent.pw thank obj.pl

69) We thank you (sg)
 (keimo ta) (nama) eima cha ly
 3pl nom.part 1 sg.obj.pron 1 pl.agent.pw 2sg.obj.pw thank

70) We thank him
 (keimo ta) (ano) eima ly
 3pl nom.part 1 sg.obj.pron 1 pl.agent.pw thank

71) We thank you (pl)
 (keimo ta) (namo) eima cha ly
 3pl nom.part 2sg.obj.pron 1 pl.agent.pw 2sg.obj.pw thank

In (72) and (73), the verb-following plural marker is not required since both subject and object are plural. Section 7.4 further discusses the use of the plural marker.

72) We thank them
 (keimo ta) (amo) eima ly
 3pl nom.part 3pl.obj.pron 1 pl.agent.pw thank

When omitting the optional pronouns, (73) shows a rather striking economy of expression.

73) You (pl) thank me
 (namo ta) (keimo) eina ly ei chi
 2pl nom.part 3pl.obj.pron 1 sg.obj.pw thank agent.pl 2sg.agent.pw

The phrase structure in (73) shows the same distinctive syntactic characteristics as (57), here shown with a verb–following agent plural marker. The object pronominal word immediately precedes the verb, and a 2p agent pronominal word follows the verb.

74) You (pl) thank you (sing)
 (namo ta) (namo) nama cha ly ei
 2pl nom.part 2sg.obj.pron 2pl.agent.pw 2sg.obj.pw thank agent.pl

In (74), the plural marker indicates that either the agent or object is plural. The presence of the “nama” 2sg agent pronominal word disambiguates the plurality for the listener. (Note that “nama,” can be either a 2pl agent pronominal word or a 2sg pronoun.)

75) You (pl) thank him
 (namo ta) (namo) nama ly ei
 2pl nom.part 2sg.obj.pron 2pl.agent.pw thank agent.pl

76) You (pl) thank us
 (namo ta) (keimo) mania nama ly
 2pl nom.part 3pl.obj.pron 1pl.obj.pw 2sg.agent.pw thank

77) You (pl) thank you (pl)
 (namo ta) (namo) nama cha ly (ei)
 2pl nom.part 2pl.obj.pron 2pl.agent.pw 2pl.obj.pw thank pl

The construction in (77), discussed in Section 7.4.1 is one where the Sabeu consultant felt phrase-terminal plural marker “ei” was appropriate despite the plurality of both agent and object.

78) You (pl) thank them

(Namo ta) (amo) nama (amo) ly
 2pl nom.part 3pl.obj.pron 2pl.agent.pw 3pl.obj.pw thank

Although the bare form “nama ly” should be sufficient for the structure in (78), the consultant felt that it would be “better to include more words,” or the 3pl object pronominal word “amo,” in order to disambiguate the phrase.

79) They thank me

(amo ta) (keima) (ama) eina ly ei
 2pl nom.part 3pl.obj.pron 3pl.agent.pw 3pl.obj.pw thank agent.pl

80) They thank you (sing.)

(amo ta) (nama) ama cha ly ei
 2pl nom.part 2sg.obj.pron 3pl.agent.pw 2sg.obj.pw thank agent.pl

81) They thank us

(amo ta) (keimo) mania ama ly
 2pl nom.part 2sg.obj.pron 1pl.obj.pw 2sg.agent.pw thank

82) They thank you (pl)

(amo ta) (nama) ama cha ly
 2pl nom.part 2sg.obj.pron 1pl.agent.pw 2sg.obj.pw thank

83) They thank them (different groups)
 (amo ta) (amo) ama ly
 2pl nom.part 3pl.obj.pron 3pl.obj.pw thank

Section 7.5.1 provides a summary of pronominal word combinations; Section 7.5.2 lays out the five transitive sentence structures and how their syntactic characteristics apply to a Mara case marking system.

7.4. Plural Markers

The plural marker “ei” is used post-verbally to indicate plurality of subject, agent, or object. Lorrain (1951:11) and Weidert (1985:929) state that it is included when only one of the participants is plural and omitted when both participants are plural; this study finds that this is generally although not always true. In the examples below, required elements are in red, optional elements are in green.

84) I thank them
 (kei ta) ei Ø ly ei
 1sg nom.part 1sg.agent.pw 3pl.obj.pw thank obj.pl

As noted earlier, no pronominal words are present for 3p objects. The post-verbal plural marker signals the plurality of the object.

85) We thank you (pl)
(keimo ta) (namo) eima cha ly
1sg nom.part 2sg.obj.pron 1pl.agent.pw 2sg.obj.pw thank

Since both agent and object are plural, no plural marker is used.

86) He thanks you (sg)
(ano ta) (nama) a cha ly
3sg nom.part 1sg.obj.pron 3sg.agent.pw 2sg.obj.pw thank

Both participants are singular; no plural marker is used.

87) He thanks you (pl)
(ano ta) (namo) a cha ly ei
3sg nom.part 1pl.obj.pron 3sg.agent.pw 1pl.obj.pw thank obj.pl

The post-verbal plural marker signals the difference in object plurality between (86) and (87)

88) You (pl) thank me
(namo ta) (keimo) eina ly ei chi
2pl nom.part 3pl.obj.pron 1sg.obj.pw thank agent.pl 2sg.ag,pw

The post-verbal agent marker precedes the agent pronominal word, and signals the plurality of the agent.

7.4.1. Plural structure exceptions

There are exceptions to this structure. In the case where the object is in the 1 pl, the plural marker is never used but rather a distinctive 1 pl object pronominal word “mania.” Plurality of the agent is indicated by the agent pronominal word.

89) You (sg) thank us
(na/nama ta) (keimo) mania na ly
2sg nom.part 2pl.obj.pron 2pl.obj.pw 2sg.agent.pw thank

90) You (pl) thank us
(namo ta) (keimo) mania nama ly
2pl nom.part 3pl.obj.pron 1 pl.obj.pw 2sg.agent.pw thank

Although he felt that these types of constructed sentences were generally grammatically awkward, the Sabeu consultant considered the plural marker to be necessary in instances where the agent was in the 2pl and the object was either in the 2sg or 2pl, which introduced ambiguity in differentiating these two forms. He displayed a similar hesitation, although not quite as pronounced, when omitting the plural marker when employing a 3pl agent and 2sg object. Following

his recommendations for the former, (91) and (92) exhibit the same morphosyntax but are semantically ambiguous.

91) You (pl) thank you (sg)

(namo ta) (namo) nama cha ly ei
2pl nom.part 2sg.obj.pron 2pl.agent.pw 2sg.obj.pw thank ag.pl

92) You (pl) thank you (pl)

(namo ta) (namo) nama cha ly ei
2pl nom.part 2pl.obj.pron 2pl.agent.pw 2sg.obj.pw thank obj.pl

Example (42), repeated below, shows how the plural marker is used to indicate plurality for an oblique indirect argument of a ditransitive verb. Further investigation would be needed to explore how ditransitive verbs negotiate the expression of plurality without ambiguity.

(42) chakhaitawta vao-sa kha khisaw-zy a-pie ei
then pig meat top.mark village-PLU 3sg.pw-give ind.pl
(And he gave the pig-meat to the villagers)

7.5. Pronominal Words

Inventories of both intransitive and transitive sentences have now been given; Section 7.2 presented an overview of the pronominal system for the simpler intransitive structure. Sections 7.5.1 and 7.5.2

examine how these morphosyntactic components combine and how their use both influences sentence syntax and reveals a case marking system. Section 7.5.3 posits the existence of a deictic hierarchy for these pronominal words. Finally, Section 7.5.4 discusses their morphological and semantic structure.

7.5.1. Pronominal word combinations

Tables 25 and 26 present agent/object pronominal word combinations. The combinations that were judged semantically infeasible by the Sabeu consultant are marked by N/A (not applicable).¹⁰ Ellipses, where present, indicate that other syntactic elements may intervene between the pronominal word indicated and the verb. Weidert (1985) and those who reference him include the equivalent of Table 23 with agent/singular object pronominal word combinations. Bedell (2002) expands on this base by including both singular and plural examples. Lorrain (1951) and Savidge (1908) conflate pronouns with pronominal words in comprehensive lists of pronouns for the nominative and accusative cases, although both later

separate out pronominal words; e.g., the pronouns “i,” “ima,” “na,” “nama,” “a,” and “ama” are used as pronominal particles to verbs (Savidge, 1908:10).” Lorrain’s and Savidge’s data differ from that gathered for this study in a number of instances. For example, Lorrain records the “chi” 2sg pronominal word for the nominative case, but does not comment on its presence only when the object is 1sg; he does not record the more common 2sg object pronominal word “cha.” Savidge omits mention of 2sg agent pronominal word “chi” used in conjunction with a 1sg object, but notes the existence of 2sg pronominal word “cha” for second person objects.

Table 25: *Agent and Singular Object Pronominal Word Combinations*

Object → Agent ↓		me 1sg	You 2sg	him/her/it 3sg
I	1sg	N/A	ei cha	ei
you	2sg	eina V chi	na cha	na
he	3sg	eina	a cha	a
she	3sg	eina	a cha	a
it/ComN	3sg	eina	a cha	a
we	1pl	N/A	eima cha	eima
you	2pl	eina ...V... ei chi	nama cha V... ei	nama V ... ei
they	3pl	eina V ... ei	ama cha V... ei	ama V ... ei

Table 26: *Agent and Plural Object Pronominal Word Combinations*

Object → Agent ↓		us 1pl	you 2pl	Them 3pl
I	1sg	N/A	ei cha V ... ei	ei V ... ei
you	2sg	mania na	na cha V ... ei	na V ... ei
he	3sg	mania a	a cha V ... ei	a V ... ei
she	3sg	mania a	a cha V ... ei	a V ... ei
it/ComN	3sg	mania a	a cha V ... ei	a V ... ei
we	1pl	N/A	eima cha	eima
you	2pl	mania nama	nama cha V ... ei	nama amo
they	3pl	mania ama	ama cha V ... ei	ama

Tables 25 and 26 show that the syntactic order of pronominal words cannot be ascertained merely by case; nominative forms can

both precede and follow accusative forms as in (93) and (94), and in one case, even follow the verb, shown in (95). Section 7.5.2 delineates the five possible syntactic structures.

93)	I thank you (sing.)		Nominative precedes accusative
	ei	cha	ly
	1 sg.agent.pw	2 sg.obj.pw	thank
	Nominative precedes accusative		

94)	He thanks us		Nominative follows accusative
	mania	a	ly
	1 pl.obj.pw	3 sg.agent.pw	thank

95)	You (sg.) thank me		Nominative follows verb
	eina	ly	chi
	1 sg.obj.pw	thank	2 sg.agent.pw

Weidert defines a notion of “morphosyntactic unpredictability,” which seeks to measure the degree of regularity of morphosyntactic structures such as word order within a given language (Weidert, 1985:905). His unpredictability measurement depends upon the “pattern congruity exhibited by orderly arrangements of agglutinated morph sequences” (Weidert, 1985:909); his assessment of pattern congruity is specifically based upon the evaluation of the consistency

of pronominal word composition and their order relative to the verb and other participants. In the study of four Sino–Tibetan languages: Kham, Lohorong Rai, Nocte, and Mara (Lakher), Mara ranks highest in morphosyntactic unpredictability with an unpredictability measurement twice that of its nearest neighbor, Lohorong Rai.

7.5.2. Transitive sentence structure

As Section 7.2 revealed, intransitive structures show SV (subject–verb) word order, both when optional pronouns are included and when they are omitted. If a subject pronoun is included, it precedes the subject pronominal word, which precedes the verb. If the subject pronoun is omitted, then the subject pronominal word alone fulfills its role. Example (96) reviews this intransitive structure, where “S” indicates “subject” and “V” indicates “verb.” Red elements are required; parenthesized elements such as (Keimo) or (S) are optional;

96) we laugh

(Keimo)	eima	pahnie
1 pl.pronoun	1 pl.subj.pw	laugh
(S)	S	V

When optional agent and object pronouns are included in transitive sentence structures, Mara employs an AOV (agent–object–verb) word order. Regardless of the order of the pronominal words or their relation to the verb, the agent pronoun will precede the object pronoun relative to the verb, as shown in (97). “A,” and “O” indicate “agent,” and “object.” Parenthesized elements such as (O) and (keima) are optional.

97) You (sg) thank me

(na	ta)	(keima)	eina	ly	chi
2sg.pron	nom.part	1 ps.obj.pro	1 sg.obj.pw	thank	2sg.agent.pw
A		(O)	O		V

However, when pronominal words are used as the sole means to indicate sentence participants, Mara embraces no fewer than five different transitive sentence structures, seen below in (98–102). For simplicity, optional elements are omitted. Required elements are

shown in red, and elements that may be semantically necessary are shown in blue.

I. All sentences with 2sg or 2pl as the object have AOV pronominal word order. This structure may also be used when the A is 2pl and the O is 3pl. See (98).

agent-pw object-pw VERB (plural marker)

98) They thank you (pl)

ama	cha	ly
1 pl.agent.pw	2sg.obj.pw	thank
A	O	V

II. OAV pronominal word ordering is used when the O is 1pl. See (99).

object-pw agent-pw VERB (plural marker)

99) He thanks us

mania	a	ly
1 pl.obj.pw	3sg.agent.pw	thank
O	A	V

III. When the O is 3p, there is no object pronominal word; the structure is AV or AØV. As noted above in (I), one exception can exist when the A is 2pl and the O is 3pl, when the structure in (95) may then be used. See (100).

agent-pw VERB (plural marker)

100) He thanks them

a	ly	ei
3sg.agent.pw	thank	obj.pl
A	V	

IV. When the A is in the 3p, the agent pronominal word may be omitted if the O is 1sg; the structure is thus OV or ØOV. See (101).

agent-pw VERB (plural marker)

101) They thank me

eina	ly	ei
3pl.obj.pw	thank	agent.pl
O	V	

V. All sentences with 2p as the A and 1sg as the O have OVA structure. See (102).

object- pw VERB (plural marker) agent-pw

102) You (sg) thank me

eina	ly	chi
1sg.obj.pw	thank	2sg.agent.pw
O	V	A

Table 27 summarizes the distribution of these structures. Where the A takes the same syntactic position as the S in an intransitive sentence structure, Mara exhibits properties of a nominative–accusative system, where A and S are marked alike. This nominative–accusative structure holds when the O is in the 2p and 3p. However, Mara exhibits properties of an ergative–absolute system when the O is in the 1p. The O is in the same syntactic position as the S of an intransitive sentence: O and S are marked alike and A is marked differently. Mara could thus be described as a split ergative language, using both nominative–accusative and ergative–absolute systems.

Table 27: *Pronominal Word–Verb Distribution Structures*

Object → Agent ↓		me 1sg	you 2sg	him/her/it 3sg	us 1pl	you 2pl	them 3pl
I	1sg	N/A	AOV	AØV	OAV	AOV	AØV
you	2sg	OVA	AOV	AØV	OAV	AOV	AØV
he/she/it	3sg	ØOV	AOV	AØV	OAV	AOV	AØV
we	1pl	N/A	AOV	AØV	OAV	AOV	AØV
you	2pl	OVA	AOV	AØV	OAV	AOV	AOV
they	3pl	ØOV	AOV	AØV	OAV	AOV	AØV

7.5.3. *Pronominal word hierarchy*

In his study of deictic class marking in Tibetan and Burmese, Beckwith (1992) cites some of DeLancey’s conclusions about pronominalization in Tibetan and Burmese. These are, namely, that “pronominalization is a type of agreement whereby pronominal affixes on the verb refer to animate arguments in sentences irrespective of syntactic functions; when two arguments are involved, a hierarchy rule is invoked, and ‘suffixation is determined by the person of the two arguments’ ” (Beckwith, 1992:1; DeLancey, 1989, cited in Beckwith). Beckwith continues, stating “Given this particle–verb distribution, it is

possible to conclude that there is a deictic hierarchy of particles”

Beckwith, 1992:1), but does not elaborate further on such a hierarchy.

While the Mara language does not have the verb affixation properties that DeLancey describes, it does show characteristics of a deictic hierarchy among sentence participants which motivates the presence of a pronominal word and its syntactic position. Any transitive sentence participant in the 1p will always have an explicit pronominal word, and it will always precede other participants, whether the 1p participant is agent or object. The 2p also always has a pronominal word, but its syntactic position is less prominent than the 1p, as it almost always follows the pronominal word of any other sentence participant. 3p participants almost always have pronominal words associated with them in an agentive role, but generally not when treated as an object. A deictic hierarchy would place the first person at the top of the hierarchy, the second person participating or at least present; the third person may or may not be present.

7.5.4. Morphology of pronominal words

Section 7.2.1 commented briefly on the interpretation of the individual morphemes in pronouns and subject pronominal words. The composition of pronominal words implies that these words (and their associated pronouns) are multi-morphemic and that the first morpheme may be meaningful in indicating person, the second number. Weidert (1985) and his referents decompose Mara's agent and object pronominal words into constituent morphemes. He relates "ei," "na," and "a" to the grammatical person and "ma" for number.

Table 28 compares Weidert's morphemic IPA transcriptions to those found in this study. (The Notes section gives IPA transcriptions for those pronominal words whose transcriptions were not included in previous tables.)¹¹ The first column shows the individual morpheme, the second column Weidert's IPA transcription (Weidert, 1985:929), and the third the morpheme semantics. The fourth column shows the IPA transcriptions recorded for the present study, and the last column

includes the pronominal words from which this study's IPA transcriptions were taken.

Table 28: *Morphemic Deconstruction of Pronominal Words*

Morpheme	IPA Weidert	Semantics	IPA Arden	Pronominal Words
ei	ēī	1p ag. or 1ps obj.	ēī	ei
			éī	eina
ma/mo	ḿə	ag. pl. if obj. not 1sg. obj. pl. if obj. 1pl.	ḿəʊ?	namo, amo eima
			ḿá?	ama
			m̀à	nama
			m̄	mania
ei	éī	1pl. ag. if obj. pl.	éī	eima
cha	ts̄ə	2p obj.	t̄ə	cha
na	n̄	1) 2p ag. 2) 3p ag. if obj. 1sg	n̄j̄à	mania
			n̄	eina
			ńá	nama
na ,, chi	n̄ ... ts̄ī	2p ag. if obj. 1sg	ńá ... t̄ēī	na ... chi
a	ə	3p ag. if obj. not 1p	á	ama, a

A number of clear correlations between the proposed individual morpheme and its semantics can be seen. “ei” always indicates first person; “ma/mo” shows plurality; “cha” always indicates a second person object. However, this is hardly a consistent system; there are

many special cases, especially when the first person is involved. IPA transcriptions in column 4 also show significant phonemic variation among the pronominal word lexical units, for example, “ma/mo” and “na” are realized quite differently in different pronominal words. Morphemic tonal differences are also evident, for example, the éí in “eima” (1 pl agent) differs from the eī̄ in “ei” (1 ps agent) and “eina” (1 sg object).

DeLancey (1989) in fact comments that the distribution of the “na” prefix appears to be “synchronically inexplicable” with a “highly unusual paradigmatic pattern” and cannot be accounted for as a simple indication of 2p. (DeLancey, 1989:330). Nonetheless, he finds similarities with Trung, a language of southwestern China, and concludes that this prefix originates from a shared ancestor of Proto-Kuki-Chin and Trung. Historically, morphemes in Mara pronominal words undoubtedly carried independent meaning. In present-day Mara, there is significant variation in their realizations, and the presence of a first person participant impairs semantic consistency.

8. Conclusion

This paper has set forth the phonetic inventory of the $\eta j \bar{a} p^h j a$ dialect of the Mara language and has discussed its contrastive sounds and contextual variants. Further, it discusses the morphosyntax of Mara pronominal words in intransitive and transitive sentences.

Mara is characterized by the historic loss of word-final consonants with the exception of the glottal stop. The language contains an unusual set of contrastive voiceless sonorants and lowered/unlowered vowel pairs. While not contrastive, Mara's distinctive word-final glottal stops can be environmentally conditioned by vowel-final tonal quality, and they disappear in rapid phrasal articulation. Primarily tri-tonal, the tone system admits a regularly produced falling contour tone that is often, if not always, induced through morphologically-derived contexts.

Aspiration of plosives and affricates is contrastive. However, voicing can be both contrastive and contextual. Voiced and voiceless

fricatives contrast and alternate in different contexts; alveolar stops contrast in both positions, while velar and uvular stops are susceptible to conditioning. Mara's characteristic pre- and post-aspirated nasals are contextual, alternating word-initially and word-medially. This study concludes that all members of Mara's unusual inventory of voiced and voiceless approximants are contrastive, although further analysis would be desirable for the voiceless trill and voiceless central approximant.

Minimal pairs illustrate contrast among many Mara vowels. Vowels o , ɤʊ , and ɔ appear to be in free variation. Λ and α also vary, where the variation can be influenced by vowel harmony. Diphthongs $e\text{ɪ}$ and $\alpha\text{ɪ}$ also show little evidence of contrast; diphthongs can also disappear in running speech. Vowel harmony resulting in vowel raising can occur in running speech.

Mara uses a complex pronominal word system, where the order and inclusion of combination of such words in a transitive structure depend upon both the person and the combination of participants.

The language can be described as a split-ergative system, showing evidence of both nominative-accusative and ergative-absolutive case marking systems for pronominal words. In its shortest forms, Mara allows for a compact form of expression with little ambiguity.

8.1. New Areas of Study

It is striking that so little new fieldwork on Mara has been done since Lorrain(1951), Savidge (1908), and Luce (Luce, 1985, fieldwork performed from 1912-1964, cited in VanBik, 2009). Of these researchers, only Luce focused on the dialects of Myanmar, such as Sabeu; Lorrain and Savidge were focused on Indian dialects of Mara. In comparing the data from this study with that of Lorrain and Savidge, there are not only substantial phonetic and grammatical differences between Sabeu and Tlongsai, but also many lexical differences between these two Myanmar and Indian dialects. Myanmar's political repression puts dialects such as Sabeu at significant risk of disappearance; additional fieldwork would be highly desirable in order to more fully document the language.

Since Myanmar's borders have been tightly controlled since the military coup in 1962, a comparative study between Mara dialects of the Indian Mizoram states (such as Tlongsai) and those of Myanmar (such as Sabeu) might also well show evidence of language divergence over the past almost-five decades. Myanmar's Mara dialects may possibly have retained more connection to their Kuki-Chin linguistic roots than India's.

In the course of the work performed for this study, data and analysis relating to the deictic use of topic and event markers was omitted due to lack of space and time; Mara has a well-evolved system of deictic markers that should be further explored.

Cutting and breaking events such as those presented in Section 7.3.1 show an interesting complexity for the cutting of food in particular; these do not immediately appear to follow the semantic dimensions presented by Majid et al (2008).

Finally, the elusive voiceless central approximant deserves further examination, and particularly in comparison with the voiceless

trill. These segments are auditorially distinct, but this study does not definitively prove their existence or contrast. The use of an articulograph, which uses electromagnetic fields to measure the locations of sensors on lips, tongue, and jaw during articulations, would yield further information about such key factors as tongue position and aperture shape and size.

9. Notes

¹ The consultant referred to his country as “Burma,” which was the name of the state from the time of British rule until 1989.

² A Swadesh list is one of several lists of vocabulary with “basic” meanings, developed by Morris Swadesh in the 1940’s and 50’s (Matthews, 1997).

³ No census date given.

⁴ VanBik (2009) is a revision of his 2006 doctoral dissertation (Dept. of Linguistics, U.C. Berkeley).

⁵ Lorrain accurately describes the existence of a tri-tonal system, but this study’s data contradicts most of Lorrain’s brief tonal examples. In his discussion of Mara, Löffler (2002) also comments on Lorrain’s tonal inaccuracies.

⁶ Lorrain’s phonetic spelling system has the letter “h” serving to indicate both a glottal fricative and a glottal stop.

⁷ Lorrain’s description for “yu” is “like the Mara “y” and “u” with no hiatus between them and the two sounds uttered in one and the same breath, this is a sound of some important [sic] and should be well practised [sic]” (Lorrain, 1951:4). Given his description and other IPA transcriptions of “y” and “u,” the diphthong would be indeed be like to be transcribed ɨu . However, this study transcribes a word such as “lyurah” as IPA l̄ɛur̄ā , mapping orthographic “yu” unto the common diphthong ɛʊ , much at odds with his description. Thus, in Table 6 and Figure 5, the derived transcription selected is that which follows directly from Lorrain’s textual description.

⁸ Although “keima” can be used as a subject pronoun, it is more commonly used as an object pronoun. No rationale was found for the variation in the 2sg or 3sg personal pronoun forms.

⁹ The interlinguistic commonalities and differences for cutting and breaking events are known to be significant; (Majid et al, 2008) defines four semantic dimensions accounting for variance among

languages. Mara’s semantic distinctions for food cutting, in particular, do not appear to correlate well to the dimensions proposed by Majid et al.; further exploration of cutting events in Mara would be an interesting area of study.

¹⁰ Mara does have a reflexive structure, but its description is beyond the scope of this study.

¹¹ The following table gives IPA transcriptions for those pronominal words whose transcriptions had not previously been introduced.

Table 29: *IPA for Additional Pronominal Words*

Pronominal Word	IPA
mania	m̄ɒnj̄à
eina	ēɪn̄ɒ
cha	t̄ɕ̄ɒ
nama	n̄ám̄à
chi	t̄ɕ̄ɪ

10. Abbreviations

1p	first person
1sg	first person singular
2p	second person
2sg	second person singular
3p	third person
3sg	third person singular
1pl	first person plural
2pl	second person plural
3pl	third person plural
A	agent: the most agent-like argument of a transitive verb
ag	agent: the most agent-like argument of a transitive verb
AOV	agent-object-verb word order
AØV	agent-null-verb word order for a transitive verb where the object is omitted.
ComN	common noun
DemNDem	demonstrative-noun-demonstrative order
F1	first formant
F2	second formant
F3	third formant
ind.pl	indirect object plural
IPA	International Phonetic Alphabet
JP	Mara consultant's initials
ms	milliseconds
N/A	not applicable
n.d.	no date
nom.part	nominative particle
pl	plural
O	object: the least-agent like argument of a transitive verb
obj	object: the least agent-like argument of a transitive verb

Abbreviations, Continued

OAV	object-agent-verb word order
OV	object-verb order
OVA	object-verb-agent word order
∅OV	null-object-verb order for a transitive verb where the agent is omitted.
pron	pronoun
pw	pronominal word
S	subject: the only argument of an intransitive verb
sg	singular
subj	subject: the only argument of an intransitive verb
SV	subject-verb word order
top.mark	topic marker
V	verb
VO	verb-object word order

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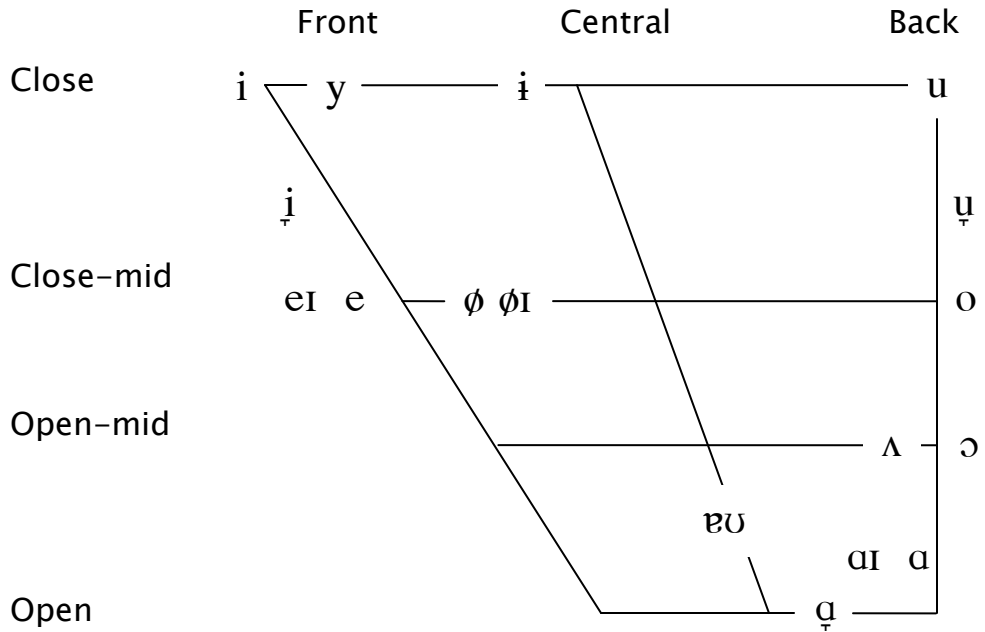
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Appendix 1: Mara Consonantal Inventory

	Bilabial	Labio dental	Dental	Alveolar	Alveo Palatal	Palatal	Velar	Uvular	Glotta
Plosive	p p ^h b		t ^h t	t ^h t d			k k ^h	q q ^h	ʔ
Nasal	m m ^h h m			n n ^h hn			ŋ		
Trill				r r̥					
Tap or Flap									
Fricative		f v		s z	ç ʒ				h
Affricate					tç tç ^h dz				
Lateral fricative									
Approximant	w			ɹ		j			
Lateral approximant				l l̥					

Appendix 2: Mara Vowel and Tonal Inventory



Rounded Vowels	Unrounded vowels	Tones	
y	ɨ	High	á
ø	ɨ̄	Mid	ā
u	ɨ̄	Low	à
ɔ̄	e	Contour	áā
ɔ	ʌ		
	ɑ		
	ɑ̄		

i is less spread than ɨ, ɨ has a spread lip position
 ɑ is less spread than ɑ̄. ɑ̄ has a spread lip position.
 u is less rounded than ɔ̄.

Appendix 3: Mara Sound Distribution Table

Word-initial	Following
p	ʌ u o ɔ a i̯ ø æʊ ai
p ^h	i ai i̯
b	ʊ øɪ
t/t̩	i u ɔ ai l l̩ y
t ^h /t̩ ^h	æʊ ei u i̯ a i ai
d	a æʊ
k	j e i u æʊ ʌ øɪ
k ^h	a i i̯ ʌ ʊ e u
m	i æʊ ʌ
hm	o ʊ
n	a i̯ æʊ
hn	ʌ o æʊ
ŋ	a ɹ
r	ei i o æʊ a u
r̩	æʊ
f	ʌ
v	æʊ ʊ
s	a ɹ ʌ øɪ i̯ u o ʌ
z	a
ç	i
ʒ	y
h	e u o ɔ a

Appendix 3: Mara Sound Distribution Table (continued)

Word-initial (continued)	Following
tɕ	ʌ ɔ̣ ɑ ɑɪ ʔ ʊ ɔ e y i i
tɕ ^h	ʊ ɔ i i
tɕ/dz	y i i
l	æʊ ɑ ɔ̣ u ʌ ɑɪ e
l̥	æʊ u ʌ
øɪ	p
ɑ	Sounds NOT following q ^h m ^h ŋ ɟ ɕ z dz w j
ʌ	h, t ^h
eɪ	p, n
ɔ	ʈ, s
i	ʔ
y	ʔ
ʌ	h
ɑ	d

Appendix 3: Mara Sound Distribution Table (continued)

Word-medial consonants		
Preceding	Consonant	Following
o əʊ aɪ ɑ̣ ɑ̣ ʌ u eɪ i i j̣ u y ɔ̣	p	w əʊ ʌ ɔ̣ ɑ̣ u ụ i ʌ
ɑ̣	p ^h	ʌ
ɑ̣	b	i w u ʌ
ɑ̣ i i eɪ ɔ̣ ụ ʌ o əʊ	t/ṭ	eɪ u i əʊ ø y ɑ̣ ḷ
ʌ ɑ̣ əʊ	t ^h /ṭ ^h	ʌ i ị
y ɑ̣ ʌ i	d	i ɑ̣ w əʊ o
əʊ ɑ̣ ʌ	k	ɑ̣ w əʊ i ị u o øɪ j
ɑ̣ aɪ	k ^h	ɑ̣ u əʊ o
ɑ̣ i	q	ɑ̣ o
ɑ̣	q ^h	ɑ̣ i
ɛ ɑ̣ i əʊ ụ ɑ̣ o aɪ u øɪ y ɔ̣ j̣ i	ʔ	j̣ ʊ k ɑ̣ e i ɛ l øɪ
ɑ̣ eɪ øɪ	m	h əʊ ɑ̣ aɪ ụ
ɑ̣ ʌ ɔ̣	m ^h	i əʊ
ɑ̣ ə i eɪ	n	əʊ o
əʊ j̣ ʌ ɑ̣ ɑ̣	n ^h	j̣ əʊ ɑ̣ j̣ ʌ ɑ̣
ə ɑ̣	ŋ	o u ɑ̣
ʌ əʊ ɑ̣	r	ɑ̣ i o
ɑ̣ ʌ u i	ṛ	ɑ̣ o i i
ɑ̣	ɹ̣	o
ɑ̣	f	o
ɑ̣ ɑ̣ ɔ̣ ʌ	v	ɑ̣ y ɔ̣ øɪ j̣

Appendix 3: Mara Sound Distribution Table (continued)

Word-medial consonants (continued)		
Preceding	Consonant	Following
ɑ y ʌ i e ɔ	s	ɨ i u ɑ ɔ o ɑɪ eɪ ʋɔ ɸɪ
ɑ	z	ʋɔ o
e u ɑ ʌ	h	e u ɸ o ɑɪ
ɔ y	ç	i j
ɑ ʌ ɥ ʔ i	tç	ʋɔ e y ʌ ɥ ɑ i u ɑɪ
ɑ	tç ^h	ɨ o ʋɔ ɑ
ɑ	dz	y
d b k p	w	ɑ ɔ
l n ^h k	j	ɑ
ɑ ɥ ʌ c ʔ t ɨ	l	j e ɥ ɑ ɔ i eɪ ʋɔ ɑɪ ɨ
ɥ ɑ ʌ t	l̥	e i ɔ

Appendix 3: Mara Sound Distribution Table (continued)

Word-final vowels	
Preceding	Vowel
m j q ^h ŋ r n ^h s ɭ	ɑ
n ^h s	ɑ̣
h ʔ ɭ	e
ŋ	ɑ̣
h p b r l s k ^h p ɭ t	u
k s p	ụ
ʔ p l t r ṭ k m ^h ṭ ^h dz d	i
ŋ ṛ k k ^h s ṭ ^h f	o
ṭ	ʌ
ṭ ^h l n p	ị
h v ʔ	∅ɪ
l ṭ ^h k ṭ	∅ʊ
ṭ	ɑɪ

Appendix 4: Formant Value Data for Un/Lowered Vowels

Ụ	Word	F1 (Hz)	1st Std. Dev.	F2 (Hz)	1st Std. Dev.
1	ṇ̀	371	76	882	94
2	p̣p̣̄	454	10	809	14
3	ḥ̄ í?	361	39	849	25
4	ḥ̄ḥ̄̄	357	21	956	22
5	ḥ̄ḥ̄̄	333	16	914	49
6	ṿ̄ sá?	461	14	860	48
7	ḳ̄ḥ̄̄ē	388	9	782	25
8	ḳ̄ḥ̄̄c̣̄̄? (1)	261	90	867	110
9	ḳ̄ḥ̄̄c̣̄̄? 2)	404	15	974	131
10	āp̣̄̄? (1)	376	19	722	16
11	āp̣̄̄? (2)	382	24	710	12
Mean formant values (Hz)		377	30	848	50
Mean omitting lowest formant value		369	32	835	42
Mean omitting highest formant value		389	24	862	53
Mean omitting highest std. dev. value		389	24	835	42

Appendix 4: Formant Value Data for Lowered and Unlowered Vowels
(continued)

u	Word	F1 (Hz)	1st Std. Dev.	F2 (Hz)	1st Std. Dev.
1	ātlú	312	25	1295	181
2	lú (1)	315	42	1389	214
3	lú (2)	316	31	1494	51
4	pāpú	350	55	1036	28
5	lùpí	321	15	1543	50
6	hūʔ	325	29	1082	68
7	pāk ^h ū	333	33	1226	47
8	pāk ^h ū	310	18	1256	89
9	rù	354	23	1246	73
10	kūʔ	325	15	1298	72
Mean formant values (Hz)		326	29	1287	87
Mean omitting lowest formant value		328	30	1314	94
Mean omitting highest formant value		323	29	1258	91
Mean omitting highest std. dev. value		323	26	1275	73

Appendix 4: Formant Value Data for Lowered and Unlowered Vowels
(continued)

$\dot{\iota}$	Word	F1 (Hz)	1st Std. Dev.	F2 (Hz)	1st Std. Dev.
1	átç ^h í _̄ prá	287	21	2059	99
2	p̄ _̄ l̄í?	313	9	2079	21
3	s̄í?	399	50	1892	48
4	p̄ _̄	309	36	1996	16
5	p ^h í	337	30	1885	77
6	p̄ _̄ l̄n ^h í?	320	71	2089	541
7	átç ^h í _̄ prá	363	12	1960	20
8	n̄ _̄	261	18	1131	44
9	p̄ _̄ l̄í	313	9	2082	15
10	réu tçí _̄ prá	388	39	1900	167
Mean formant values (Hz)		329	30	1907	105
Mean omitting lowest formant value		337	31	1994	112
Mean omitting highest formant value		321	27	1887	56
Mean omitting highest std. dev. value		322	28	1887	56

Appendix 4: Formant Value Data for Lowered and Unlowered Vowels
(continued)

i	Word	F1 (Hz)	1 st Std. Dev.	F2 (Hz)	1 st Std. Dev.
1	pāī	315	10	2037	16
2	k ^h itété	282	17	2082	37
3	sáplì	310	23	2230	33
4	lùpí	268	6	2211	47
5	ápá?	284	18	2058	12
6	dzāvílá?	321	26	2131	50
7	hè í?	274	15	2206	39
8	čí	284	13	2038	49
9	ćínhá?	280	12	2113	71
10	hōī	318	40	2167	38
Mean formant values (Hz)		294	18	2127	39
Mean omitting lowest formant value		296	18	2137	42
Mean omitting highest formant value		291	17	2116	40
Mean omitting highest std. dev. value		291	16	2137	38

Appendix 4: Formant Value Data for Lowered and Unlowered Vowels
(continued)

Q	Word	F1 (Hz)	1st Std. Dev.	F2 (Hz)	1st Std. Dev.
1	tɕávèʔ	766	85	1511	39
2	sàq ^h á	791	57	1474	34
3	sát ^h èʊʔ	947	48	1623	37
4	sáp ^h lì	866	52	1498	32
5	sáp ^h lèŋò	814	53	1388	61
6	dzýsátʔ	726	32	1477	47
7	ŋá	684	29	1352	13
8	çínhátʔ	794	39	1466	34
9	tɕáfò	772	68	1478	80
10	lɔpíʔ	913	55	1534	34
Mean formant values (Hz)		807	52	1480	41
Mean omitting lowest formant value		816	54	1494	44
Mean omitting highest formant value		792	52	1464	42
Mean omitting highest std. dev. value		812	48	1480	37

Appendix 4: Formant Value Data for Lowered and Unlowered Vowels
(continued)

a	Word	F1 (Hz)	1st Std. Dev.	F2 (Hz)	1st Std. Dev.
1	ádzytá?	673	51	1460	48
2	tɕátà	772	47	1417	48
3	ālèʊ?	764	33	1443	35
4	ārāpā	715	37	1197	46
5	āpū?	837	29	1382	40
6	sā?	718	43	1416	52
7	sàq ^h á °ž	795	43	1340	31
8	ɕínha?	794	39	1466	34
9	ák ^h èʊ?	797	54	1450	44
10	árópà?	735	40	1246	47
Mean formant values (Hz)		760	42	1382	43
Mean omitting lowest formant value		770	41	1402	42
Mean omitting highest formant value		756	38	1382	43
Mean omitting highest std. dev. value		756	40	1378	41

Appendix 5: Sound Files

IPA	Meaning	Page/Ex	File name
áɪp ^h iẽk ^h ɪt̚	IPA Kiel (font type)	2	IPAKiel
ɲǎp ^h ǰà	Ngiaphia	12	ngiaphia dialect
k ^h èɪt̚áʔē	how	25/1	kheitae how
páɪ	pipe	28/2	pai pipe
p ^h áɪ	brush off	28/2	phai brush off
kūʔ	hand	30/3	ku hand
k ^h áɪt̚ít̚áʔé	when	30/3	khatitae when
āqá	throw	30/4	aka throw
áq ^h ɪ	bitter	30/4	akhae bitter
áɬɛ̃kwā	cold	30/5	achakua cold
áɬɛ̃ ^h ɪpá	bad	30/5	acchiepa bad
hmóʔ	blow	31/6	hmo blow
ēm ^h èʊʔ	I blow	31/6	eihmo I blow
hn̄ɫp̄ɫsū	nose	31/7	hnapasu nose
ān ^h jẽʊp̄āʔ	near	31/7	ahniapa near
p̄ɫɪ	dizzy	35/8	pari dizzy
sáɾò	animal	35/8	sahroh animal
áɾóp̄áʔ	other	35/8	ahropa other
áɾòp̄áʔ	green	35/9	ahropa green
áp̄áɫáp̄á	straight	35/10	apalapa straight
áp̄áɫèúp̄á	round	35/10	apalhopa round
húɫj̄āʔ	there	42/11	haolia there
ɲǎp ^h ǰā	Ngiaphia	42/12	ngiaphia dialect

Appendix 5: Sound Files (continued)

IPA	Meaning	Page/Ex	File name
pāpú	uncle	46/13	papu uncle
pàpū	grandfather	46/13	papao grandfather
éí	medicine	46/13	si medicine
sí	slave	46/13	sie slave
ālèʊ?	salt	46/13	aloh salt
tɛáʋè?	not	46/13	chavei not
	do re mi	49/14	do re mi three tones
sá?	meat	60/15	sa meat
sà	rice	60/15	sa rice
kʰátítá?é	when	61/17	khatitae when
kʰítítáé rā ēīmā sī ò	When do we hunt?	61/18	khatitae rah eima sie aw when do we hunt
zā?	night	63/19	za night
zá?	tickle	63/19	za tickle
áāqa	freeze	64/20	aka freeze
pòvó tɛá tɛʰíkū tɛ̀pɔ̀pātā àazɛʊ	the bird flew through the window	67/23	pavaw cha chhikao chapia pata azaw
pí	give	68/24	pie give
pʰí	take off	68/24	phie take off
pái	pipe	68/24	pai pipe
pʰái	brush off	68/24	phai brush off

Appendix 5: Sound Files (continued)

IPA	Meaning	Page/Ex	File name
tɕávèʔ	not	70/25	chavei not
átɕ ^h ípá	bad	70/25	acchiepa bad
āk ^h éú	hit	73/27	akhau hit
áq ^h ĩ	bitter	73/27	akhae bitter
éínháʔ	grass	77/29	sinha grass
sĩ	slave	77/29	sie slave
zýdwáʔ	all	78/30	zydua all
zāʔ	night	78/30	za night
tɕitɕàlāʔ	right	79/31	chachala right
átɕy ^t áʔ	few	79/31	achyta few
réú tɕ ^h ípá	bad smell	79/31	ro chhiepa bad smell
dzýsáʔ	man	79/31	chysa
hmóʔ	blow	81/33	hmo blow
ém ^h ó	I blow	81/33	eihmo I blow
bøĩ	party	94/39	by party
bārōmā tètutā í vø	I came from Burma	95/40	Burma tauta ei vy
vø	came	96/41	vy come
vù-sáʔ	pig meat	97/42	vao sa pig meat
tɕā-k ^h áí-tā-tā vù-sø k ^h a k ^h i-so-zøa pí ei	And he gave the pig meat to the villagers	97/42	chakhaitawta vao sa kha khisaw zy a pie ei

Appendix 6: Human Subjects IRB Approval



**SAN JOSÉ STATE
UNIVERSITY**

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To: Michelle Arden

From: Pamela Stacks, Ph.D.
Associate Vice President
Graduate Studies and Research

Date: May 21, 2009

The Human Subjects-Institutional Review Board has approved your request to use human subjects in the study entitled:

“Master’s Thesis: A linguistic investigation of Mara, a Tibeto-Burmese language”

This approval is contingent upon the subjects participating in your research project being appropriately protected from risk. This includes the protection of the anonymity of the subjects’ identity when they participate in your research project, and with regard to all data that may be collected from the subjects. The approval includes continued monitoring of your research by the Board to assure that the subjects are being adequately and properly protected from such risks. If at any time a subject becomes injured or complains of injury, you must notify Dr. Pamela Stacks, Ph.D. immediately. Injury includes but is not limited to bodily harm, psychological trauma, and release of potentially damaging personal information. This approval for the human subject’s portion of your project is in effect for one year, and data collection beyond May 21, 2010 requires an extension request.

Please also be advised that all subjects need to be fully informed and aware that their participation in your research project is voluntary, and that he or she may withdraw from the project at any time. Further, a subject’s participation, refusal to participate, or withdrawal will not affect any services that the subject is receiving or will receive at the institution in which the research is being conducted.

If you have any questions, please contact me at (408) 924-2427.

Protocol #S0902204

cc. Daniel Silverman 0093

The California State University
Chancellor’s Office
Bakersfield, Channel Islands, Chico, Dominguez Hills,
East Bay, Fresno, Fullerton, Humboldt, Long Beach, Los
Angeles, Maritime Academy, Monterey Bay, North
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San Marcos, Sonoma, Stanislaus