Topics in Marma (မာရမာ)

by

Rani Ukhengching Marma (ဦး ချမ်း စိန် မာရမာ)

B.S., Asian University for Women (2017)

Submitted to the Program in Linguistics and Philosophy
in partial fulfillment of the requirements for the degree of

Master of Science in Linguistics

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

September 2024

Author_____

Program in Linguistics and Philosophy
September 06, 2024

Certified by_____

Norvin Richards
Professor of Linguistics, Margaret MacVicar Faculty Fellow
Program in Linguistics
Thesis Supervisor

Accepted by_____

Daniel Fox
Anshen-Chomsky Professor of Language and Thought
Linguistics Section Head

Topics in Marma (မာရမာ)

by

Rani Ukhengching Marma (ဦး ချမ်း စိန် မာရမာ)

Submitted to the Program in Linguistics and Philosophy
on September 06, 2024, in partial fulfillment of the
requirements for the degree of
Master of Science in Linguistics

Abstract

Marma[1], an endangered indigenous language of Bangladesh, is spoken by approximately 200,000 Marma individuals residing in Bangladesh's southern region called the Chittagong Hill Tracts (CHT). Marma language is closely related to Rakhine and Burmese, and many lexical items are almost identical to those in Burmese and Rakhine, "although Marma exhibits a more conservative phonological profile than Burmese in the grammatical particles" Keisuke (2011). This research study analyzed several morphemes and their roles in shaping discourse structures in Marma information structure (topic-focus articulation). Marma has "**agglutinative morphology**", meaning words are formed by stringing together morphemes in specific sequences. We observed prefixation, suffixation, and infixation in Marma. We analyzed the multifunctionality of these selective morphemes ["က=*ga/ka,* ကို =*go/ko,* စာ=*cha,*ရာ=*ra,* ယည်=*yi*"] within Marma discourse and explored their implications for a better understanding of information structure in Marma language. At the end of this paper, through instrumental analysis, we proposed three tones in Marma (i. High and creaky, ii. low, and iii. falling).

Key words: Marma, indigenous language, information structure, topic and focus, morphology and tone.

Thesis Supervisor: Norvin Richards
Title: Professor of Linguistics, Margaret MacVicar Faculty Fellow, Program in Linguistics

[1] "According to Bradley (1985:180), the Marma group would have first migrated from Arakan to the Chittagong Hill Tracts by the early sixteenth century and then after the Burmese conquest in 1785. They live mainly in the Chittagong Hill Tracts where they form one of the main Indigenous groups (Htin, 2015) "

Acknowldgement

Completing this journey could not have been possible without the support of my parents (Mr. Aungkyajai Marma and Mrs. Suinaiching Marma). I am deeply indebted to my parents for instilling in me the value of education and without their sincere effort, unconditional support, and sacrifices, I could not have reached where I am standing today. I am equally grateful to my husband (The Mong Circle Chief, Raja Saching Prue Chowdhury), and my extended family members who have been a source of strength in my difficult times. I also want to thank my dearest friends, Faeqa Mohsin and Taieba Tawakoli, for their unwavering support during tough times.

My deepest gratitude goes to Professor Norvin Richards, my academic and thesis advisor, for guiding me for the last two years. Without his intellect and expertise in the relevant fields, I couldn't do this work in Marma. As Noam Chomsky wrote his email to me, besides being a great linguist, Norvin is also a great human being. He never failed to understand my situation as an international graduate mother and knew exactly when to push me to the next level. Moreover, I truly feel privileged to work under Dr. Cora Leisure (Phonologist) for her support and guidance for chapter 5 of this thesis, especially for teaching me to use PRAAT and MATLAB to analyze the data. Also, I thank Dr. Mitya Privoznov for his insightful comments on chapters 2, 3, and 4. I would also like to thank the MIT Department of Linguistics for their scholarship.Without the support, I would not have been able to come to MIT and complete the degree.

I want to thank the two student groups at MIT: 1) the Native American and Indigenous Association (NAIA), and 2) the Globally Indigenous Students for Justice (IS4J) who inspired me to continue my activism for Indigenous issues and empowered me with their unwavering support and solidarity during my time here.

Thank you everyone (အကိုံသူကို ကျေးဇူးတင်ပါရဲ)

Contents

Introduction

Marma (ISO 639-3 rmz) is an endangered indigenous language of South Asia. It is spoken by approximately 200,000 Marma individuals residing in southern Bangladesh's Chittagong Hill Tracts (CHT) [2]. Marma is a sub-dialect of Arakanese, and many lexical items are almost identical to those in Burmese, "although Marma forms exhibit a more conservative phonological profile, especially among initials and many grammatical particles, however, are considerably different from those in Burmese" Keisuke (2011). Marma has the closest resemblance to the Arakanese.

This paper investigates several morphemes and their roles in shaping discourse structures in Marma (specificity and definiteness, topic-focus articulation, and information structure). Marma has "**Agglutinative morphology**" Davis (2014), predominantly using suffixes. This paper will analyze the multifunctionality of selected morphemes within Marma's discourse, exploring their implications for understanding Marma's information structure. These affixes/particles/morphemes can be prefixed, infixed, and suffixed to nouns, verbs, and other words. The morphemes can also be dropped depending on the discourse context.

We will analyze specific sets of particles: "က=*ga/ka,* ကို =*go/ko,*
စ=*cha,*ရ=*ra,*=*yi*". The markers get pronounced from "*go* to *ko* or *ga* to *ka*" due to regular word and phrase internal intervocalic voicing.
Voice Alteration rules in Marma.

- 'Ga/Go' is pronounced when the preceding syllable ends with velar nasals and vowels.
- 'Ka/Ko' is pronounced when the preceding syllable ends with velar obstruent/ voiceless plosives (p,t,k)[3] and postalveolar affricates followed by a glottal stop.

[2]In 2007, around 150,000 Marma lived in Bangladesh; in the 2001 Indian census, 30,600 Marma lived in the Mizoram and Tripura areas of India

[3]Plosives are usually introduced first because of the kind of constriction in the mouth by which they are produced (closing-compression-release). There are six of them: /p, b, t, d, k, g/. Among them voiceless plosives are /p, t, k/, and voiced plosives are /b,d,g/

In the following table we see in which environment the voicing alternation happens.

English Word	IPA	Morphemes	Marma Writting
Tiger	Ky[â]	ga/go	ကျား
Chicken	Kɹakʔ	ka/Ko	ကြက်
Mouse	Kɹaukʔ	Ka/Ko	ကြွက်
Cat	kroŋ	Ga/Go	ကြောင်
Pond	Kaiŋ	Ga/Go	ကန်
Stone	kjaukʔ	Ka/Ko	ကျောက်
Cereal (Foxtail millet)	Chhepʔ	Ka/Ko	ဆပ်

Table 1: Marma Voice Alternation

Chapter Overview

Chapter One: The document begins by outlining a preliminary grammar sketch of Marma. Subsequent sections will discuss a detailed analysis of several morphemes in Marma.

Chapter Two: The second chapter examines *=go/ko*'s dual function to express specificity or definiteness within noun phrases and as a differential object marker. This section attempts to distinguish between accusative marking and definiteness or specificity in Marma through an examination of noun phrases in object positions and will analyze the circumstances in which *=go/ko* morpheme is used.

Chapter three: This chapter analyzes the multifaceted roles of two morphemes *=cha*, *=ga/ka* in Marma discourse by analyzing natural discourse and narratives and contextual application. This section discusses different functionalities of *=cha,=ga/ka* that contribute to the clarity and coherence of the Marma discourse.

Chapter Four: This chapter analyzes three focus particles *=ra*, *=yi* and *=ba.ga* in Marma. This section assists in a refined understanding of focus marking in Marma's discourse management strategies.

Chapter Five: This chapter explores the three tones associated with Marma vowels.

Methodology

Participants

For any academic research, the methodology is the foundation upon which the research is based. My research paradigm has been both qualitative and quantitative. To analyze the role of different markers/morphemes in Marma discourse structure, I have undertaken a qualitative and explanatory approach[4] by observing in a natural discourse setting. A qualitative research study is conducted to understand any social phenomenon that occurs in a natural setting and in our case it's the natural discourse setting.

This qualitative study was conducted in Khagrachari and some via Zoom involving 20 participants concerning different sections of the research. As Usher (1996) states a researcher or herself is also an explicit part of knowledge production rather than being excluded from the research. Being from the Marma community, I also put myself as a participant along with others to analyze the data undertaking all sorts of ethical considerations. The participants got overlapped while collecting data across different chapters.

Table 2: Chapter One, Two and Four

Chapters	**Age Group**	**Total Participants**	**Male**	**Female**	**Clan**
Chapter 1	55-65	1	1	0	Plengsa
Chapter 2 and 4	26-35; 36-45	3	1	3	Plengsa,Lungudusa and Regesa
Total		4	2	6	3 Clans

[4]Explanatory research is a research method that explores why something occurs when limited information is available (George, 2023). This method helps to improve the understanding of a given topic, ascertain how or why a particular phenomenon such as morpheme in Marma is occurring, and predict future occurrences for the morphemes in a specific setting.

For Chapters 1 and 2, I selected one participant from the Plengsa Clan, he is a Marma language writer and researcher. He has contributed significantly to developing pre-primary and primary-level children's books under the Bangladesh Government's National Curriculum and Textbook Board.

For Chapter 3, we analyzed two markers. For the marker *=cha*, 17 participants were consulted from different clans. Some of the participants I have taken Zoom interviews. For the marker *=ga/ka,* we also followed the observation method where we assessed the use of the marker in naturalistic setting.

For Chapters 4, I first analyzed the data by myself and then ran through the data with the other four participants from Regesa and Lungudusa Clan.

Table 3: =Cha, Topic Marking

Age Group	**Total Participants**	**Male**	**Female**	**Clan**
26-35	5	2	3	Plengsa
36-45	3	2	1	Ragesa
26-35	3	1	2	Khyongsa
46-55	2	1	1	Marongsa
26-35	2	1	1	Lungdusa
36-45	1	0	1	Frangsa
46-55	1	0	1	Kowkdeinsa
Total	17	10	7	7 Clans

For, chapter 5, tonal analysis, I have taken a quantitative approach through instrumental analysis. We used PRAAT and Matlab to analyze the data. We recorded the voice data for two speakers from Plengsa Clan to identify tones in Marma.

Limitations

We limited most of the data to the speakers of the Plengsa clan from Khagrachari. For future studies to analyze the tones and morphemes in Marma, speakers from all other clans could be included.

Chapter 1

Chapter 1 Grammar Sketch

1.1 Morphosyntax

In Marma, we see both inflectional and derivational morphemes. Marma words are monosyllabic and formed via affixation (prefixation and suffixation), reduplication, and compounding. Grammatical functions are carried out mainly by particles or morphemes and word order. Similar to Chinese, morphemes can be combined freely with no changes. The word order of Marma is predominantly SOV and sometimes, OSV and OVS. Nouns are inflected for case and number; verbs are inflected for tense; numbers are suffixed with different classifiers to indicate the kind of noun being counted. Marma has a highly developed classifier system and a variety of elaborate expressions. I call these affixes or particles "morphemes, or markers" that also serve grammatical function roles.

Syntactically, Marma is a head-final language, where the verb constituent working as the root of a sentence appears at the end of a sentence and sometimes in the middle. Similar to Japanese, subordinate clauses are placed before their modifying parts and before the main clause of a sentence.

1.1.1 Alphabets

Marma has 12 Vowels and 33 consonants. Vowels carry the tones. In this research, we will carry out a brief tonal analysis in Chapter 5.

Arakanese, Burmese, and Marma follow the same orthography. They have two sets of vowels. Set A:[a, e, ɛ, i, o, ɔ, u] (in open syllables), and Set B:[eɪ, aɪ, ɪ, oʊ, aʊ,

Marma Vowels			
	Vowel	**Vowel Quality**	**Tone**
1	အ	front and low [á]	high, creaky
2	အာ	front and low [à]	low
3	ဣ	Front and High [í]	high, creaky
4	ဤ	Front and High [ì]	low
5	ဥ	Back and high [ú]	High, creaky
6	ဦ	Back and high [ù]	low
7	ဧ	front and close mid [è]	low
8	ဧ́	front and close mid [è]	High and Falling
9	ဩ	Back and close mid [ô]	falling
10	ဪ	Back and open mid [ò]	low
11	အံ	Front and open mid	low
12	အား	front and low [â]	falling, breathy

Table 1.1: Marma Vowels

ʊ] (in closed syllables). The Set A vowels are found in open syllables, while Set B vowels are found in syllables closed by nasalization or the glottal stop. Watkins (2000) stated that in Burmese the low, falling, and creaky tones appear with the first set of vowels, while glottal stop and nasal can only appear on the second set of vowels (Watkins,2000 cited in Mooney 2021). However, our analysis in Chapter 5 claims that only three tones can appear in both sets of vowels.

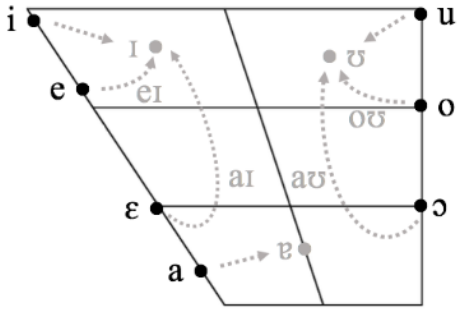


Figure: Proposed set of open syllable vowels(black) and closed syllable vowels (gray). (Mooney, 2021, pg 26)

Each Marma consonant letter has an inherent vowel and other vowel sounds are indicated using separate letters or diacritics as below, in front of, after, or around the consonant which I will discuss more in section 1.1.2. Similar to the Rakhine language, Marma notably retains an /r/ sound that has become /j/ in the Burmese (Myint

Marma Consonants			
	Letter	**Romanization**	**IPA**
1	က ခ	K,kh	k, k^h
2	ဂ ဃ	g gh	g, g^h
3	င	ng/nga	ŋ
4	စ ဆ	ch, chh	ʧ, $ʧ^h$
5	ဇ ၛ	j,jh	ʤ, $ʤ^h$
6	ည	ny/nya	ɲ
7	ဋ ဌ	ʈ ʈ	ʈ $ʈ^h$
8	ဍ ဎ	ɖ ɖ	ɖ $ɖ^h$
9	ဏ	na	n
10	တ ထ	t th	t, t^h
11	ဒ ဓ	d dh	d, d^h
12	န	n	n
13	ပ ဖ	p ph	p, p^h
14	ဗ ဘ	b bh	b, b^h
15	မ	m	m m^h
16	ယ	ya	j
17	ရ	ra	ɾ
18	လ ဠ	la	l
19	ဝ သ ဟ	wa sa ha	w θ h
20	ဠ အ	la a	l a

Table 1.2: Marma Consonants

Oo et al 2019). Marma speakers pronounce the medial (◌ျ) as "Yapang" (i.e., /j/ sound) and the medial (◌ြ) as "Raro" (i.e., /r/ sound). Moreover, the Burmese vowel (◌ေ) (/e/ sound) is pronounced as ◌ိ (/i/ sound) in Rakhine language and Marma seems to be similar to Rakhaine. Thus, for example, the word "dog" in the Myanmar language is written as (ခွေး) (Khwe), and in both Marma and Rakhine language it is written as (ခွိး) (khwii). The same word ပဲဟင်း (pea curry) is pronounced (peh-hinn) in Burmese and (peh hang) in Marma. According to Myint Oo et al(2019), the most significant differences between the Rakhine and Burmese are in their pronunciation and vocabulary; there are no grammatical differences. We also predict the same for Marma.

1.1.2 Writing System

Marma's writing system is Abugida. It is a segmental writing system in which consonant-vowel sequences are written as units. In the following table, it's shown how the sound changes using the diacritics for each word (some of them are not real words).

Vowel Diacritics				
		Word Formation	**Diacritics**	**Vowels**
1	ka	က	No diacritics used	အ
2	kaa	ကာ	◌ာ	အာ
3	ki	ကိ	◌ိ	ဣ
4	kii	ကီ	◌ီ	ဤ
5	ku	ကု	◌ု	ဥ
6	kuu	ကူ	◌ူ	ဦ
7	ke	ကေ	◌ေ	ဧ
8	kyii	ကဲ	◌ဲ	ဧဲ
9	koh	ကော	◌ော	ဩ
10	koh	ကော်	◌ော်	ဪ
11	keing	ကံ	◌ံ	အံ
12	kaa	ကား	◌ား	အား

Table 1.3: Abugida (Marma) Writting System

For example, လ is a consonant that has an inherent vowel sound (la). And using the diacritics [◌ိ]/[i] gives another word [လိ]/[li] which means air.

Similarly, the symbol [◌ု]/[u] is realized for the alphabet [ဥ]. The symbol [◌ူ] is realized for the alphabet [ဦ]. The other extended sound [◌ူး] represents the third extended sound of [ဦး] to express breathy phonation.

The other vowels also have similar symbols and diacritics

Phonetic Diacritics

There are three main sound-changing diacritics [◌ံ ◌့ ◌း] in Marma which can be known **phonetic diacritic**. These three diacritics (shown in Table 1.4) are marks that are added to letters that indicate a change in the sound (or phonetic value) of the vowel and consonant letter. These three diacritics guide pronunciation and represent sounds that can not be easily expressed with the standard Marma alphabet.

- ့ represents a creaky sound.
- ံ found in vowel 11.
- ः represents a breathy sound which is found in vowel 12 (Table 1.3)

Use of Phonetic Diacritics				
	Name of Diacritics	**Diacritics**	Use	**Vowels**
1	Sisitang	ံ	This symbol is used in the right part above any consonant or vowel letter to turn a short vowel sound into a long vowel sound	စံ tʃ=eiŋ
2	Oukamroh	့	This symbol is used on the right part below any consonant or vowel letter to change a long vowel sound into a short vowel sound	ကော့ K=ɛʔ
3	Wecha nholung-powk/Hrigapouk	ः	This symbol is used to change a long vowel into a heavy vowel sound	အား ကား

Table 1.4: Phonetic Diacritics

Tones in Marma

Marma's writting system also indicates tone.

For instance for the vowel alphabet 3 and 4 (Table 1.3) there are two different tones. The symbol [ိ] is realized for the alphabet ကြ that represents the high and creaky tone. The symbol [ီ] is realized for the alphabet ကြီ that represents the low tone. The other extended sound [ီး] represents the falling tone.

We will discuss more on tones in Chapter 5.

1.1.3 Morphemes in Marma

Marma is a richly inflected language and the morphemes can be referred to as discourse markers. In the existing literature on discourse studies, discourse markers are also known as "discourse particles" (Schourup 1985), "interactional particles" (Janes 2000)," discourse connectives" (Blakemore 1988), and "pragmatic markers" (Fraser 1996). I will just refer to these morphemes as general markers/affixes in this paper.

For this paper I will only focus on the morphemes ' *=ru, =m*à*, =ch*à*, =g*ò*/k*ò*, =r*à*,* and *=g*á*/k*á'. These serve as inflectional morphemes, performing various functions depending on the various discourse contexts.

For chapters 1,2, 3, and 4 we won't be using any tone markers.

These morphemes are bound, meaning they must be attached as suffixes or prefixes to nouns, pronouns, verbs, and sometimes to demonstratives in both subject and object position. When a noun is accompanied by a quantifier, plural suffixes are not applied. Marma distinguishes gender by adding suffix particles to words, not only through the nouns themselves. For example, for humans and animals ' *=ma*' is suffixed after female, and '*=buh*' is suffixed after male animals.

In the following examples, we have three morphemes ' *=go/ko* in objects, *=cha* and *=ma*' in the subject. The morphemes can be omitted under certain conditions.

(1) [Mamasyi=**cha**] chawo to.khu [phe-ti]
[Girl=**cha**] Book one.classifier [read-tense marker]
"The girl is reading a book"
မမသျွစာ စာအုပ် တစ်ခု ဖတ်တေ

(2) Nga [Mamasyi=**go**] [mrang-rih]
I [Girl=**go**] [see-tense marker]
"I see the girl"
ငါ မမသျွကို မြင်ရေ

(3) Umey [nhauk=**ko**] [mrang-rih]
Umey [you=**ko**] [see-tense marker]
"Ume sees you"
ဦမေ ငၚ်ကို မြင်ရေ

(4) [Nga=**ma**] Basing [rangji=cha] heirih
[I=**ma**] Basing [dress=cha] have
"I have Basing's dress"
ငါ့မာ ဘသိန်း ရင်ဇီးစာ ဟိရေ

1.1.4 Demonstratives and Plural Marker

In Marma, the syntactic ordering requires that demonstratives consistently precede the noun phrases they modify. There are three demonstratives in Marma: *iei* or *de* "This", *yauk*ʔ "that", and *thu*ʔ "that". The plural marker *=ru* is suffixed to the noun phrases and this positional precedence reflects a fixed syntactic feature where demonstrative determiners act like English equivalents like "this/these", and "that/those" to refer to nouns. This structure in Marma indicates a head-initial configuration within the noun phrase.

(5) Iei hnauk
"This bird"
ဤ ငှက်

In sentences 6 and 7, we see two morphemes "*=ru*" and "*=go*" are suffixed to show plurality and object marking.

(6) Ieii [hnauk=ru] ahalapa
"These [birds=plural marker] beautiful"
These birds are beautiful
ဤ ငှက်ရို့ အလှပ

(7) Umey iei [hnauk=ru=go] ahla mrang-reh
Umey these [birds=PM=OM] beautiful see-tense marker
"Umey thinks these birds are beautiful"
ဦမေ ဤငှက်ရို့ကို အလှ မြင်ရေ

In Marma, plural morphemes can also be attached to proper names to denote plurality. For example, *Basing=ru* translates to "Basing and her family."

1.1.5 Pronominal System

The pronominal system in Marma is given below. The '=*ru*' suffix is added to demonstrate plural pronouns. Marma personal pronouns are used differently depending on the level of formality and politeness. The pronouns also change forms based on the clans and place whether they are used as the subject or the object of a sentence. For instance, there are several uses of the first person in different settings. ŋà is used mostly by clans from Khagrachhari and Rangamati for informal purposes. 'Akyoing' is used by people from Bandarban while speaking to elders.

Here, =*su* is a personal pronoun marker.

	Singular	**Plural**
First Person	ŋà(I)	ŋo=ru(we) or ŋo
First Person (Polite)	Akyoing (I)	
Second Person	Nang(You)	Nang=ro
Second Person (Honorofic)	Kobang/ko (You)	Kobang=ru/ko=ro
Third Person	Yauk=su (He/She)	Yauk=su=ro

1.1.6 other parts of speech

To maintain the relevance of this research, this section only focuses on the formation of verbs, adverbs, and post-positions in Marma.

Verbs

In Marma, tense is inflected on verbs. Morphemes like '=*ri, =bo, =li, =pho, =bya*' are affixed to the main root word/verbs. To specify something negative, the '=*ma*' prefix is used before the verb or root word.

Words	Present	Past	Perfect	Future
Eat	cha=ri	cha=li=ri	bya	pho
Go	Lah =ri/bo	La=li=ri / La=khi= rih	La=ha=bya	La=pho
Walk	Sowari/bo	Sowa=li=ri / Sowa=khi=ri	Sowa=bya	Sowa= pho
Drink	Sowa ri/bo	Sow=li=ri	Sow=bya	Sow=pho
Dance	Ka=ri/bo	Ka=li=ri	Ka=bya	Ka= pho

Table 1.5: Verb Tense suffixes

Morpheme	**Prefixation**	**Morpheme**	**Prefixation**
Amo	Amo=sowa	Ase/i:roʔ	Ase=sowa
Amo	Amo=pyang	Ase/ i:roʔ	Ase=pyang

Table 1.6: Adverb suffixes

Adverbs

Derivational morphemes like '*amo*' '*ase* or i:roʔ' 'takɛ', 'achuŋ' or 'atuŋ', are the prefixes used to form verbs from adverbs. These prefixes are merged with root words.

(8) Amo=sowa
Prefix=walk
"Walk Faster"
အမော သွား

(9) ase=sowa or i:roʔ sowa
Prefix=walk
"Walk Slowly"
အသာ သွား အီးရို့ သွား

Adpositional Phrases (Postpositions)

Marma uses adpositional phrases and adpositions usually appear as particles and also may take the form of clitics, substantives, nouns, or verbs. Marma is a postpositional language and particles like '=dó, =mà, gá/ká, chà' etc are suffixed after noun phrases to demonstrate postpositions and express spatial or temporal relations (in, under, towards, behind, ago, etc.) or mark various semantic roles (of, for). These morphemes are combined with a noun phrase which is a complement, or sometimes object.

For instance, the marker =*ch*à is often compared with the Bangla definite particle =*ta* that appears just in this position as per our translation into Bangla Keisuke (2011). It also plays the role of a genitive marker and sometimes other roles as well which we will discuss in Chapter 3. In Marma, the particles or morphemes are reused or repurposed depending on the sentence context.

Table 1.7: Post-positional Markers

	Morpheme	Affixation	Comment
1	=do	Prang=do(ပြင်ဒို့)/Outside	Direction Marker
	=do	Ithi=do (အထဲဒို့)/inside	Direction Marker
2	=mà	Athaw-mà (အထက်မာ)/ on	Locative Marker
	mà=	mà=la (မလား)/neg=go	Negative Marker
3	=gò	Nga=gò (မလား)/ me	Accusative Marker
	=gò	Basing=gò (ဘသိန်းကို)	Object Marker
4	=ga	Nyi=ga (ညဉ့်က)/ Morning	Time/Temporal Marker
	=ga	Nhei=ga (နှန်းစိက)/From Seasame	Ablative Marker
	=ga	amei=ga (အမိက)/ By or from mother	Agentive and Benefactive marker
5	=kha	Trawphasa=kha (တရက်ဖက်သားခါ)	Time/ Temporal Marker
	=kha	root-word =kha (ခါ)	subordinate clause marker (when)
6	=chà	Iei=chà(ဧစာ)	Definite Marker
	=chà	Nga=chà(စာ)/Mine	Genitive Marker

1.2 Marma Syntax

1.2.1 Word order and Phrase structure

The basic word order in Marma is SOV. It follows OSV order as well. And in both cases, the verb comes at the end. The word order in Marma is relatively flexible. Marma is a head-final language. In noun phrases (NP), the noun can be modified by postpositions, verbs, nominal particles, case markers, demonstratives, and numeral

classifiers. Demonstratives always precede the noun in noun phrases (NP). VP selects the NPs, and Postpositional markers combine with NPs. Both nouns and verbs use affixes to demonstrate the grammatical relation in the sentences. Case markers in Nouns and Tense markers in verbs are a few of the characteristics of head-final languages which we observe in Marma as well.

(10) Basing Umey=go ngya=ga=kha Buri (SOV)
Basing Umey=go yesterday hit
"Basing hit Umey yesterday"
ဘသိန်း ဦမေကို ညကခါ ဘုတ်ရေ

(11) Ngya=ga=kha Umey=go Basing Buri (OSV)
Yesterday Umey=go Basing hit
"Basing hit Umey yesterday"
ညကခါ ဦမေကို ဘသိန်း ဘုတ်ရေ

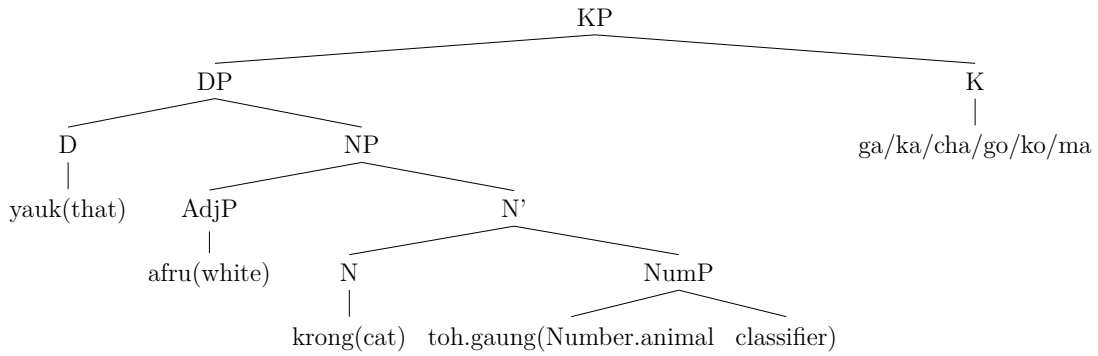
(12) Amhong cha-pho
Rice eat=tense marker
"I will eat rice"
အမှောင် စားဖို့

In Marma, a subject can be dropped sometimes and the sentence can remain completely grammatical (12).

Possible structure of Noun Phrase (NP) in Marma

In noune phrase (NP), the adjective phrase can be scrambled, it can come before or after the N (cat.white.one=CLF or white.cat.one=CLF). The morphemes are always suffixed to NPs. Here, K denotes case marking.

(13) Yauk afru krong toh.gaung=**ga/cha/go/ko**
That [white] [cat one.cl=suffix]
"That one white cat"
ယက် အဖြူ ကြောင်တစ်ကောင် က စ ကို



In Marma, not only common nouns but also personal pronouns freely allow adjectives and demonstratives to precede them.

(14) Nga yauk atusyi mama=go chiloteh]
I that short girl=ACC marker scolded
"I scolded that short girl"
ငါ ယက် အတိုသျှ မိမ ကို ဆဲလိုက်တေ

(15) Nga yauksu=ru=go chiloteh
I them=PLM=ACC scolded
"I scolded them"
ငါ ယက်သူရို့ ကို ဆဲလိုက်တေ

In sentence 15, we see Marma's pronouns behave like common noun phrases.

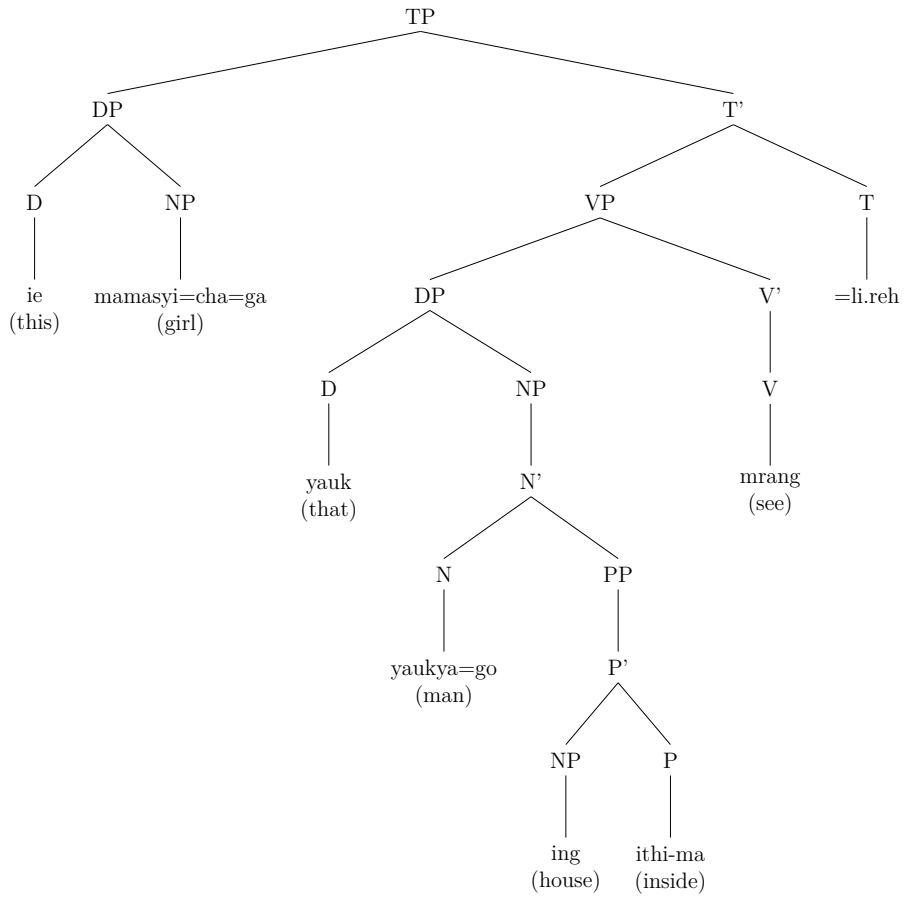
Trees for ad-positional/ post-positional phrases

Marma is an adpositional language which means it has covert post preposition particles. These morphemes denote something about the semantic role of an adjacent noun phrase in the sentence. Marma's noun phrases always precede the postpositions. And ad positional phrases are always head-final.

In sentence 16, ***=ma*** is a post-positional marker and in the syntax tree we see the phrase inside the house represents the post-positional phrase marker where P (ithi=ma) is in the head-final position.

(16) Yauk [mamasyi=cha=ga] yauk [yaukya=go] ing [ithi=ma] mranglirih
That [girl=cha] that [man=go] house [inside=PM] saw

"This girl saw that man inside the house"
ယက် မိမသျှ စာက ယက် ယောက်ျားကို အိမ် အထဲမာ မြင်လိရေ

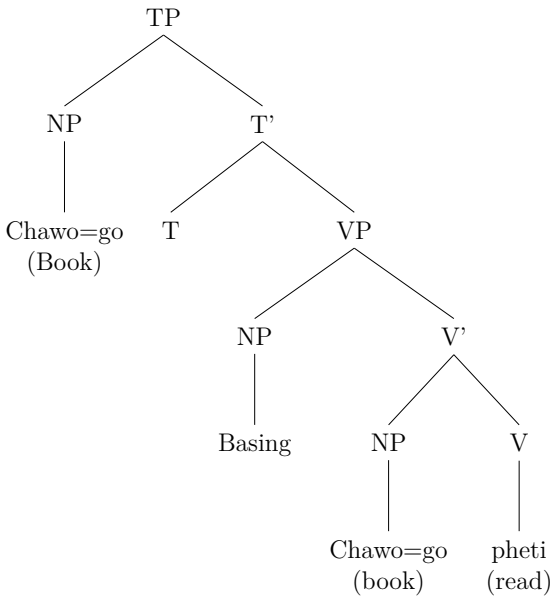


Tree with OSV word order

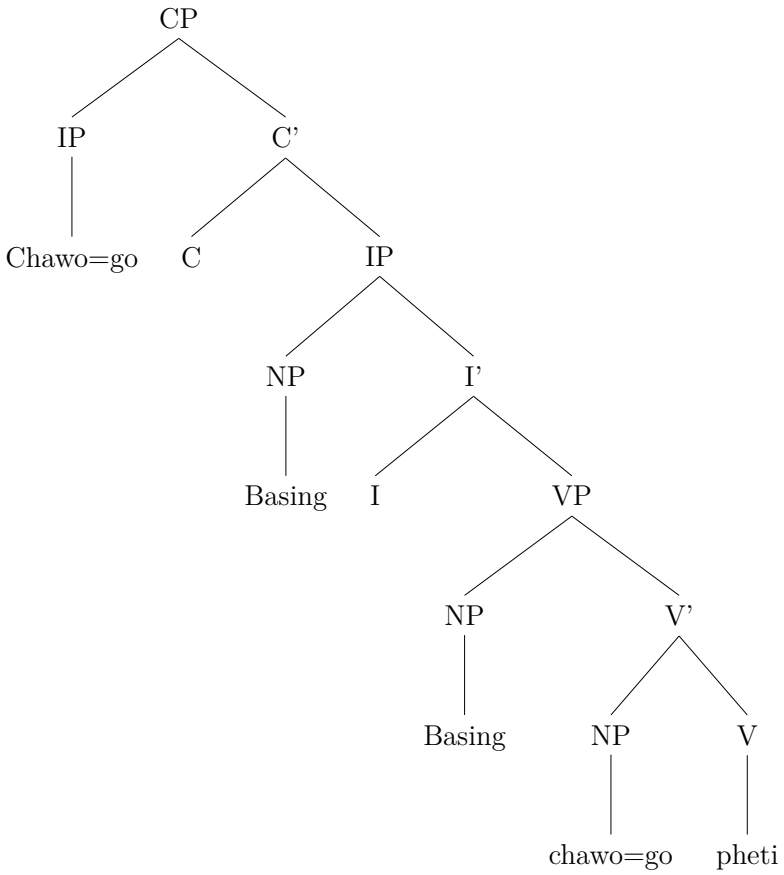
In Marma, NPs can be scrambled such as an object can be higher than the subject position. In the following syntax tree one explanation could be, NP (chawo/book) receives the accusative case in its base position first from the verb. And while scrambling, the theme moves up to Spec, IP, or TP position by A' movement. As per the VP-ISH theory [1], the agent generates as Spec, VP, and maybe in Marma, it stays in that position while scrambling. As we can see in sentence 16.

[1]The VP-Internal Subject Hypothesis (VPISH) suggests that during sentence formation subjects (agents) are originated in the specifier position of the verb phrase (Spec, VP). This theory could be implied in Marma as well where the subject remains in this initial position, adjacent to the verb while other constituents (like objects) can be scrambled around it which we can see in the OSV structure

(17) Chawu=go Basing pheti
Book=go Basing read
"Basing reads the book"
စာအုုကို ဘသိန်း ဖတ်တေ



Another possible explanation could be the subject/Agent stays in the Spec, IP position as usual, and the theme/chawo/book (NP) first receives an accusative case from V (read) in its base position and moves to the Spec, CP position.



1.2.2 Forming Question

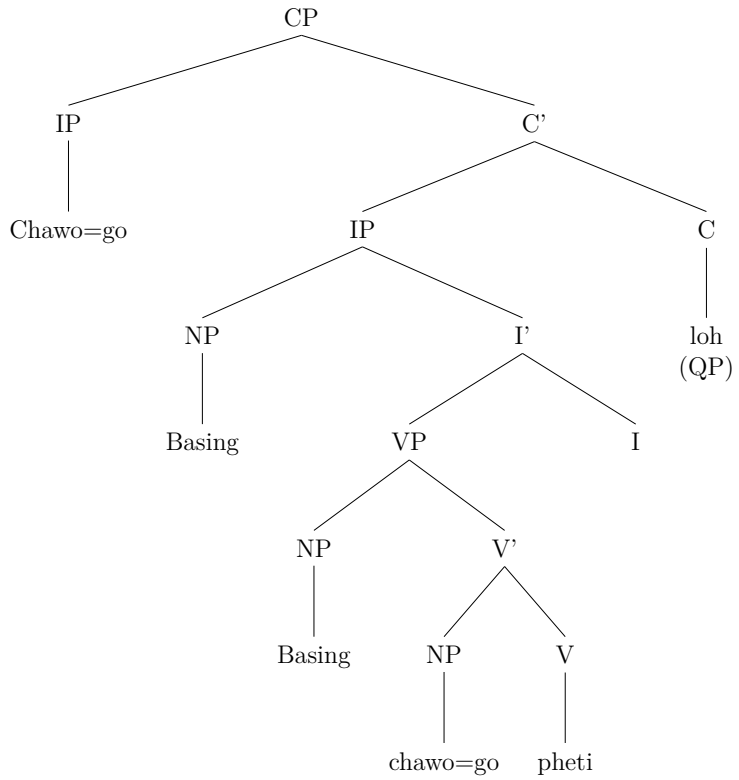
If we try to form a Wh-question, we can see it does not move to spec, CP like English showcasing ***wh-si-tu*** property. The question particle "leh/loh" in Marma takes the C position but, in the sentence,-the final position. In Marma, the question particles (loh, leh) come at the end of sentences, and in head-final languages, tense markers come after the verbs as suffixes. As Marma does not have visible auxiliaries, the "I" position may be allocated for tense in the syntax tree.

Yes/No Questions

To form regular yes/no questions in Marma, the particle "loh" comes at the end of the sentence and the particle occupies the C.

(18) Basing chawo=go pheti=loh
Basing book=go read QP

"Does Basing read the book"
ဘသိန်း စာအုုကို ဖတ်တေ လော



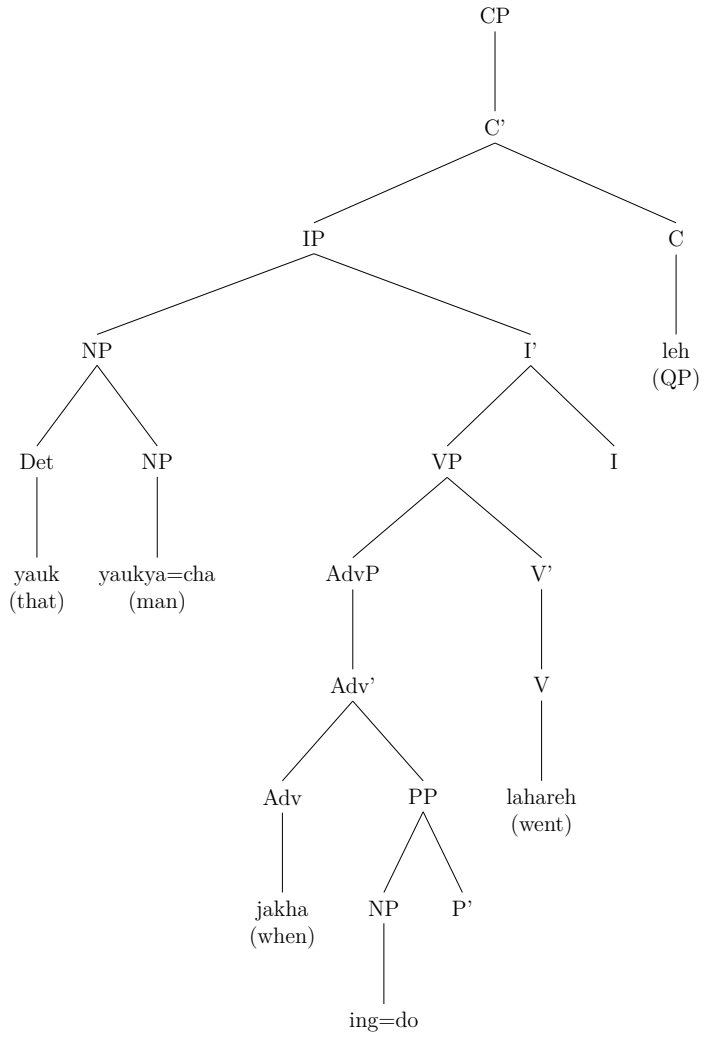
In Marma yes-no questions, movement is rare or not possible because tense particles are attached to verbs, and the 'loh' question particle always takes the C position.

- *Aluhiri* is used to refer to the '*should*' and I position in the IP structure.

Forming WH Question

The WH element can move independently without moving the entire phrase, but it always follows the verb element in the sentence. In Marma Wh questions, the question particle '*loh*' becomes '*leh*' and takes the C position in the tree as we can see in the syntax tree.

(19) Yauk yaukya=cha jakha ing=do lahareh leh
That man=cha when home=to went QP
"When did that man go home"
ယက် ယောက်ျားစာ ဇာခါ အိမ်ဒို့ လခရေလည်း



1.3 Case Morphology in Marma

The term '**case**' is systematically ambiguous between the '(inflected) form of a nominal word' and 'property of a noun phrase (determiner phrase)' and cases are usually suffixes (Spencer 2012). In world languages, the case has been a complex phenomenon that can be predicted based on more general principles (Pesetsky and Torrego 2012), and these principles themselves look quite specific to 'syntax and morphology". According to Minimalist conjecture, by Chomsky's case properties in natural languages should be understood as (1) 'the interactions of independent mental systems; or (2) general properties of organic systems' (Pesetsky and Torrego 2012). Two types of case marking case are observed in world languages, one is morphological case and the

second is syntactic (Spencer 2012).

Cases in Marma can be realized both morphologically and syntactically. The markers for nominative nor the accusative case morphemes are obligatory in all cases. Marma expresses grammatical relations using particles/morphemes and follows a nominative-accusative alignment system.

Nominative Case

In this paper, I am referring to the nominative case or subjective case that appears with the subject of a verb, or a predicative nominal or adjective. The term 'subject' is used for the set of arguments including the single argument (S) of intransitive clauses and the (more) agent-like argument (A) of transitive clauses (Jenny 2013).

There are several morphemes/particles in Marma that appear with the subjects =(*ká/ga*), *ch*à. However, these markers are not entirely restricted to S/A arguments but may occur with other elements in a clause which we will discuss in the following chapters.

Accusative Case

In Marma, the accusative case be found on the complements of verbs and postpositions which are similar in languages like Latin, Russian, Japanese, and many others (Pesetsky 2012). The case marker or object marker =*g*ò/*k*ò appears only with the patient argument but it has several other roles to play in the Marma discourse.

For this paper, I will discuss various functions of selective morphemes depending on the various discourse contexts.

Chapter 2

Chapter 2 ကို =go/ko, a marker of definiteness or specificity?

2.1 Introduction

Marma lacks a direct counterpart to the definite article 'the' and it uses morphemes or post-positional markers to convey definiteness and specificity to avoid ambiguity. I will analyze the cross-linguistic expression of "uniqueness" and "anaphoricity" as two important aspects of definiteness and specificity in Marma in this chapter. I will run some tests proposed by (Schwarz, 2013) for instance **situationally unique definite, anaphoric definite, immediate situation definite, bridging** and lastly analyze the discoursed linking hypothesis for determining definiteness in the object (patient) position. Schwarz (2009) characterized weak definite expressions as "the uniqueness of an individual, such that the descriptive content conveyed by the nominal can only be attributed to that individual". And he characterized strong definite expressions as "anaphoric or familiarity, where the expression invokes an anaphoric link to a previously mentioned individual". In section 2.4, I will analyze another test proposed by Schwarz **"bridging"** to discuss indirect references, and in section 2.6 I will discuss the D-linking hypothesis.

Throughout the paper, I will focus on examples of transitive verbs and investigate what kind of alignment structure they take with the markers/morphemes.

2.1.1 Differential Object Maker (DOM) or Accusative case marker or definite marker?

In this section, I wanted to assess the role of =*go/ko* in Marma discourse.

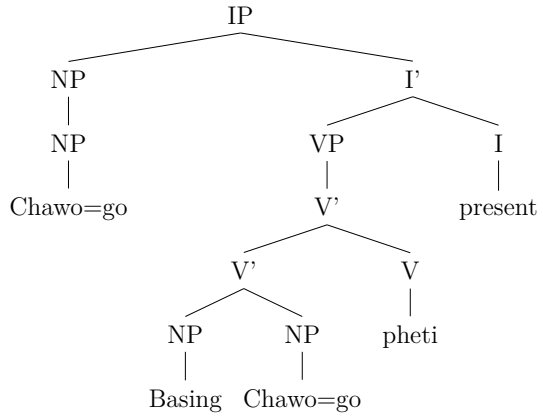
DOM

My first assumption is the marker is associated with the phenomena called "Differential Object Marking (DOM)" where certain direct objects are marked. Worldwide many languages show the DOM characteristic and carry special morphemes/particles in direct objects that are more specific, definite, or animate (Ozerov 2015). The DOM in Marma could be proposed as the Patient-argument constituent is marked by the particle '=*go/ko*' or some other markers.

In Marma, not every object requires an overt case marker. The object in sentence 2 has more referential status for the hearer than in sentence 1. Referring expressions can serve as antecedents (indefinite, definite, proper names, and even some quantificational noun phrases).

(1) Basing chawo pheti
Basing book reads
"Basing reads a book"
(ဘသိန်း စာအုံကို ဖတ်တေ)

(2) Basing chawo=go pheti
Basing book=go reads
" Basing reads the book"
(စာအုံကို ဘသိန်း ဖတ်တေ)

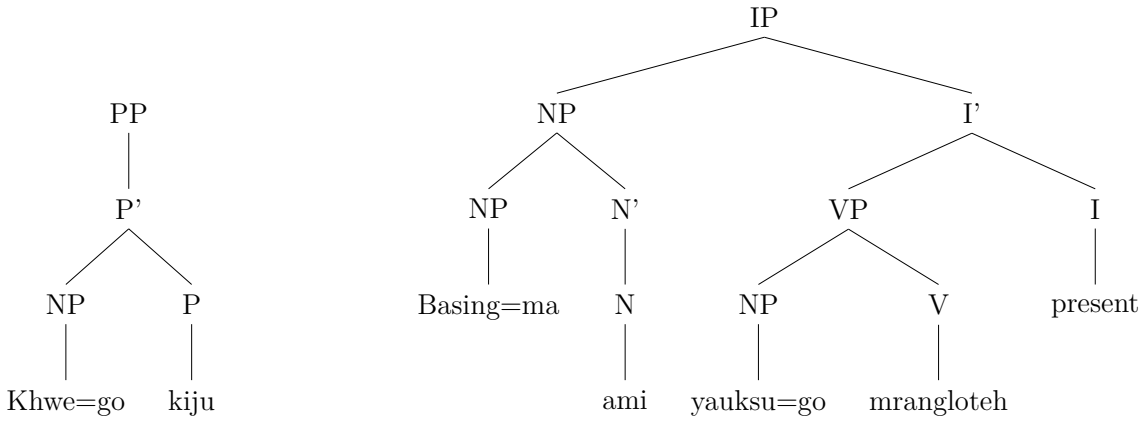


=go/ko as Postpositional/ Accusative Marker

In English, verbs, and prepositions assign accusative to adjacent NP complements. Whereas Marma is a post-positional (PP) language, and it uses different postpositional markers suffixed to NPs.

(3) Nga Khwe=go kiju rudu churi
I Dog=go for song sing
"I am singing for the dog"
ခွီးကို ကျေးဇူ

(4) Basing=ma ami yauksu=go mrangloteh
Basing=ma mother her=go saw
"Basing's mother saw her"
ဘသိန်းမာ အမိ ယက်သူကို မြင်လိုက်တေ



In sentence 4, the verb *mrangloteh* 'see' gives the accusative case to *yauksu=go*'him'. Marma has both overt and covert postpositions. While there is a covert postposition, *=go* clarifies the position of the experiencer's role of the object and takes the accusative case. Marma has both overt and covert post-positions which will be seen in the later sections.

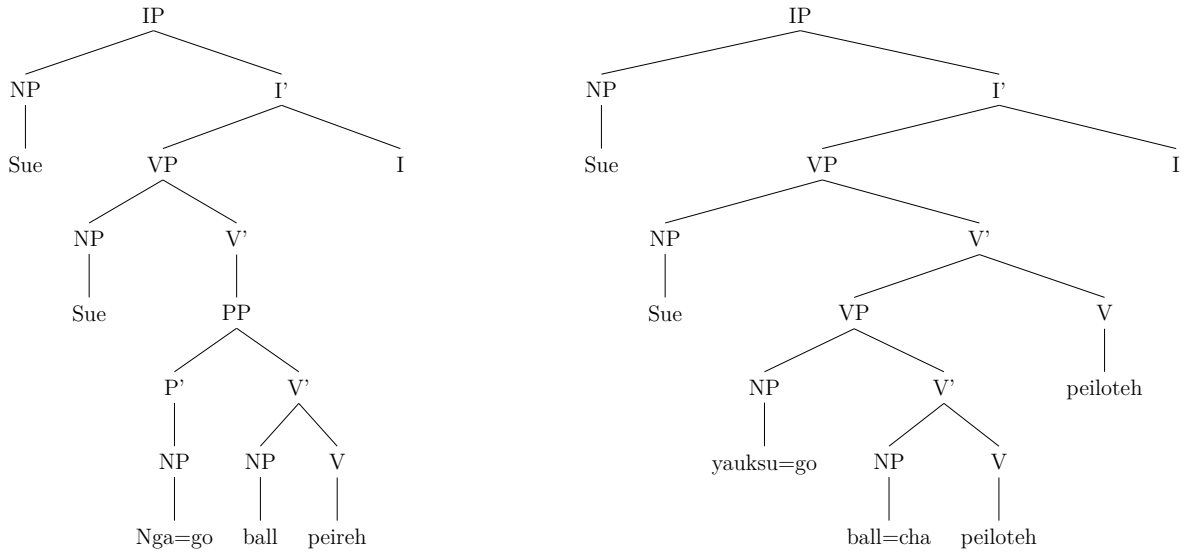
Dative Marker

Let's consider the two following ditransitive sentences in Marma. In sentence 5, *nga* 'me' may be receiving the accusative case from a covert postposition. For sentence 6, the verb is being raised and the verb(piloteh/gave) is assigning theta roles to two

NPs (theme and object). Here, the ball is the theme, and *yauk=su* 'him/her' is the goal. Here in both sentences, we see that the marker *=go* is suffixed to the goal as a dative marker. The ball/theme may or may not use any marker depending on the discourse context.

(5) Sue nga=go ball peireh
Sue I=go ball gave
"Sue gave me the ball"
သူ ငါ့ကို ဘောလ် ပီးရေ

(6) Sue yauksu=go ball=cha/go peiloteh
Sue he=go ball=cha gave
"Sue gave him the ball"
သူ ယက်သူကို ဘောလ်စာ ပီးလိုက်တေ



In this paper, I am proposing that *=go*, besides being an object marker, accusative marker, or dative marker, is a marker of definiteness as well.

2.2 Definiteness

Definiteness in many languages is defined as the semantic-pragmatic notion closely associated with the use of the definite article (or determiner). In English, the definite article "the" can be used in different conditions: Deictic, Anaphoric, Unique,

and certain indirect uses, often called "Bridging Uses" (Heusinger 2014). Definite expressions in all languages can cover personal pronouns, proper names, demonstratives, definite noun phrases, and universally quantified expressions. But Marma is an articleless language and it shows morphological marking of definiteness using the suffix *=go/ko* in the object position. Also, there has been a long-standing debate on definiteness and specificity. In this paper, I will focus on general definiteness related to object marking in Marma.

Two reported features or characteristics of definiteness are Identifiability and Inclusiveness. "Semanticists often prefer inclusiveness (or often uniqueness – thus limiting themselves to accounting for singular definites or noun phrases), and pragmatists prefer identifiability" (Lyons 1999). But in linguistics, some have preferred to combine the two and we will consider definiteness in a single category.

" **Inclusiveness as a criterion of definiteness:** I will narrow my work on the uniquenesses approach which signals a single definite entity in a particular situation. And uniqueness is merely a simple case of inclusiveness resulting from the singularity of NP.

Identifiability as a criterion of definiteness: To define definiteness and specificity within a single scale in terms of identifiability by speaker and hearer, definite NPs are used if both the speaker and hearer can identify the referent.

We also use the familiarity hypothesis which has evolved based on the identifiable context where both speaker and hearer are familiar with the specific situation or entity. This familiarity hypothesis is applicable in general knowledge, anaphoric, and, associative uses which we will see in later sections. Moreover, specific indefinite NPs are used if only the speaker can identify the referent, while non-specific indefinite indicate that none of them can identify the referent". (Heusinger 2002).

2.3 Unique definite/ Weak Definite

I propose, that Marma is a numeral classifier language and Marma's unique definites are realized as bare nouns. Jenks (2015) also reported a similar case in Thai.

According to Schwarz (2009), there are four distinct uses of bare nouns as definite in numeral classifier languages. These are 1. larger situation definite, 2) weak definite, 3) immediate situation definite, and 4) part-whole bridging labeled as unique definite environments. In this paper, I won't analyze the difference between weak and strong definite in Marma but rather focus on general definite contexts on NPs in the object position.

There is a general agreement that definite noun phrases carry a "familiarity", "uniqueness" or "identifiability" condition; the referent of a definite referring expression should be uniquely identifiable within a referential domain (Schwarz 2009).

In the following sentence 8, the cat refers to a unique definite patient that has been mentioned in the previous discourse, and the marker '=*go*' is required. The speaker has a particular referent in mind — supporting an "epistemically specific" use (Farkas 1994). If we use "cat.one.cl" without the marker then the NP is indefinite.

Context: Basing went to buy a pet in the market. He saw a seller selling a dog and a cat. Under the specific interpretation, in sentence 8 the speaker can distinguish the specific cat between the dog and the cat.

(7) Basing yung la krong=ga.boh [Krong=go] weloteh
Basing rabbit and cat=PP between [cat=go] buy
Between the two, he has bought the cat
ဘသိန်း ယုံလ ကြောင်ကေပေါ် ကြောင်ကို ဝယ်လိုက်တေ

(8) Basing [krong toh.gong/krong] yubo lehte
Basing [cat one.classifier/cat] brought
Basing has bought a cat
ဘသိန်း ကြောင် တစ်ကောင် ယူဘော် လာတ်တေ

Whereas, in 8 the cat Basing bought does not refer to a specific cat, it refers to any cat and is at least not known in our knowledge, hence it does not require the marker. Marma discourse old information is required to be marked with "=*go/ko*".

2.3.1 Situationally Unique Definite

According to Biswas (2012), the uniqueness approach suggests that the referent of a definite description has a property that is unique in a contextual situation,or at least can be identified by an appropriate description.

Let's see the following scenarios where '=*go/ko*' appears.

(9) Mama toh.yauk bowlung toh.lung; bolung koingbo
Girl one.CLF ball one.CLF; ball hold
"A girl is holding a ball"
မိမ တစယောက် ဘောလုံး တစ်လုံး ကိုင်ဘာ

(10) Mamha=cha aguk bolung=go kyaukti
Girl=cha now ball=go kick
"The girl is now kicking the ball"
မိမစာ အဂု ဘောလုံးကို ကျောက်တေ

(11) Mamha=cha=ga aguk bolung=go tutangreh
Mamha=cha=ga now ball=go hold
"Now, the girl is holding up the ball"
မိမစာက အဂု ဘောလုံးကို တိုးတင်ရေ

Here, the object/ the ball in sentence 9 expresses indefiniteness because it is not mentioned in the previous discourse. The marker *=go* is not introduced in the first mention and the sentence allows 'one' with the ball which is known as a universal indefinite marker. And in Marma, I propose, the indefinite marker [one. classifier] is used in immediate situations to express indefiniteness.

In this context, we know the inanimate patient in the discourse which is "the yellow ball" and interlocutors are referring to the same inanimate object. Suppose there were two balls (one red and one yellow), and the girl was playing with the yellow ball which is now missing, and someone else is asking for the specific ball the girl was playing with. But a few minutes ago, a boy came in and took it away with him.

I answered to the questioner:

(12) Yokyashyi toh=yauk lepo yauk [ball=go] yubo lahareh
Boy one=CLF came that [ball=go] carried away
"A boy came and carried away that ball"
ယောကျားသျှ တစယောက် လာတ်ပါ ယင်း ဘောလ်ကို ယူဘော် လခရေ

In sentence 12, the use of a demonstrative is required in front of the ball and the uniqueness of the referent 'the ball' satisfies the descriptive content of the NP (within a given situation) and requires the marker '=*go/ko*' . Hawking's notion of matching constraint seems more like "**identifiability**" that involves definiteness and in sentence 13, the ball is identifiable which is known in the previous context and the ball is definite because both the speaker and hearer can identify it.

Using the demonstrative in sentence 12 distinguishes a "matching constraint" which instructs the hearer to match the referent with some identifiable definite object that is visible or known in the previous context and "links the demonstrative with the definite article" (Hawkins 1978) in English translation. But in an articles-less language like Marma, we must use the marker '=*go/ko*' with the demonstrative. We will discuss briefly the use of demonstratives related to definiteness in section 2.3.4 of the paper.

2.3.2 Situationally Unique Definite (World or General Knowledge)

Bare nouns in numeral classifier languages are used with larger situation definiteness (Hawkins 1978), a category where uniqueness is licensed by general knowledge. Based on world knowledge, we know cars do have engines, or there is only one moon or sun.

In sentence 13, a bare object is acceptable with or without the marker '=*go/ko*' in the bridging contexts. Sentence 14 is grammatical but semantically anomalous because it can be interpreted as cars having multiple engines.

(13) Nga gari=do wongbo engine (=go) thik khyaloteh
I car=into entered engine (=go) fixed
"I got into the car and fixed the engine".
ငါ ဂါရီဒို့ ဝင်ဘော် အင်ဂျိန်ကို ထိချလိုက်တေ

(14) #Nga gari=do wongbo engine toh.khu (=go) thik khyaloteh
I car=into entered engine one.CLF (=go) fixed
"I got into the car and fixed the engine".
ငါ ဂါရီဒို့ ဝင်ဘော် အင်ဂျိန်ကို ထိချလိုက်တေ

(15) Guni nga laba=go amoh ahla mrnagreh
Today I moon=go very pretty see
"The moon looked so nice to me/ I think, the moon was so bright today".
ဂနိ ငါ လဗကို အမော အလှ မြင်ရေ

(16) Armstrong pathma luk jaso la pri=do laharee
Armstrong first person who moon county=do(direction marker) went
"Armstrong was the first person who land on the moon"
အာရ်မစ်တရောင်း ပထမ လ ပြည် အခြီ ချရေလူ

For sentences, 15 and 16, there is only one unique moon in all real-world contexts, and laba/moon cannot be modified with a demonstrative, or with marma-words 'one-classifier' and the bare object is acceptable. The marker is obligatory in sentence 15 because the referent of the NP is unique which is the "Moon" here which is uniquely identifiable given world knowledge, the bare noun is utilized. As cross-linguistically attested, the strategy of the "weak article" or bare noun definite depends on the referent being salient, but not by the current context (Biswas, 2012).

So, using demonstrative or one. classifier makes the sentences impossible for a Marma speaker due to the uniqueness of the NP. In 16 we use the postpositional marker/ direction marker '=*do*' after the moon. It may have the same semantics or syntactic properties as '=*go/ko*' , but we won't discuss it there.

2.3.3 Immediate situation definite (context-specific/previous knowledge)

The environment of an immediate situation relies on shared knowledge between the speaker and the hearer, but this knowledge is specific to a particular situation or context (Schwarz, 2009). I propose that bare nouns must be used in Marma, as in many languages with classifiers (Jenks, 2015) in immediate situations (Hawkins,1978). Consider the following examples where demonstratives cannot be used to express an immediate situation.

Let's investigate the following two examples.

Context: At lunchtime, we wanted some of the soup we'd made earlier in the morning. And my mom informed me no soup was left because the baby had finished it all. We both knew we were talking about the same soup from this morning. My mom says,

(17) Amonsyi soup=go soblopya
Baby soup=go drank
"Child finished the soup"
အမိုက်သျှ ဟင်းရည်ကို သောက်ပလိုက်ဗျာ

This sentence 17, requires the marker because we are referring to the same soup we made in the morning.

Context: Let's take another scenario. We have been trying to feed the baby, but he is a very picky eater and does not want to eat anything. Finally, after trying for one hour, he just ate soup and did not eat any other items. I tell my mom,

(18) Amosyi hangry toh.khu=ra sowribya
Baby soup one.cla=ra drank
"Baby only ate the soup"
အမိုက်သျှ ဟင်းရည် တစ်ခုရာ သောက်ရေဗျာ

The sentence 18, has a focus particle *=ra* 'only' which we will discuss more in chapter four. If we infix the marker '*=go/ko*' it refers the a specific soup in the immediate situation context.

Mass Noun

I have analyzed mass nouns and plural nouns in Marma, to receive a nuanced understanding of definiteness derived from traditional linguistic perspectives. Hawkins (1978), suggested that mass and plural nouns primarily demonstrate inclusiveness rather than uniqueness. And (Lyons 1999) provided a different viewpoint where uniqueness can indeed be assimilated into inclusiveness or it could be possible to unify both. I will consider the unifying approach to comprehend Marma's grammatical structures on definiteness by analyzing discourse.

Let's consider the following examples with Mass Nouns. In sentence 19, water is an example mass noun that is indefinite and becomes specific when it becomes discourse old and requires the marker. In both 19 and 20, the references are part of the set or totality of the objects or mass which satisfies the description and fulfills the felicity condition in Marma. The mass nouns sugar and water become a specific definite and require the marker '*=go/ko*'.

Context: You and Basing are at Lovely's house. Lovely gave some cold water to Basing to drink without knowing he can not drink cold water. But Basing already finished drinking. Lovely tells me:

(19) Nga fridge=ga [re] amra thoulireh. Basing yauk [rei=go] sowpreibya.
I fridge=ga [water] cold tookout. Basing that [water=go] drank
"I brought out cold water from the fridge. Basing has finished the water".
ငါ ဖြိုးဇ်က ရီ အမြ ထုတ်လီရေ ဘသိန်း ယက် ရီးကို သောက်ပြီးဗျာ

Context: We had some sugar left at home, so went to the market and got a new packet of sugar. I asked Basing to add the new packet of sugar to the jar.

(20) Jei=ga.boh yubolecha [sagafru=go] rowloh
Market=PP brought [sugar=go] add
"Add the sugar we have brought from the market to the jar"
ဇီးကဘော် ယူဘော လာတ်စာ သကာဖြူကို ရောလိုက်

Determiners like *=teke* 'some', plural count nouns, and mass nouns without definite determiners can be interpreted indefinitely. In the following examples, both the

objects (Milk and three spoons) denote indefiniteness.

(21) Yauk=su nu teke yujong lahare
She milk some buy went
"She went out to buy some milk"
ယက်သူ နို့တကေ ယူဇောင် လားခရေ

(22) Nga table athawma hangyung sung=khyong thaloteh
I table on spoon three=CLF put
"I put three spoons on the table"
ငါ တေဘီလီ အထက်မာ ဟင်းကျုံး သုံးချောင်း ထားလိုက်တေ

But, if we put the marker'=*go/ko*' after these mass or countable objects, it has the referential status as follows in example 23. Here, '=*go/ko*' is getting suffixed to relativizer (that) and giving the definite expression of the milk you have.

(23) Nu teke hei=cha=go peila
Milk some have=cha=go give
"Give me some milk that you have"
နို့တကေ ဟိစာကို ပီးလာတ်

2.3.4 Anaphoric Definite

An anaphoric definite expression has an explicit linguistic antecedent and in Marma, an anaphoric NP requires a demonstrative. Anaphoric definites are also linked to "familiar definites" which are realized as demonstratives or overt pronouns. Cross-linguistically languages often use a "strong" form of the definite article in anaphoric contexts Schwartz (2009) for example in Bangla (Biswas 2012).

Marma distinguishes unique versus anaphoric definites by using demonstrative languages morphologically. With the anaphoric definite in Marma, with the demonstrative, using the marker '=*go/ko*' is obligatory in the object position.

(24) Basing ing toh.chong krioleth. Yauksu nowka yauk [ing=go] wephu
Basing house one.CLF saw. He later that [house=go] buy
chureh

"Basing went to check on a house. He will buy the house later".
ဘသိန်း အိမ်တဆောင် ကြည့် လိုက်တေ ယက်သူ နောက်က ယက်အိမ်ကို ဝယ်ဖို့

Context: We went to see the Mong Raja[1] (King) to discuss an important issue. But he was not present in his residence but we met his office assistant. Later, we had to call his assistant to get another appointment with the King.

(25) Ngu yauksu=go aroktokhowk mang=laboh atwekhenfukiju call thelorareh
We that him=go again king=with meet call
"We had to call the assistant or that assistant to get another appointment with the King".
ငို့ ယက် သူကို အရော် တစ်ခေါက် မင်းလာဘော် အတို့ ခံဖို့ ကျေးဇူ ကော်လ် ထည့်လုိက်ရရေ

(26) Ngu yauk assistant=go aroktokhowk mang=laboh atwekhenfukiju call
We that assistant=go again king=with meet call
thelorareh

"We had to call the assistant or that assistant to get another appointment with the King".

For 24,25 and 26, we are using the demonstrative *yauk* 'that' to denote the anaphoric definite expression (that same assistant we met at Raja's office) in Marma, and it requires the marker '*=go/ko*' . So with a human and a specific and definite referent as an object, the marker is obligatory.

2.4 Bridging

The contrast between "demonstratives" and "bare nouns" is apparent in bridging definite (Clark 1975 cited in Jenks 2018), also called the association anaphora. Hawkins (1978) and Schwarz (2009) demonstrated bridging as the first-mention use of definite where the referent is implicitly associated with previously introduced discourse referents. Schwarz also distinguishes two classes of bridging use (a) "part-whole bridging", and (b) "producer-product bridging".

[1]The Marma community, led by the Mong Chief, one of three Indigenous Chiefs who rules the separate and distinctive clans of the Chittagong Hill Tracts, Bangladesh.

2.4.1 Indirect Reference

Clark (1975) distinguishes two instances of bridging or indirect reference by the following.

Indirect reference by association:

(27) Nga room=do wongharekha [ingkhong=go] amrang mralohteh
I room=into entered [ceiling=go] high saw
"When I entered inside and checked the room, I saw the ceiling was high"
ငါ အိမ်ဒို့ ဝင်ခရေခါ အိမ်ခေါင်ကို အမြင့် မြင်လိုက်တေ

In this example 26 is the example of "part-whole bridging". Here, "the ceiling" is mentioned for the first time with the option to use the markers ' *=go/ko*' or '*=cha*'. It is understood that houses generally have ceilings, thus it's not necessary to explicitly state the existence of a ceiling in the house in the previous clause. Clark identifies this use of a definite phrase upon its first mention as an indirect reference by association.

(28) Nga iing krijon laharikha [tongphawbrawka toh=go.ra] igri mranghareh
I home check went [westside room=go.ra] big saw
"When I went to check the apartment, I saw the west side room was the big one".
ငါ အိမ် ကြည့်ဇောင် လားခရေခါ တောင်ဖက်ပြက်က တိုက်ကိုရာ အကြီး မြင်ခရေ

In example 27, it introduces "the room" for the first time, paralleling the same theory established in previous example 26. The use of the marker ' *=go/ko*'identifies a specific room in the house and highlights the specific room is situated on the west side. This example further demonstrates the concept of indirect reference by association by Clark, employing a definite phrase at its first mention in the discourse. A similar concept was proposed by Walker and Prince(1996) "hearer status" which indicates the hearer's ability to identify the inferable subject based on the prior knowledge and can be marked with a definite none phrase (NP).

Indirect reference by characterization:

(29) [John=go] nyaga seibloteh. Police ugubang [seisa=go] fengbo
[John=go] yesterday murdered. Police till now [murderer=go] marasesh
caught could not

"John was murdered yesterday. Police still could not catch the murderer".
ဇွန်ကို ညက သတ်ပလိုက်တေ ပိုလိစ် အဂုပင် သတ်သားကို ဖမ်းဘော် မရသီး

In sentence 28, the murderer is not mentioned before, however, they are associated with the previous discourse. The murderer is inferable and it has to be specific and the marker is required.

When an object is specific then the marker is obligatory.

2.4.2 A producer and product relationship reference

Schwarz (2009) also introduced the producer and product relationship concept for understanding the bridging references. This approach suggests speakers can refer to the entities that are not explicitly mentioned in the first place but can be inferable based on a relationship context. In this case, it's an author and his play (adapted from Collins (2017)'s work on Tagalog), it's an author and his play"

Context: Umey is leaving the theater after watching a play. She doesn't know whether the play she saw has multiple authors or just one author, but she wants to go backstage and meet the author or authors of the play. Basing, who saw the same play, is a theater expert who knows exactly which author or authors wrote the play. Umey overhears Basing talking to Saching about the play. Basing mentions:

(30) Stage nowkabo nga natok=ma [author=go] twiloteh
Stage behind, I natok=ma [author=go] met
"Backstage, I met the author of the play"
စ်တေးစ် နောက်ကဘော် ဇာတ်လမ်းရှီးသားကို တွီ့လိုက်တေ

(31) Stage nowkabo nga natok=ma author [to.yauk=ko]
Backstage, nga natok=ma author [one.CLF=ko] met
twiloteh

"Backstage, I met one author of the play".
စ်တေးစ် နောက်ကဘော် ဇာတ်လမ်းရှီးသား တစ်ယောက်ကို ကို တွီ့လိုက်တေ

Question: Based on this information, should Umey expect to find backstage that the play has one author or multiple authors?

Response with 30: Yes, it means just one specific author, because Basing said "author=*go*". This denoted one specific author of that play they just watched. Whereas

with the response with 30, the response is ambiguous and hints at the possibility of multiple authors but not the one specific author in that play. Also, in the response to example 31, the use of "one" raises ambiguity even though the marker is suffixed.

However, the author or authors are part of the same specific play they watched which I believe is a case of inclusiveness.

2.5 Numeral Classifier in Marma

According to Jone (1970), classifier Languages of East and Southeast Asia fall into two categories according to the structure of noun phrases and the word order within the NP follows an areal pattern. In the North, in languages like Chinese, Vietnamese, and Hmong, the head noun follows the numeral and the classifier ([NUM-CLF]- N). And in South Thai, Burmese, and Khmer, the head noun precedes the numeral-classifier group (N-[NUM-CLF]). Marma numeral classifier follows the second group (N-[NUM-CLF]) as well.

Marma has a highly developed classifier system and a variety of "elaborate expressions" (in the sense of Matisoff as cited in Keisuke (2011). These numeral classifiers can also be used for reference management to signal definiteness, specificity, topicality, and thematic salience that can be conveyed by the presence or choice of the classifier and the order of the classifier phrase (Kilarski 2021).

2.5.1 One. Classifier as indefinite

We have seen that bare NP in article-less languages like Marma may arbitrarily be definite or indefinite depending on where it occurs in the discourse. Sentence 32 gives an indefinite interpretation but the 33 gives a definite interpretation.

(32) Ngu apang khoweketi
We tree cut
We are cutting tree

(33) Ngu apang=go khoweketi
We tree=go cut
We are cutting the tree

I propose that multiple bare nominative patients can be counted as definite descriptions in a discourse setting requiring the use of a demonstrative and an affix in Marma. In Marma, an indefinite NP takes the numeral 'one' with an appropriate classifier, and cross-linguistically the numeral 'one' has been grammaticalized into an indefinite article (Givon 1981).

(34) Basing budhunei sukhu/sukhu. toh.yauk phenglereh oro Lovely=cha yauk
Basing Wednesday theif/theif one.CLF caught and Lovely=SM that
[sukhu=go] kosobdini phengreh
[thief=go] Thursday caught
"Maria caught a murderer on Wednesday and Karlos caught that murderer on Thursday".
ဘသိန်း ပဒူးနိ သခိုး တစ်ယောက် ဖမ်းလီရေ အရော် လာဗလီးစာ ယက် သခိုးကို ကြာသပဒီးနိ ဖမ်းရေ

Here, in sentence 34, using the numeral one refers to two different murders.

(35) Basing sukhu toh.yauk budhuni teileih oro Lovely=cha Sukhu
Basing thief one.classifier Wednesday caught and Lovely=CT one.
to.yauk kosobdni teiereh
classifier Thursday caught
"Basing caught one thief on Wednesday and Lovely caught one thief on Thursday".
ဘသိန်း သခိုး တစ်ယောက် ပဒူးနိ တည်းရေ အရော် လာဗလီးစာ သခိုး တစ်ယောက် ကြာသပဒီးနိ

In example 34, the first indefinite nominative patient can be bare (*Sukhu* 'thief') or can take a numeral one (*Sukhu. toh=yauk* "One thief"). In the second clause (35), there is a bare NP which is definite and refers to the previously mentioned thief Basing caught on Wednesday. And we must use a demonstrative and suffix=*go* and without the marker, the sentence is not grammatical. Without a demonstrative on the second object 'thief' /Bare NP, it does not refer to the same thief.

In Marma, the definiteness or indefiniteness of a bare noun phrase in the object position may be contextually determined and requires a definite affix '=*go/ko*' to be defined as specific. In the minimal descriptions if there are multiple bare nominative noun phrases, employing a demonstrative before the second NP can help clarify which specific entities are being referred to (Schwarz 2009).

In 35, some speakers also allow the marker '=*go/ko*' both in the first thief and second thief with the numeral =one. However, while we use the marker '=*go/ko*', it may enforce a specific meaning. One probability that some speakers might use the marker even if it carries an indefinite meaning is due to the animate nature of the thief. I am considering why some speakers omit the marker since it does not immediately follow the proper noun but follows one classifier. I consider that '=*go/ko*' marking/direct object marking determines the ambiguity between specific and nonspecific.

In sentence 36, even though the NP is animate, it remains unmarked because it denotes an animate indefinite or nonspecific direct object. However, in sentence 37, the marker '=*go/ko*' is used to emphasize a specific meaning as we are looking for one particular individual, namely Uma's husband, which is definite.

(36) Ngu Ume kiju samak to.yauk rahgeteh
We Ume for husband one.classifier search
"We are searching for a husband for Uma".
ငို့ ဦမေ ကျေးဇူ သမက် တစ်ယောက် ရှာရေ

(37) Ngu Ume-mah samak=ko rahgete
We Ume's husband=ko
"We are searching for Uma's husband".
ငို့ ဦမေမာ သမက်ကို ရှာ ကတ်တေ

More examples on specificity:

There is some evidence that =*go* can be a marker of specificity, rather than of definiteness. Consider a scenario in which a boy has fallen in love with a particular woman from the Lungudusa clan, and intends to marry her. He can use the sentence in (38) to announce this fact to his parents:

(38) Nga lungdusma=go ingthongprufu
I Lungdusma=go marry
"I will marry from Lungudusa Clan".
ငါ လိုဲဒုသ္မကို အိမ်းထောင်ပြုဖို့

In (38), the use of =*go* is obligatory. Here the object is not definite; the girl in question is being mentioned for the first time. In this example, =*go* appears to mark specificity, rather than definiteness; =*go* is used because the boy has a particular girl in mind.

Another examples: I went to Basing's house yesterday for dinner. He immediately killed a chicken and cooked for us. (We don't know how many chickens Basing has).

(39) Basing krauk toh=gaung sepo thamong pere
Basing chicken one=CLF killed rice gave
"Basing killed a chicken and fed us"
ဘသိန်း ကြက တစ်ကောင် သတ်ဘော် ထမင်း ပီးရေ

I went to Basing's house. He has one black and one red chicken, and he kills the black chicken for us.

(40) Amye krauk=ko seipo thamong pere
Black Chikcen=ko killed rice gave
"Basing killed the black chicken to feed us"
ဘသိန်း အမဲ ကြကကို တစ်ကောင် သတ်ဘော် ထမင်း ပီးရေ

The inclusion of the numeral one in example 39 implies an indefinite and nonspecific interpretation because it signals uncertainty regarding which of his chickens Basing slaughtered to feed us during the dinner. Whereas sentence 40 establishes a specific interpretation of "the black chicken" by employing the marker *=go*.

2.5.2 One. Classifier as definite description in Marma

While numeral one has been extensively attested as indefinite in many literatures in Marma we have found a special use of "one" + classifier as a definite referent, a similar has been predicted in Chinese by Chen(2003).

Context: Basing and Lovely went grocery shopping. They were looking to buy chicken but not many people are selling it today. Basing tells Lovely,

(41) Guni krawk toh.gaung weirafu
Today chicken one.CLF buy
"Today I need to buy a chicken"
ဂနိ ကြက တစ်ကောင် ဝယ်ရဖို့

In above sentence 41, Basing will buy a chicken today, but they don't know which chicken they will get in the market. He is not buying fish or meat today, only buying

chicken but the chicken has an indefinite interpretation. Then, they kept walking to buy other vegetables. And they both saw one seller had only one chicken left but they decided to buy it later and kept buying other items. But it took a bit of time, and now Basing is panicking to buy the chicken because someone else can buy it and he tells Lovely.

(42) Nang yauk [karauk to.gong =go] labo yukhi yang
You that [chicken one. classifier =go] buy (stress)
"You go and buy that chicken now immediately"
· နင် ယက် ကြက တကောင်ကို လားဘော် ယူခီယင်

(43) Nang yauk [karauk to.gong =cha] labo yukhi yang
You that [chicken one. classifier =cha] buy (stress)
"You go and buy that chicken now immediately"
· နင် ယက် ကြက တကောင် စာ လားဘော် ယူခီယင်

In sentence 42, the chicken has a specific interpretation. If we want to make the numeral 'one'+ classifier a definite referent, we must use demonstrative and an affix ('=*go/ko*') in an anaphoric context. Some speakers also use another affix ' =*cha*' instead of '=*go/ko*' which I propose as a definite and topic marker as well.

2.6 Discourse Linked/D linked (Specificity)

Discoursed -linked / D-linked by (Pesetsky 1987) claimed "Knowledge about the identity of the set N: a set that is implicit in who/what, explicit in which N".

Marma WH morphemes are the following.

- *a/ja=cha* "what"
- *Aa/ja-cha=go* "Which one"
- *Aa/Ja=do* "where"
- *Eei=cha* "this"
- *Thuw=cha* "that"
- *Eei=su* "this person"

- *Thuw=su* “that person”

(44) Basing seireh ja khwe=cha ja krong=go mungrehleh
Basing knows which dog=cha which cat=go hates
“Basing knows which dog hates which cat”
ဘသိန်း သိရေ ဇာခွီးစာ ဇာကြောင်ကို မုန်းရေလဲ

(45) Nang guni acha chafule
You today what eat
“What will you eat today?”
နင် ဂနိ အစာ စားဖို့လည်း

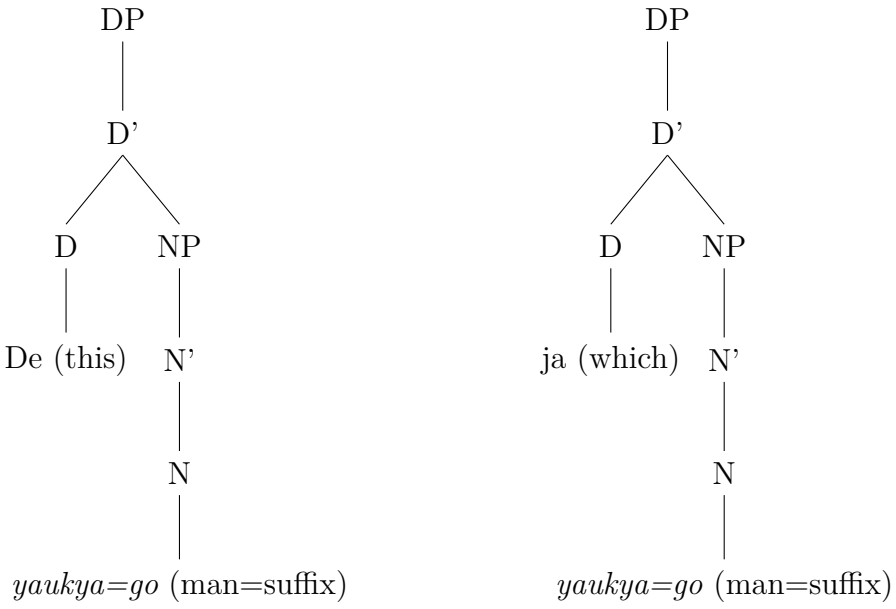
(46) Nang guni acha=go chafule
You today which eat
“Which one will you eat today?”
နင် ဂနိ အစာ ကို စားဖို့လည်း

Example 46 has a more definite meaning and requires the marker *=go*. Suppose there are several options (bamboo shoots, chicken, pork).

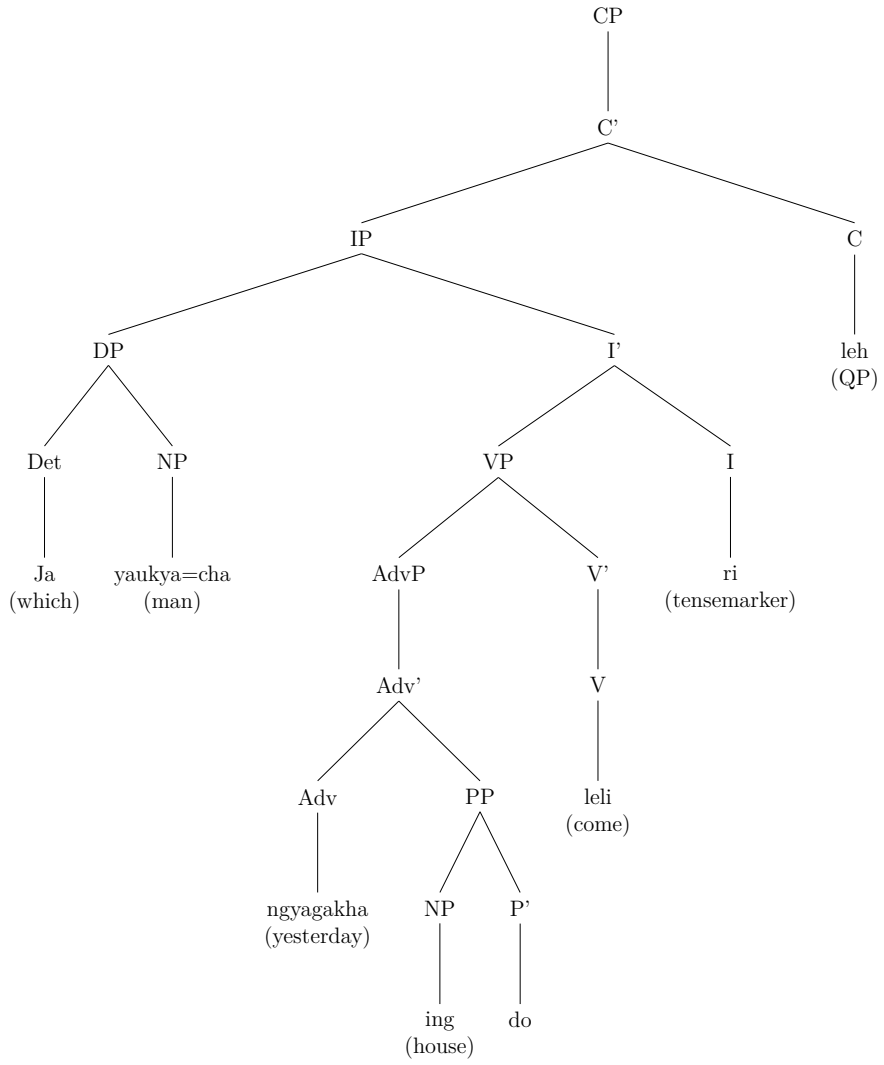
(47) Nga nahang/nahang=go chafo
I bambooshoot eat
“I will eat the bamboo shoot”.
နငါ နဟင်းကို စားဖို့

Example 47 has the partitive answer, among the three sets (bamboo shoot, chicken, pork) I specifically choose to eat the bamboo shoot.

If we consider the DP as a whole constituent, I propose Marma’s “wh morpheme” “*ja/aa*” has a specific place in DP’s head. We also see in Marma demonstratives obligatorily appear to the left of NPs. I propose that “wh morpheme” or demonstratives take the same head D position in the DP phrase.



According to Pesetsky (2000), wh-in situ phrases must raise covertly to Spec, CP, and D-linked wh-phrases are exempted from this requirement and they may take scope via unselective binding by the Q operator in C (Shields 2008).



My claim is, that Marma definite NPs syntactically project a DP, which is semantically related to definiteness. But more research is required to conclude this.

Quantifiers

In Universal grammar(UG), bare quantifiers like "something" and "someone" are used in specific referential contexts where the marker '=*go/ko*' is obligatory in Marma. In the following sentence 44, the reference is contextually forced which is the context of D-linking.

(48) Speaker A : Nang yasru=go sereloh, ywak louru=go?

Speaker A: You them=go know, those people=go?
Speaker A: “Do you know them, those people”
နင် ယက်သူရို့ကို သိရေလား

(49) Sepaker B:Ing, Nga to.yauk=go seikhyangyong twere
Answer: Yes, I one. CLF=go know feel
Answer: “I guess, I know someone from them”.
ငါ တယောက်ကို သိချင် သိချင် တို့ရေ

Let’s take another two examples, where the relevant property is definiteness rather than specificity in 50. Basing comes to X doctor’s chamber and he knows which doctor he is looking for and referential namely X. In 50 the marker *=go* is obligatory. The marker is not obligatory in 51 where Basing is looking for any certain type of doctor (non-specific).

(50) Basing Umie=mah doctor=go rahreh
Basing Umie’s doctor=go search
“Basing is searching for Umie’s doctor
ဘသိန်း ဦးမေ မှာ ဒက်တော်ကို ရှာရေ

(51) Basing Umie Kiju doctor to.yauk rahre
Basing Umie for doctor one find
“Basing is searching a doctor for Umie”
ဘသိန်း ဦးမေ ကျေးဇူ ဒက်တော် တယောက် ရှာရေ

From the above examples, we can see Marma’s specific definite objects are obligatory case marked. However, some indefinites are case marked as well Enç (1991) characterizes this class as “specific”, notably, the class includes partitive indefinites.

2.7 Conclusion

- My conclusion is more than definiteness, *=go/ko* marks specificity.
- From my finding in Marma, definiteness and specificity affect the presence or absence of the marker *=go/ko* in object position. I have not examined the nature of topicality with *=go/ko*.

- Both specific inanimate and animate objects require the marker. Bare nouns with definite interpretations are restricted to definite environments whereas we can see, that anaphoric definite requires a demonstrative occurrence in familiar or anaphoric definite environments.
- And while referring to a prior discourse referent, are commonly expressed by *=go/ko* or required after NPs in the object position.
- One. Classifiers can be definite in the immediate situation context but must require the marker *=go/ko* and demonstrative is required. Indefinite determiners like partitive quantifiers can become definite when discourse is old and require the marker *=go/ko*
- Non-specific objects with '=**one. Classifier** ' omit the marker (examples 36 and 51).
- I propose in Marma specific NPs syntactically project a DP, which is semantically related to definiteness.

Chapter 3

Chapter 3 Topic Marking in Marma

3.1 Introduction

In this section, I concentrate on topic marking in Marma, one of the two information structure relations "topic and focus" and on their contrastive versions (contrastive focus and contrastive topic) using Marma data. Aissen (2017) refers to "information structure (IS) as the partitioning of the grammatical information conveyed in a sentence in a way that relates that information to the discourse context". Following Aissen, I will use **'the topic'** for the phrase that refers to the entity that the utterance is about and **'focus'** to refer to a phrase that provides the new information in an utterance.

I propose that Marma preverbal nominals bear two of the central IS relations, (topic and focus) with morphological markings. This chapter will focus on the two topic markers ဏ=*'chaa'* and က=*'ga/ka'* which play an important role in Marma's information structure. I will also analyze how social factors such as clan affiliations (e.g., Plengsa vs. Regesa/Khyongsa vs. Marongsa clans) influence the usage of these morphological markers.

3.1.1 Numeral Classifiers

Numeral classifiers in Marma can be referred to as inflectional morphemes used as suffixes and inflected on nouns. They follow the number and type of nouns (human, animals, things, etc) they modify. In Marma, the head noun precedes the numeral

classifier (Noun-Numeral-Classifier). Using the classifiers the distinction among humans, animals, and objects' physical shapes, essence (animate vs non-animate), social criteria (hierarchy in animacy), etc can easily be identified.

Cross-linguistically the classifier use of different categories (humans, animals, and long/round shapes) is motivated by cognitive principles. They are also related to their socio-linguistic context as well (Sera et al. 2022). In Marma, human hierarchy, sacred objects and concepts related to religion or Buddhism are counted with a particular classifier which are common in Burmese, Thai, Khmer and Vietnamese like Southeast Asian societies (Sera et al. 2023).

(1) Mang=toh=ba
King=one.CLF
'One king'
မင်း တစ်ပါး

In example 1, the king has the highest social position and he needs to be addressed with '=*ba*'.

Numeral Classifiers						
Number	Status	Animal	Flower	Tree	Human	Things
1 (Toh?)	ba	gaung	Bowong	Bang	Yauk	Khu
2 (Nho?)	Pa	Kaung	Powong	Pang	Yauk	Khu
3(sung)	ba	gaung	Bowong	Bang	Yauk	Khu
4(lei)	ba	gaung	Bowong	Bang	Yauk	Khu
5 (Nga)	ba	gaung	Bowong	Bang	Yauk	Khu
6 (khrauk?)	Pa	Kaung	Powong	Pang	Yauk	Khu
7 (Khnauk?)	Pa	Kaung	Powong	Pang	Yauk	Khu
8 (Syo?)	Pa	Kaung	Powong	Pang	Yauk	Khu
9 (Ku)	ba	gaung	Bowong	Bang	Yauk	Khu
10 (Chi)	ba	gaung	Bowong	Bang	Yauk	Khu

Table 3.1: Marma Classifiers

In table 3.1, we see how the sound changes after glottal stops or stop consonants (k,t) from ba to pa, gaung to kaung, go to ko with an exception *to*? 'one'.

3.2 Various roles of =*cha*

Previous research in Marma by Keisuke (2011) suggests that =*cha* specifically appears after the subject in NPs, and can be glossed as a definite marker. This marker also functions as a genitive marker and nominalizer in Marma. Our investigation narrowly focuses on the role of =*cha* as a topic marker both in subject and object position in Marma extending the experiment across different Marma clans.
Keisuke (2011) reports that in many sino-Tibetan languages, "relative clause and attribute/genitive markers are identical with nominalization devices and that sentences bearing such markers can also function as independent utterances". For instance, in sentence 2, the morpheme works as a genitive marker whereas in 3 and 4 it works as a nominalizer. In phrase 2 'Basing's book' the genitive case marker and =*cha* is used to show possession of the book. Here, Basing carries the genitive case, indicating that the book belongs to Basing.

In both 3 and 4, it's nominalizing a verb.

(2) Basing Chwo=**cha**
Basing book=genitive marker
"Basing's Book"
ဗာသိန်း စါအုပ်စာ

(3) Khuwi cha:=**cha**=ma chang=cha wangbo wei=reh
Buffalo eat=**cha**=locative marker elenphant=cha enter
"The elephant slept at Buffalo's dining or eating place".
ခွီးစား**စာ**မှာ ဆင်းစာ ဝင်ဗော် ဝိရေ

(4) Nga pro=**cha** chaga kyare
I tell=**cha** thought happened
"Whatever I told happened"
ငါ ပြော**စာ** စကား ကျရေ

The role of =*cha* in nominalizing clauses in Marma has not been examined in my study; future research may delve further into this subject matter.

3.2.1 "=*cha*" as Topic marker in Marma

I will analyze the following texts to illustrate the concept of the topic in Marma. The following example is taken from Aissen (2017)'s paper on topic and focus which is based on Datz's (1980) Mayan story.

(5) Tarak phasakha, khakrah=ma lugri toyok la **sa** toyok heiliereh
Once a time Khagrachari=PM man one and son one was
"Once upon a time, there was a man and his son who lived in Khagrachari".
တစ်ရက် ပသာခါ ခက္ခရာမှာ လူကြီး တစ်ယောက်လ သား တစ်ယောက် ဟိလီးရေ

(6) Yauk.su=ma iey **sa=cha/su** konggong ponygasyaing heiliehreh
His=PM this son=cha/su, very wise was.
"This son of his/His son, was very wise"
ယက်သူမှာ ဣသား**စာ** ကောင်းဂေါင်း ပညာရှင် ဟိလီရေ

(7) Tarauk ni.kha **yauk=su** afa labo aludu lahare
One day he father with work went
"One day he went to work with his father [and he was happy when they started their journey"
တစ်ရက်နေ့ခါ ယက်သူ အဖ လာဗော အလုတို့ လားဟရေ

In sentence 6, *Iey sa=cha/su*;'this son of his' is the topic because it denotes the identity which the utterance is about.

Next to the topic phrase, the host sentence is the comment – it says something about that entity. The topic identifies the individual (the son) in the "left peripheral" position and new information (the comment) should be associated (wise and very smart). "The topic phrase precedes the comment and antecedes a pronoun in the associated clause and once the topic phrase is established, subsequent references to it can be via minimal pronouns" Aissen (2017). As in the rest of the phrase in sentence 6 where we can drop the subject in the comment phrase. Syntactically, the topic phrase "this son of his" is placed on the left which establishes a topic, selecting from among the two protagonists introduced in the first sentence son and father.

In sentence 7, some speakers used the marker =*cha* after the =*sa* 'son', and some used =*su*, some did not use any marker at all. But all the speakers used the demonstrator *Iei* 'this' before the son. The use of both particles (=*cha* or =*su*) is appropriate as used by native speakers.

More examples

There are three speakers in this setting, a teacher, and two students in the classroom. They have been studying about different capitals of the world. After a whole conversation about the capitals around the globe, the students presuppose that the teacher will be asking questions about the capitals. At the end of the discussion, the teacher asks the students [*What is the capital of Bangladesh?*]. Student X answers with 8 which is the correct answer. Then student Y responds with the wrong answer that Istanbul is the capital of Bangladesh and the teacher corrects him or her with the answer 9.

(8) Bangladesh=ma mangningmru=Ø frote Dhaka (Student X)
Bangladesh=PP capital =Ø is Dhaka
"Dhaka is the capital of Bangladesh".
ဘင်္ဂလာဒေ့သ်မှာ မင်းနီးမြို့ ဖြစ်တေ ဒါကာ

(9) mahauk Dhaka=**cha**=ra Banglaprei=ma mangningmru (Student Y)
No Dhaka=**cha**=ra Bangladesh=ma capital
"No, Dhaka is the capital of Bangladesh".
မဟုတ် ဒါကာ စာ ရာ ဘင်္ဂလာဒေ့ရှ်မှာ မင်းနီးမြို့

(10) Dhaka=**cha** Bangladesh=ma mangningmru, Istanbul=**cha** Turkey=ma
Dhaka=**cha** Bangladesh=ma capital Istanbul=**cha** Turkey=ma
mangningmru
capital
"Dhaka is Bangladesh's capital and Istanbul is Turkey's capital"
ဒါကာ စာ ဘင်္ဂလာဒေ့သ်မှာ မင်းနီးမြို့ အီသ်တန်ဘူလ် စာ တိုရ်ကျီမှာ မင်းနီးမြို့

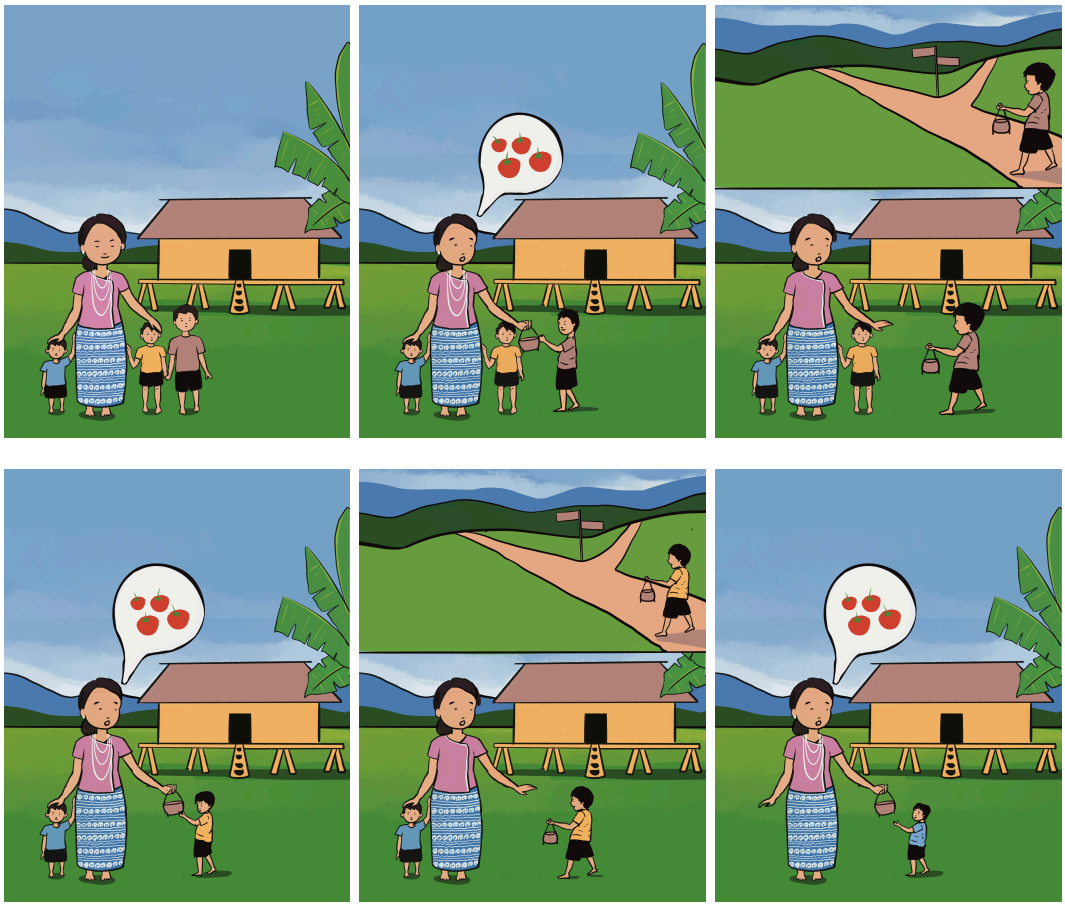
In sentence 8 the capital is the given information and suffixation with =*cha* is optional here, and when =*cha* is present it would arguably be functioning as a topic marker in this case. But Dhaka is uttered for the first time in discourse 8 which is the focus but eventually becomes a topic in later phrases 9 and 10.

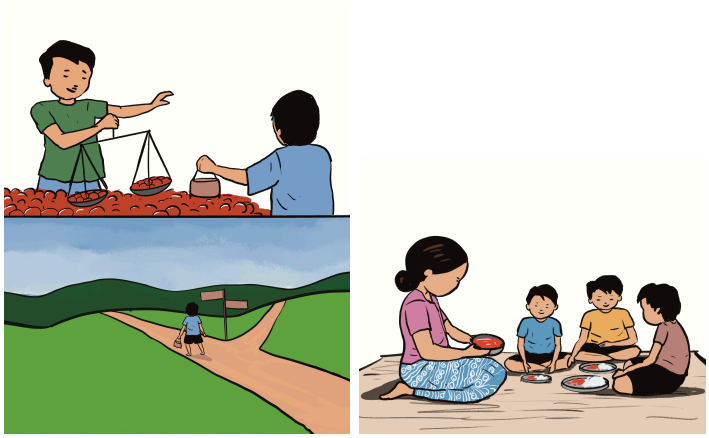
In sentence 9, there are two markers suffixed together =*cha* and =*ra*. Here, =*ra* is the corrective focus marker which I will discuss in the later sections. While using =*ra*, using =*cha* could be optional or could be used both. But it's obligatory to use=*cha* in sentence 10 in both subjects as contrastive topics.

However, it is very early to finalize =*cha* as a topic marker for all clans in Marma because Marma's 12 different clans may have different preferences.

Natural Discourse

To assess the marker =*cha*'s role as a topic marker we will run a test on naturally occurring discourse following Aissen (2017)'s paper on Topichood. We will introduce several discourse referents (mother and three children) that will later function as "topics, establishing a discourse referent as a topic, continuing a discourse referent as a topic, shifting the topic" Aissen (2017). This discourse context includes a **common ground** which is the set of propositions that the discourse speakers have mutually accepted. The common ground also has a set of given discourse referents who have already been introduced into the discourse at the beginning, or who are at least familiar to the speaker and addressee during the discourse (e.g., because they are present in the speech situation (Stalnaker 2002). The following story is about a mother and her three children.





	Sentence	Topic	Focus
1	Once upon a time, a mother had three children		
2	One market day, she sent her eldest child to buy some tomatoes	mother	Child 1
3	The child took a basket and Ø set off to the market	Child 1	
4	But it couldn't find the right road and Ø came back without the tomatoes	Child 1	
5	Then the mother sent the second child	mother	Child 2
6	This child, too, set off, Ø lost its way, and Ø came back without tomatoes	Child 2	
7	So the mother sent her youngest child to the market	mother	Child 3
8	This child found the right way	Child 3	
9	It arrived at a market stall, Ø bought tomatoes and Ø came back to its mother	Child 3	
10	They were very happy, and the mother cooked a tomato soup	mother and children	

Table 3.2: Tomato Story Aissen (2017)

In Table 3.2, the mother becomes the topic in sentences 2,5, 7, and 10. Child 1 is the topic in sentence 3 and 4 because he was introduced in sentences 1 and 2. Child 2 becomes the focus because it's a piece of alternative information about the action of the mother, even though Child 2 was introduced in sentence 1. Child 2 becomes the

topic in sentence 6. Child 3 becomes the focus in sentence 7 and becomes the topic in sentences 8 and 9.

Experiment Set Up for tomato story

I experimented to observe the frequency of the marker *=cha* across different Marma clans. A group of 17 speakers was carefully chosen from different clans[1]. Since inter-clan marriages are very common, we made sure to consider the complex relationships of marriage among these clans to keep their identities clear. Among the three districts, the Rangamati Hill district has a significantly more heterogeneous clan diversity than the other two districts. Intermarriages among different clans are very common as well in Marma. Clans can be identified from their distinct speech patterns, such as intonation and pitch or speech characteristics. Additional research is required to identify these patterns among various clans. Among the 17 speakers from different Marma clans, 14 speakers used *=cha* to mark the topic in the discourse. One speaker from the Lungdusa clan omitted *=cha* in each phrase and suffixed the marker *=su* which is a personal pronoun (he/she). We have observed that the personal pronoun marker *=su* is used by all other speakers in both subject and object positions with *=cha* marker.

Frequency of *=cha*			
The Clans	cha	ga	su
1.Palaing-sa (5)	yes (37 times)	yes (1)	yes
2.Rege=tsa (3)	yes (15 times)	yes (2)	yes
3.Khayongsa (3)	yes(12 times)	yes(4)	yes
4.Marong-sa (1)	Ø	yes (4)	
5.Marong-sa (1)	cha (6 times)	yes (4)	
6.Lungdu-sa (1)		Ø	yes
7.Frang-sa (1 time)	Ø		yes
8.Kowkdyn-sa (1 time)	yes (7)	Ø	yes
9.Lungdu-sa and Frang-sa (1 time)	yes (6)	Ø	yes

Table 3.3: Use *=cha,ga* and *=su* across different clans

It appears that among the different Marma clans, most people from the Plengthong clan consistently use *=cha*. Notably, one speaker from the Marongsa clan used *=ga*

[1]The Marmas are subdivided into 12 clans, named after the place from where they migrated. These clans include the Plengsa, Ragraisa,Khyongsa,Longdusa, the Frangsa, Marongsa and others

in her speech and did not use =*cha* at all. Another speaker from the Marongsa clan did use =*cha* in every topic phrase mentioning that he spent most of his childhood in the Bandarban area, suggesting that geographical influence might have affected his usage of the marker.

There are two other information structure relations in this narrative "contrastive topic/CT" and "contrastive focus/CF". We will discuss the CF in a separate section. In sentence 8, child 3 succeeded in getting to the market to buy the tomato contrasting with the failure of the other two. In English, this is characterized by special intonation on "THIS child", which is associated with the contrastive topic. In a natural reading, other questions are relevant to the larger inquiry Aissen (2017). In sentence 8, most of the speakers I interviewed used =*cha* as a contrastive marker and one speaker from Marongsa clan used =*ga* as both a topic and contrastive topic marker.

Contrastive Topic

Contrastive topics (CT) can also be referred to as topics, but the two contrasts are concerning the predicate. The following passage illustrates an example of how contrastive topics (CT) function within discourse in Marma, specifically within the framework proposed by Buring (2003). This framework depicts the role of contrastive topics in generating implicit sub-questions in a discourse. It guides the structure of both the questions asked and the responses given in a discourse setting (*What does your brother do? What does your sister do*?).

Through the following examples, we can see the application of this theory in a practical, Marma conversational context.

(11) Nang=ma mong la namha ja lutele? (Question)
Your=ma brother and sister what does
"What do your brother and sister do?"
နင့်မှာ မောင်လ နမှ ဇာ လူလေ

(12) Nga mong frote ruduchusa.[Namha=**cha**] frote nurse=ma
My brother is musician.[Sister=**cha**] is nurse=female
"My brother [is musician]f. My sister [is nurse]f"
င မောင် ဖြစ်တေ ရဒု ဆိုသား နမှ**စာ** ဖြစ်တေ နာ၍်

(13) Nga [mong=**ga**] frote musician. Namha=cha frote nurse=ma
My brother is musician. Sister is nurse=female

"My brother is [musician]f. My sister IS[nurse]f"
ငမောင်က တေးခြင်း အဲ ရဒု ဆိုသား နမှ **စာ** ဖြစ်တေ နာ့ရှ်

The speaker in 12 uses =*cha* as a contrastive topic marker which is also a topic. The other speaker in 13 uses =*ga* instead and we will discuss this marker shortly.

In the above examples, we have observed the two markers (=*ga* and =*cha* occurrences) in the subject position/left edge of a clausal constituent. In our observance, we are proposing its occurrence with the objects as well when the predicate is fronted and situated to the left and it is a typologically recurrent pattern for the CT to occur on the left periphery Aissen (2017). In English, this is associated with displacement and this is associated with a CT interpretation Aissen (2017). While CT is in its base position, it can also be displaced to the left periphery in so-called 'Topicalization' structures.

Now I will analyze the following scenario where topic marking occurs with the objects. For instance, we were invited by a Marma family in Boston for dinner. The items were very delicious, but the chicken and the mutton were the best ones. And we were discussing with each other about the dishes and the chicken and mutton are presupposed and become topics.

(14) krauksa=**cha/go=cha** maya khyauk=reh aro chuisa=**cha** lang
Chicken=**cha/go=cha** wife cook and mutton=**cha** husband
khyauk=reh
cook
"Wife cooked the chicken and husband cooked the mutton"
ကြက်သား စာ ကိုစာ မယျာ ချက်ရေ ဆီးသား**စာ** လင် ချက်ရေ

(15) krauksa=**cha/cha=ga** maya khyauk=reh aro chuisa=**cha** lang
Chicken=**cha=ga** wife cook and mutton=**cha** husband
khyauk=reh
cook
"Wife cooked the chicken and husband cooked the mutton"
ကြက်သား စာ စာက မယျာ ချက်ရေ ဆီးသား**စာ** လင် ချက်ရေ

(16) krauksa=**ga/ go=ga** maya khyauk=reh aro chuisa=go **or** go=cha lang
Chicken=**go=ga** wife cook and mutton=**go** husband
khyauk=reh
cook

"Wife cooked the chicken and husband cooked the mutton"
ကြက်သား**ကိုက** မယျာ ချက်ရေ ဆီးသား**ကိုစာ** လင် ချက်ရေ

There are three possible answers where the setting includes a plural set (the Marma family and these dishes). The setting raises a set of implicit sub-questions dealing with each member of the set (Wife and Chicken; Husband and Mutton Curry). We see in the object position we see multiple stacking of the morphemes *=go=cha*; *cha=ga*; *=go=ga*.

It seems when the topic marker is affixed then it's not obligatory to use the accusative marker (*=go/ko*) in sentences 14 and 16. And "cross-linguistically fairly common for morphology added to DPs that are already inflected for Case to interact in different ways with structural and inherent case morphology. And DPs with the inherent case either cannot receive the morphology at all or simply add it on top of the existing inherent case morpheme " (Richards 2013). Further research in Marma is needed on how this approach works in Marma.

3.2.2 Conclusion on [=*cha*]

- *=cha* as a topic marker can be suffixed to both animate and inanimate NPs both in subject and object positions.
- *=cha* can also be used with *=go*. When indicating a contrastive topic in object position, *=go* can be omitted as well and it can stand alone as *=cha*, serving as a contrastive topic marker.
- *=cha* as a topic marker can also be affixed to *=ga*.

Our observation concludes that the topic construction in Marma requires a specific morpheme *=cha* that can be suffixed to both subject, object, animate, and inanimate NPs.

3.3 က *=ga/ka*; a Topic marker

In the previous sections, we have seen the use of '*=ka/ga*' as a topic marker by very few speakers. The frequency of using the marker =cha was higher in our experiment which was a constructed context set in an artificial setting. In this section, we are analyzing naturally occurring speech through videos in Marma.

This morpheme is pronounced as *=ka* after a glottal stop and as *=ga* in other environments. In this section, our further investigation into the =ka/ga marker in Marma to reveals its essential role in both maintaining topic continuity and introducing contrastive topics.

(17) Basing ja/acha=**ga** lete leh
Basing where=**ga** lete Question Particle
"Where is Basing coming from?"

(18) Basing=**ga**/Basing Dhaka=**ga** lete
Basing=**ga** Dhaka=**ga** come
"Basing is coming from Dhaka "

These two are homophonous markers (Basing=ga, Dhaka=ga) that are syntactically distinct enough to treat them as separate markers. The marker =ga in the object position in sentence 17 is the postpositional marker equivalent to the English preposition 'from'. I am going to concentrate on the marker *=ga* that appears in Basing/Subject.

3.3.1 More Examples

We cooked some fish in the morning to eat during lunch. But during lunchtime, I saw no fish was left. I asked my mother about the specific fish(19) and we used the marker *=cha.*

(19) Nga hang=cha jamale
Fish curry=cha where
"Where is the fish curry"

There are four possible sets of answers.

(20) Nga hang=*go* Umie chablopya
Fish curry=*go* Umie ate
"Umie finished all the fish/ Umie has eaten or finished the fish curry"

(21) Nga hang=***ga*** Umie chablopya
Fish curry=*ga* Umie ate
"Umie has eaten or finished the fish curry "

(22) Nga hang=*go*=*ga* Umie chablopya
Fish curry=*go*=***ga*** Umie ate
"Umie has eaten or finished the fish curry "

(23) Nga hang=*go*=*cha* Umie chabllopya
Fish curry=*go*=*cha* Umie ate
" Umie has eaten or finished the fish curry"

(24) Nga hang=*cha* Umie chabllopya
Fish curry=*cha* Umie ate
"Umie has eaten or finished the fish curry"

(25) Nga hang=*cha*=***ga*** Umie chabllopya
Fish curry=*cha*=***ga*** Umie ate
" Umie has eaten or finished the fish curry"

In 21,22,23 and 25, the phrase 'fish curry' is topicalized. The topic is displaced to the left of the clause and the marker is used while emphasizing the "topic" of discourse, a similar pattern in Burmese (Okell and Allott 2001), a function related to the subject marking. We see an interesting pattern, where in many cases the object marker =*go* can be omitted (21 and 24) and we can simply use =*ga* and =*cha*. And in 25, we can stack both the markers =*cha* and =*ga*. However, we will only focus on the marker =*ga/ka* in this section.

In discourse, it is important to distinguish between topics and comments, with =*ka/ga* being a major factor. In all the cases above, =*ka/ga* topicalizes "*Nga.hang=go* 'fish curry' dividing the topic (fish curry) from the comment (Umie's action).

To understand the depth usage of the marker =*ga/ka* in Marma, we used the observation method, one of the two major methodologies employed in empirical sciences which are observation and experimentation (Kibrik 2011). Through the observation method, we have studied =*ga/ka* in naturally occurring speech. We have analyzed three short stories in Marma where we observed that Marma speakers regularly unmark the subjects before the first introduction of the entity in the discourse.

Story one from Bomangthong/ Bandarban

This story is narrated by a male speaker from Bomanthong/ Bandarban district. I collected the story from a You tube channel where they broadcast Marma folklore

and children's stories in the form of animation and storytelling.

Sentence	**Topic**	**Focus**
1.Once upon a time, there lived a small boy and his mother		
2.After harvesting the paddy, the mother laid out the paddy under the sun to dry. But an unexpected rain ruined all their hard work. Days passed, and the relentless rain made it impossible to dry the paddy. Days passed, and the relentless rain made it impossible to dry the paddy. Seeing the mother's suffering the boy becomes very angry with the rain deity.	mother, son=Ø	the deity
3.Then the mother says, Son, please don't be angry with the deity. Every season has its duty. But the boy wanted to teach the deity a lesson for his actions	mother=ga	
4.The boy left his home without letting his mother know. He met a goat.	the boy=su	goat
5.The goat asks the boy "Where are you going"	the goat=ga	
6.The boy answered "I am going to war with Rain Deity"	the boy=su	
7.The goat also wants to join him.	the goat=ga	
8. The boy then also meets one crab, an egg, and a thread. They asked where was he going.The boy tells the story of his mother's sufferings.	the boy=ga	crab, thread and egg
9.After hearing his story, they also want to join the boy.	they=ga	

I only analyzed half of the story in the above table. Several referents have been mentioned in the below story description such as the boy, the goat, the crab, or the rain deity in the storyline, and the marker *=ga/ka* is used to refer to the topic. The speaker did not use the marker *=cha* anywhere. The speaker used the marker *=su* after the boy which I am proposing as a definite marker beside the personal pronoun marker as well.

The first mention of the two referents (the mother and the boy) is referentially independent and the narrator doesn't use any marker. In the second mention the speaker did not use any marker as well (2). But in the subsequent mentions, all the topics are marked by the marker *=ga* (both human and animals) and sometimes *=su* for the human (boy).

People from this clan also use the marker *=cha* but he has omitted using the marker throughout the story.

Plengthong/ Mong Circle

This animated children's story is narrated by a speaker from Plengsa Clan from Mong Circle[2].In the animated story, Raju and his family own a parrot. On a particular day, while Raju was at school, the parrot flew to a window in his classroom. It began to mimic the nursery rhyme that the teacher and students were reciting in the class, drawing everyone's attention. Then Raju after spotting his family's parrot exclaimed loudly (in 7:11 minutes).

Iei=cha is the direct transition of English 'it/this' .

(26) [Eei=cha=*ga*] ngu kyi
[This=cha=*ga*] our parrot
" This is our parrot"

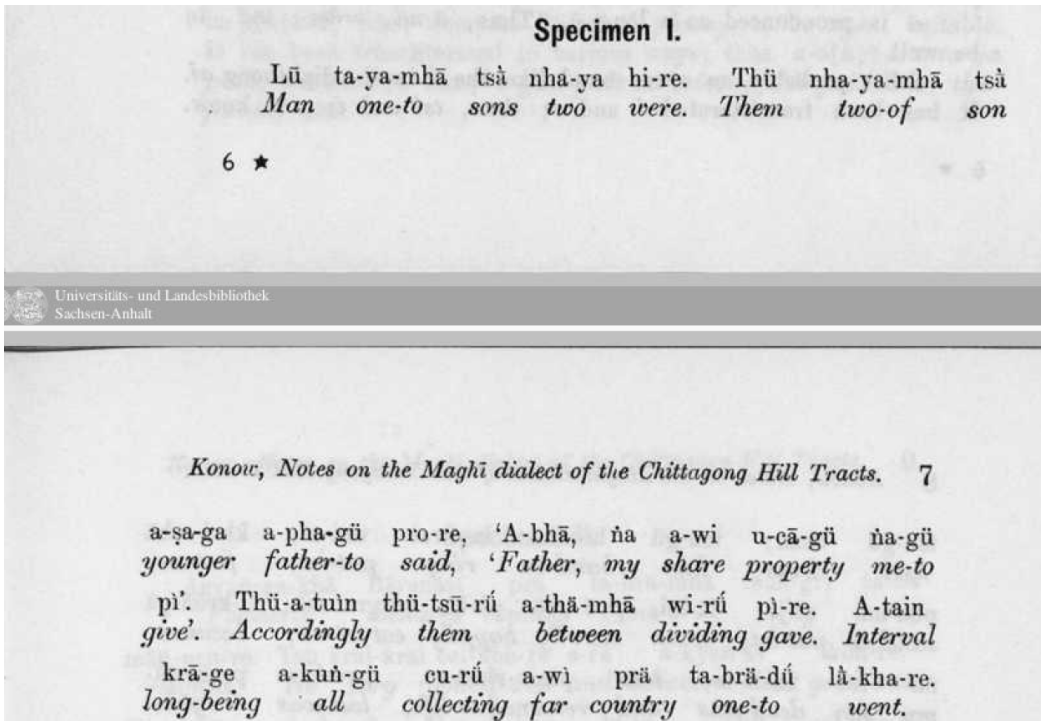
Even though the parrot was not present in the class from the beginning, this is presupposed for Raju because his family already owns a parrot, and this is the parrot who is sitting in the classroom window. Here the marker *=ga* is marking the subject or topic (the parrot) as well.

Work from Sten Konow (1903)

We also analyzed a transliterated folktale by Sten Knonow from his paper titled "Notes on the Maghī dialect of the Chittagong Hill Tracts". He referred to Maghī, the current Marma people of CHT living in three different Hill Districts. He documented

[2]The Mong Circle is one of three hereditary chiefdoms (or "circles") in the Chittagong Hill Tracts, Bangladesh. The jurisdiction of the Mong Circle encompasses parts of Khagrachhari District. The chiefdom's members are of Marma descent and are known as 'Plengsa' .The inhabitants of the other Marma chiefdom, the Bohmong Circle settled in the south and are known as Regraisa/Regesa/Khyongsa. (Wikipedia)

two specimens in this paper in 1903 but he did not specify from which district he collected the two folktales. I analyzed the two specimens thoroughly and found the marker $=ga$ as a topic marker which is affixed to the previously mentioned topics. As in the following story the younger son is taking $=ga$ in the second sentence and he is among the previously mentioned two sons.



Specimen I.

Lū	ta-ya-mhā	tsà	nha-ya	hi-re.	Thü	nha-ya-mhā	tsà
Man	*one-to*	*sons*	*two*	*were.*	*Them*	*two-of*	*son*

6 ★

Konow, Notes on the Maghī dialect of the Chittagong Hill Tracts. 7

a-ṣa-ga	a-pha-gü	pro-re,	'A-bhā,	ṅa	a-wi	u-cā-gü	ṅa-gü
younger	*father-to*	*said,*	*'Father,*	*my*	*share*	*property*	*me-to*
pì'.	Thü-a-tuìn	thü-tsū-rű	a-thā-mhā		wi-rű	pì-re.	A-tain
give'.	*Accordingly*	*them*	*between*		*dividing*	*gave.*	*Interval*
krā-ge	a-kuṅ-gü	cu-rű	a-wì	prä	ta-brä-dű	là-kha-re.	
long-being	*all*	*collecting*	*far*	*country*	*one-to*	*went.*	

Mog from India

For this section, I have watched the short video from Mog [3] people from India.

In this short video, there are three characters (a mother, a father, and their son)

Context: A mother has been asking his son and husband to get some groceries because her younger brother is visiting from Bangladesh. But they are too lazy to go to the market. And the mother reacts,

(27) Sa=ga=sa afa.leh=ga yojonje
Boy=ga.boy father.too=ga same

[3]The Mog People in India, majority of them share the same dialect with the Marma people from Mong Circle. The partition of India and Bangladesh significantly reconfigured the traditional homelands of various ethnic groups, including the Mogs. This geopolitical event led to the division of their community, with a considerable number relocating to the Indian side of the newly established borders.

"Son and father has the same careless nature"

In the above example, =*ga* is affixed to both topics [father and son]. Here, =*ga* is infixed where mother uses the marker between =*sa/son* to emphasize her statement. The mother is stating that both of them are careless. Because no one cares what she is saying. The marker =*ka/ga* also draws attention to contrastive components within the discourse topic; this is demonstrated in [*Sa*=*ga*=*sa*] [*afa.leh*=*ga*] , where the father and son's common carelessness is emphasized. This contrastive emphasis greatly influences the way discourse dynamics are shaped.

3.3.2 Conclusion

We have observed the two topic markers =*cha* and =*ga/ka* both can be affixed in subject and object positions in Marma. In Aissen's tomato story, I observed most of the people used the marker =*cha* for topics, but some used =*ga/ka*. And Plengsa Clan are the frequent =*cha* users as the topic. However, this research still could not conclude the difference between the two markers and I will continue my research to identify the semantic differences in the usage of these two markers in topic and contrastive topic positions across the 13 clans in Marma.

=*cha* can be suffixed as a definite marker, genitive marker, topic marker, and nominalizer.And I have found =ga/ka only as a topic marker.

I have identified another marker =*su* in both the =*cha* and =*ga/ka* contexts, I am proposing this personal pronoun marker which can be only suffixed after person or people, is a definite marker used for discourse referent.

Chapter 4

Chapter 4 Focus Marking in Marma

4.1 Focus Marking in Marma

This chapter will discuss the three types of focus constructions (Information focus, Contrastive Focus, and Argument Focus) in Marma. We found three focus morphemes or particles *=ra*, *=yi* and *=ba.ga*. These particles don't occur in information-focus construction but appear in contrastive focus and argument-focus situations.

4.1.1 Different Types of focus

According to Krifka (2008)"**Focus** indicates the presence of alternatives that are relevant for the interpretation of linguistic expressions ". 'Focus' also indicates a new or important information component that is not to be shared by the speaker and the hearer in a discourse (Jackendoff 1972). Aissen (2017) has documented two types of focus "information focus" and "contrastive focus" in her paper. Aannestad (2021) has mentioned two types of morphological focus marking construction i)Argument-associated morphological marking, ii) Clause-level focus morphology. I argue Marma has a 'Morphological focus construction'Aannestad (2021) which is a sort of "segmental morphology" that appears in argument-focus and contrastive-focus situations and not in other situations. I will refer to all the affixes, clitics, or particles as morphemes or markers in this paper.

'Morphological focus construction' in Marma can be referred to as 'dependent' marking Nichols (1986) in both 'argument focus' and 'contrastive focus' situations that

involve some morphological affixation in the sentence that would not be grammatical on other grounds.

Lambrecht (1994) refers to '**argument focus**' as the focus that is placed on a single constituent within a sentence. 'Argument focus' highlights a specific part of a sentence, while predicate focus zooms in on the action or verb of the sentence. 'Predicate focus' carries significant semantic content outside the topic, whereas in 'sentence focus', the entire sentence is in focus as a unit. Sentence focus treats the entire sentence as equally important, without emphasizing any one part over another Aannestad (2021).

(1) Question: What does Basing want?
Answer: Basing wants a book (Predicate Focus)

(2) Ieicha=yi yauk chawo=cha ja=cha Basing lure
It=yi that Book=topic what Basing wants
" It was that book Basing wants"(Argument Focus)
ဣစိယျ□ယည် ယျက်စိအုပ်စိ ဇာစိ ဗာသိန်း လိုရေ

(3) Basing=ga chawo to.khu lure
Basing=ga book one.classifier wants
" Basing wants a book" (Sentence Focus)
ဗာသိန်းက စိအုပ် တစ်ခု လိုရေ

Information focus offers "one proposition as true" and the alternatives are not made explicit and may not be 'active' in the consciousness of the speaker or hearer Aissen (2017). In answering a wh question like in the following example, the speaker offers one proposition as true and the speaker does not indicate any attitude towards the truth or falsehood of alternative propositions of the focus constituent in a discourse.

(4) What is he doing? (**Speaker A**)

(5) Yasu kow khyare;[chaba chote][Nunhu kow khyare]
He plant do;[Rice plant][Termeric plant]
" He is planting, he is planting rice, he is planting turmeric " (**Speaker B**)
ယျက်သူ ကောက်ချရေ စပါး စစ်တည် နုန္ဂိုး ကောက်ချရေ

Speaker B's answer involves Verb Phrase (predicate) focus; this is information focus and there is no evidence of using any marker in Marma. The next utterance in 6 is spoken by the narrator (C), who corrects B's response.

(6) Yasu=ga [makafu=ra] chote
Yasu=Topic [Corn=ra] planting
"But it is corn that he is planting" (**Speaker C**)
ယျက်သူက မကာဖူးရာ စစ်တည်

In sentence 6, in speaker C's utterance, 'corn' is the focus, and the rest, 'he was planting something' is the presupposed background. The focus on 'corn' contrasts with the explicit alternatives (rice and turmeric) mentioned by speaker B in sentence 5. The extent of focus depends on the discourse context or presupposed information, with 'information focus' giving the new information (sentence 5) and 'contrastive focus' (sentence 6) emphasizing differences by comparing alternatives. "The focus is contrastive when there are counter-expectations, either by rejecting or restricting earlier assertions or by presenting surprising or new information in the discourse context" Aissen (2017) and here 'corn' marks the contrastive focus which is affixed with the marker *=ra*.

This paper only investigated Marma focus marking based on information focus, contrastive focus, and argument-associated focus construction and did not analyze whether prosodic effects, such as stress and accent (e.g., duration, pitch, loudness) or prosodic phrasing, are related to focus marking in Marma.

4.2 More on Information Focus

Aissen (2017) stated the most straightforward way to elicit examples of information focus is through wh question prompts, as "these make the partition of the answer into the background and focus particularly clear". It's also crucial to set up a common background that both the questioner and answerer or speaker know. To analyze information focus I will establish a setting or context and prompt. The setting will be a visual form (picture story Skopeteas et al. (2006) which can be used as the basis for wh questions that elicit new information focus. The prompt will be questions or situations designed to trigger specific information that will help capture the intended speech naturally to identify the information focus.

I will analyze the following test to determine whether Marma's information-focus

constituent requires any morpheme. This test is also taken from Aissen (2017)'s "Nasty Dog" story.

(7) Why is the man running through the forest? (Question)

(8) Khwe=cha yauk luk=go lote (Answer)
Dog=Topic Marker man=go chase
" A dog/the dog is chasing the man "

(9) What does the dog have around his neck? (Question)

(10) Khwe loifangma kru khoyoingbo (Answer)
Dog neck rope has
" The dog has a belt around his neck"

(11) What happened to the dog? (Question)

(12) Khwe=ma loifangma=kru=cha sapangma tare (Answer)
Dog=ma neck=belt=topic tree hang
" Dog's neck collar got stuck in the tree "

The above questions are intended to analyze information focus. The answers (a dog and a boy) are non-contrastive as the preceding context does not provide a set

of explicit alternatives. In this discourse setting, none of the answers counters the expectations of the hearer except a dog, not a cat or tiger, and a boy, not a girl. There is no focus morpheme observed so far. The marker *=cha* used in sentence 8 with the dog is the topic marker here because the belt is the topic in sentence C.

4.2.1 Contrastive Focus

Kratzer and Selkirk (2020) stated that contrastive focus evokes alternatives to signal contrast with a previously uttered discourse referent. And "it has been argued for a range of languages that contrastive foci must be marked in a special way using special prosodic, syntactic, or morphological means, which sets them formally apart from mere information foci" Onea (2011). According to Rooth (1992), contrastive (alternatives) focus can be interpreted by both the phonology and the semantics. We have seen above that 'information focus' does not require a marker in Marma but in the following examples, we see the 'contrastive focus' particle *=ra* (15). In the following glosses (f) refers to focus and (g) refers to given information.

In the following setting, several participants (Kyanu, Peng, Basing, Lovely, Atu,Paitu) are in the discourse. They are talking about oranges which is the common ground here.

(13) Kyanu: Did anybody eat the oranges? I can't find them in the fridge.
Peng: (I think) Basing might [have eaten the oranges]G.

In sentence 13, oranges become the topic of the following discussion. Subsequently (14 and 15), two new speakers, Lovely and Atu, join the conversation about the oranges. Atu asserts that it was not Basing but Unuching who mailed the oranges. Therefore, Unuching is contrasted with Basing, and we see the contrastive focus particle *=ra* attached to Unuching.

(14) Lovely: Basing mailed the oranges.

(15) Atu: Mahouk, [Unuching=ra]f [oranges=go] mail pyangloteh
Atu: No, [Unuching=ra]f [oranges=go] mail did
Atu: " (No), [Unuching]f [mailed the oranges]g "

Then another speaker (Paitu) joins and brings two new pieces of information (Ukyamong and Chocolates) which are not suffixed with *=ra*. Because they are not contrasting to any piece of previously given information.

(16) Paitu:Howti, aro [Ukyamong.li] [choclate=go] mail pyangloteh
Paitu:Yes, and [Ukyamong.also] [choclates=go] mail did
Paitu: Yes, and [Ukyamong]f [mailed]G [the chocolates]f

The left periphery is a common syntactic position for both (contrastive) focus and topic Lambrecht (1994). Here, Unuching in sentence 15 is contrasting with Basing and Unuching carries the morphological marking. The notion of contrastive focus demonstrates that the common ground (CG) content contains a proposition; [maling the oranges] is the CG here in this setting, with which the current utterance can be contrasted. However, Ukyamong mailing the chocolates is not in contrast to the previous utterances but brings only new information in the setting.

We can conclude that *=ra* is a contrastive focus marker in Marma.

4.3 Argument-associated morphological marking in Marma

In this section, I show that argument focus construction in Marma requires morphological marking and different clans use different markers.

In the following example 18 to 21, the particle '*=yi*' follows the focus constituent in the argument focus construction and is a common type of construction called "dependent marking" Aissen (2017). '*=yi*' is used by speakers from two clans (Plengsa and Lungdusa). I also asked three speakers from the Regesa Clan from Bandarban District; one speaker used the marker *=ba.ga* instead of the marker '*=yi*'. Another speaker used the marker '*=yi*' and another speaker did not use any marker at all.

(17) Umar=ma sa nyagakha amosyi=go buwri
Umar's son yesterday baby=ACC hit
" Umar's son hit the child yesterda "

(18) Isu [Umar] yi jasuma sa=cha nyagakha amosyi=go buwri
It's [Umar] focus whose son=cha yesterday baby=ACC hit
" It's Umar]f whose son hit the child yesterday. "

(19) Ieei amosyi=go ngyagakha Umor=ma sa buli=cha
This child=ACC=focus yesterday Umor=ma son hit=cha
" [It's the child]f that Umor's son hit yesterday."

(20) Amongsyi=gu bufu aluwk=cha=yi ngyagakha Umor.ma sa pyanglireh
Child=go hit work=cha=focus yesterday Umor's son did
" It's [hitting]f the child that Umar's son did yesterday "

(21) Ngyakha=yi Umar=ma sa amosyi=go buwri
Yesterday=focus Umar's son=cha son=ACC hit
" It was [yesterday]f that Umar's son hit the child "

However Aannestad (2021) claims that morphological marking found in argument-focus sentences need not be directly associated with the focussed constituent. It's also possible to put the marker *=yi* at the end of all Marma sentences (18,19,20 and 21) and not need to be directly associated with the focused constituent. I did not asses this with another marker *=ba.ga*.

4.4 "Only" and association with focus

According to Falaus (2013), focus meanings are demonstrated with a variety of expressions in different languages and those expressions are associated with focus-sensitive particles such as ' **Only** or **even**'.' Only' is the focus particle that introduces clear truth-conditional differences in the discourse Rooth (1992).' Only' indicates that the properties assigned to the focus set are not shared by elements of the alternative set Erlewine (2020). I suggest that *=ra* is the particle associated with ' Only' in Marma that appears to be quantified over the different types of constituents.

For the examples 22 and 23, without computing 'Only', the ordinary value of the following two sentences is identical, unlike their focus values. Once ' Only' is computed, the resulting meaning of (22) is that "Basing introduced Paitu to Ume" and any other proposition in the set of alternatives is false, i.e. Basing introduced Paitu to Ume and no one else. In (23), only takes a different alternative set and the derived interpretation is that "Basing introduced Paitu only and no one else to Ume". This provides a simple illustration of the truth-conditional effect of focus-induced alternatives. Falaus (2013)

(22) Basing [Paitu=go] akhli [Ume=la=ra]f atwe khengjiloteh
Basing [Paitu=go] only [Ume=with=Foc] introduced do
" Basing only introduced Paitu to [Ume]f "

(23) Basing akhli [Paitu=go=ra]f [Ume=labo] atwe khengjiloteh
Basing only [Paitu=go=ra] [Ume=with] gave
“ Basing only introduced [Paitu]f to Ume”

The same scenario is applicable for the following context, In terms of sentence 24, I gave the book only to John, I did not give it to Rohn or anyone else. In Sentence 25, I gave only the book to John, nothing else.

(24) Nga akhli [John=go=ra]f chawu=cha piloteh
I only [John=go=ra]f book=cha gave
“ I only gave the book to [John]f ”

(25) Nga akhli [chawo=cha=ra]f John=go piloteh
I only [book=cha] John=go gave
“ I gave [the book]f only to John”

=*ra* 's appearance in other settings

I will analyze =*ra*'s appearance in different focus situations considering “**structured meanings**” approach (Cresswell 1985), a very usable technique for interpreting focus constituents in a given focus-sensitive construction in a sentence. In semantics, the structured meanings approach demonstrates splitting the meaning of a sentence or phrase into two parts. The background part sets the context, and the focus part highlights specific information in the discourse. This approach was first introduced by Cresswell and von Stechow in 1982 and later further developed by others and assists in analyzing how emphasis affects sentence interpretation. Falaus (2013).

The structured meaning representation with a narrow focus on the object is shown in (26), and the structured meaning representation with a narrow focus on the subject, is given in (27).

(26) Basing Invited [PEng]f
$\langle \lambda x \subset D_e$.Basing invited, x Peng$\rangle$

(27) [BAsing]f invited Peng.
$\langle \lambda x \subset D_e . x$, invited Peng, Basing$\rangle$

In sentence 26, Basing invited Peng, if **Peng** is the focus, the semantic representation would split into Basing invited x as the background and Peng as the focus, shown as $\langle \lambda x \subset D_e$.Basing invited, x, Peng$\rangle$

If the focus is on Basing in sentence 27, **Basing** invited Peng, the structure alters to [x invited Peng] as the background with **Basing** as the focus, represented as $\langle \lambda x \subset D_e . x$, invited Peng, Basing$\rangle$

I have carefully analyzed that the morpheme *=ra* appears in focused and emphasized constituents either subject or object positions which I propose is the Morphological realization of focus in Marma and as well as seen across languages like Wolof and Guruntum (West Chadic) Hartmann and Zimmermann (2009),Falaus (2013).

The following section is adapted from Erlewine (2020)'s work on focus and I will analyze the morpheme's appearance based on the Rooth (1992)'s 'Alternative Semantics' concept which refers that in a set of propositions, every focus has a second semantic value. In the following examples from 29 and 30, to attach *=ra* with the verb, the verb can be copied before the focus marker, and then the morpheme will be infixed and the root verb comes at the end. I am providing an additional example 30 for *=ra*'s infixation to the verb.

(28) Umaching akhli [[sandwich=ra]]^f welireh
Umaching only [[sandwich=ra]]^f bought
"Umaching only bought [the sandwich]f "

(29) Umaching sandwich akhli [[we=ra=welireh]]^f
Umaching sandwich only [[bought]]^f
" Umaching only [bought]f the sandwich."

(30) Umaching nahang=go akhli [[tu=ra=tulireh]]^f
Umaching bambooshoot only [[collect]]^f
"Umaching only [collected]f the bambooshoot"

In 28, [[$\forall x \subset D_e$]]: Umaching bought x $\rightarrow$ x = the sandwich
In this sentence, we are focusing on different objects (type e), among the objects that Umaching chose is the sandwich which is x.

In 29,[[$\forall R \subset D_{e,\, e,t}$]]: Umaching R'ed the sandwich$\rightarrow$ R = *buy*
Here, we are quantifying over or considering different transitive verbs. Here, the action Umaching did was just buy, she did not perform any other actions.

'Alternative semantics' proposes that the meaning contribution of focus is analyzed through two semantic values. One specifically introduces a secondary semantic layer, termed as the focus semantic value, the focus semantic value, $[[]]^f$, which is computed in parallel to the ordinary semantic value, $[[]]^0$, of an utterance Zimmermann and Onea (2011), Rooth (1992). Following Erlewine (2020)'s handout we have considered the two dimensions of meaning associated with focus.

For any syntactic object α, we compute:

- i) the ordinary semantic value $[[\alpha]]^0$
- ii) the alternative set $[[[\alpha]]^{alt}]$ (or focus semantic value) for the examples 28 and 29, the set of all ordinary semantic values obtained by substituting alternatives for any F-marked subparts of $[\alpha]$

(31) $[[\text{Mary bought [the sandwich]}_f]]^0 = \wedge$Mary bought the sandwich
$[[\text{Mary Sandwich [welereh]}_f]]^0$
$[[\text{Mary bought the sandwich }]]^{\ 0} =$

(32) $[[\text{Mary bought [the sandwich]}_f]]^{alt} = \wedge$Mary bought the sandwich
$= \wedge$Mary only bought the pizza
$= \wedge$Mary bought the biscuit

(33) $[[\text{Mary [bought]}_f\text{the sandwich}]]]^0\& = \wedge$Mary only bought the sandwich
$[[\text{Mary Sandwich [we=ra=welereh]}_f]]^0$
$[[\text{Mary [bought]}_f \text{ the sandwich}]]^0 =$

(34) $[[\text{Mary [bought]}_f \text{ the sandwich}]]^{alt} = \wedge$Mary bought the sandwich
$= \wedge$Mary sold the sandwich
$= \wedge$Mary ate the sandwich

In the above examples, 31 and 33 it has the prejacent or propositions with an ordinary

semantic value. The word 'only' could serve as a quantifier[1] over the alternative set $[[[\alpha]]^{alt}]$ (or focus semantic value) in 32 and 34 and negates all plausible alternatives except for the prejacent itself within the context. And while computing only in the settings, the morpheme *=ra* appears with the focused constituents.

4.5 Discussion

This chapter showed how Marma marks focus constituents using specific morphemes or particles or affixes in three focus constructions. 1) Information Focus, 2) Argument-associated focus, and 3) Contrastive Focus situations.

Firstly, Information Focus arises in response to wh-questions and introduces new or important information. And Marma does not require any special markers to indicate information focus.

Secondly, Marma contrastive focus (CT) requires the marker *=ra*, and the marker serves to emphasize the contrast between the focused element and the alternative set within the discourse.

Thirdly, in Argument-associated Focus, I observed some regional variation or clan-based variation. Speakers from the Plengsa and Lungdusa clans predominantly use the marker *=yi*. One speaker from the Regesa Clan in Bandarban District used an alternative focus marker *=ba.ga* and another speaker used the same marker *=yi* in the focus constituents. I observed the consistent use of the marker *=ra* for contrastive focus situations across all three clans.

I primarily conclude a more widespread agreement on using the focus markers *=yi, =ra* in Marma discourse. This research emphasizes identifying clan-based differences in language use, especially in Marma since there is very little linguistic research has been conducted. I will continue further research to explore focus marking in other Marma clans and to see if features like stress, intonation, or pitch also play a role in to complete understanding of Marma's linguistic structure.

[1]Only presupposes the prejacent proposition and negates a set of alternative propositions (following Horn, 1969). Rooth (1985): Focus regulates the shape of this set of alternatives Erlewine (2020).

Chapter 5

Chapter 5 Tones in Marma

5.1 Background

In this chapter, I have done a preliminary acoustic and instrumental analysis of the existing tones in Marma. I will follow a similar methodology to Alexander R. Coupe (2014) drawing on his field experiences from similar tonal languages in Nagaland, northeast India. The steps assisted us in facilitating comprehensive documentation on the auditory and acoustic analysis of tonemes in the Marma language. Marma is an agglutinative language and, "the tone-bearing unit" is typically the syllable, similar to Tibeto Burman languages spoken in mainland Southeast Asia. This section of the thesis will discuss the acoustic characteristics of the tonal variations based on real data collected from Marma native speakers.

This chapter has followed the following structures.

- Preparation of a word list which will ensure the analysis of the recorded corpus of words that will facilitate the auditory analysis of the tone system in Marma.
- Using instrumental software to measure the **f0** and duration of the syllable rhymes under each vowel quality to identify the tonal characteristics of vowels.

By finding mainly three characteristics of each vowel [1)vowel quality, 2)mean f0 and pitch contour, and, 3) vowel duration] used to distinguish each tone in Marma, this paper adds necessary acoustic analysis to the literature on both Marma and Burmese.

5.1.1 Introduction

Marma follows a similar orthography to Burmese and is the sister language of Arakanese and has 12 vowels that fall under seven vowel qualities [a, e, i,o,u,ɜ,ei]. Previous research in Burmese has noted four tones: high, low, creaky, and, stopped (Bradley 1982, Green 2005, Wheatley 1987, Watkins 2001 cited in Mooney 2021). From our experiment, we propose that although Marma and Burmese follow a similar orthography, Marma only has three tones which goes against the findings of what is generally said for Burmese. There is some experimental evidence that Burmese also has three tones, which interact with sonority and syllable structure. The three underlying tones are found in both open and closed syllables, but "the syllable nucleus centralizes when there is a glottal stop or diphthongizes when there is a nasal" (Mooney 2021). I leave the analysis on sonority in Marma for future work.

The commencement of experimental research on Burmese tone is relatively recent(Gruber 2011, Kelly 2012 and Watkins 2005). Previous investigations before them were predominantly impressionistic studies in Burmese.

Our quantitative experiment will examine three factors; 1) **vowel quality**, 2) **mean f0 and pitch contour**, and 3) **vowel duration** to provide a more detailed analysis of the characteristics of each tone in Marma. Our experiment shows that **f0** is indeed a significant factor in identifying three tones in Marma under relevant vowel qualities. Marma has primarily 12 vowels and to identify each tone in Marma, we need to learn the extended sounds under seven vowel qualities.

We propose the following five hypotheses in Marma tone.

1. Marma has only three tones.
2. **High and Creaky**: High-tone syllables or rhymes are associated with high f0. This tone starts higher than the other two tones, has a higher pitch value, and falls higher than the other two at the end. It can be differentiated from the falling and low tones by having a higher **f0** at its onset (beginning), mostly at the peak, and a higher falling contour.
3. **Low:** The low tone typically begins at a significantly lower pitch than the high tone and slightly lower than the falling tones in some instances. Although the pitch height between the low and falling tones becomes similar before both of them descend, featuring a slight rising contour at the end.
4. **Falling**: Falling tone usually starts at the close pitch height as the low tone one but falls at the end. This has breathy phonation as well.

5. We propose that the f0 contour is a distinguishing factor to compare the high tone from the other two tones. Both the falling and low tones are longer in duration than the high tone.

In our study, we did not check the effect of phrasal intonation to analyze the pitch behavior of each tone. While this study only looked into pitch, pitch contour, and duration, other contrastive features like phonation type and intensity values were not calculated quantitatively. Instead, we visually analyzed the wave/spectrogram and listened to the audio files, assessing impressionistically. I leave an acoustic analysis of the correlates of phonation to future work since this must be done on a language-by-language basis.

We will further examine data in the later section of this chapter.

5.1.2 List of vowels with extended sounds

We have listed words with all 12 vowels and their extended sounds (a total of 19 sounds) inthe following Table 5.1. We will be referring to them according to the numbers as shown in Table 5.1 throughout the paper.

5.2 Methodology

We have conducted a quantitative experiment involving two speakers (Female-30 years old and Male-65 years old) from Plengsa Clan. Then we conducted auditory and acoustic analyses using the instrumental analysis software PRAAT and the programming software MATLAB. We analyzed the pitch values of 12 main vowels and their extended sounds in a total of 19 vowel sounds. We calculated the frequency (f0) and the duration of each vowel.

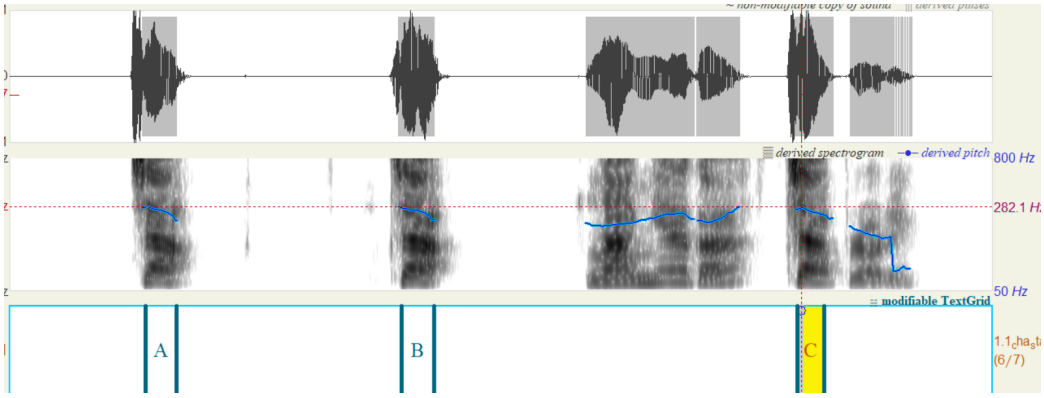
Using PRAAT first, we recorded a word list (monosyllabic and Disyllabic) from different word classes (Noun, Verb, and Adjective). Then we uttered the target word first in isolation twice and then uttered them within a predetermined carrier phrase. We tried to keep the phrases controlled and consistent, making limited use of intonation for focus and clarity (Coupe 2014).

(1) [cha] [cha] [nga nyaga cha prori]
[Start] [Start] [I said start yesterday]

12 volwes and their extended sounds		
	Vowel	**Vowel Quality**
1	အ	front and low [á]
2	အာ	front and low [à]
3	အး	front and low [â]
4	အိ	Front and High [í]
5	အီ	Front and High [ì]
6	အီး	Front and High [î]
7	အု	Back and high [ú]
8	အူ	Back and high [ù]
9	အူး	Back and high [û]
10	ဧအ	front and close mid [ɛ̀]
11	ဧအု	front and close mid [ɛ̀]
12	ဧအး	front and close mid [ɛ̂]
13	အဲ	front and close mid [è]
14	အဲု	front and close mid [è]
15	ဧအာ	Back and close mid [ɔ̀]
16	ဧအာ်	Back and close mid [ɔ̀]
17	ဧအော်	Back and close mid [ɔ̀]
18	အံ	Front and open mid
19	အံု	front and open [éi]

Table 5.1: Marma Vowels

For each tone, we recorded at least two to three words and for some vowels, we only could analyze one word. Then to segment each recorded data in the spectrogram, we annotated each tone-bearing unit (A, B, C) in the phrase with tiers to analyze phonetic transcription, pitch (f0) contour, and duration. The domain that carries the tone-bearing unit (TBU) could be the vowel, the mora, the entire syllable, or just the rhyme. In Marma, every consonant bears a vowel sound. For the monosyllables, the domain of tone or TBU is the voiced part of the syllable.



After recording the words, we created a spectrogram using the audio file and their corresponding TextGrid files. In the text grid file, we marked annotations (A for the first utterance, B for the second utterance, and C for the utterance in the carrier phrase) with tiers with corresponding voiced parts that help us to generate the frequency components over time. In the spectrogram, we annotated the voiced part of the audio file by the two intervals that contained the intended vowel or each tone. These steps assisted us in detecting the tones in Marma by thoroughly analyzing the acoustic characteristics of the targeted word segments.

5.3 Data Analysis

Using MATLAB, these segments were then analyzed for f0 through VoiceSauce software, where the average f0 was taken for 5 segments across the vowel duration.

Filename	Label	seg_Start	seg_End	Duration	sF0_mean	sF0_means001	sF0_means002	sF0_means003	sF0_means004	sF0_means005
1_1_Cha_start.mat	A	626.359	892.105	265.746	141.662	155.834	147.701	148.612	149.582	106.848
1_1_Cha_start.mat	B	1896.846	2003.782	106.936	152.757	162.868	158.81	151.817	146.306	144.033
1_1_Cha_start.mat	C	3834.592	3951.084	116.492	85.497	64.884	149.588	71.561	25.034	122.343
1_2_Ka_dance.mat	A	575.303	721.381	146.078	148.761	162.204	157.447	155.782	156.396	112.567
1_2_Ka_dance.mat	B	1815.243	1925.669	110.426	73.531	164.38	154.957	52.296		
1_2_Ka_dance.mat	C	4301.944	4409.22	107.276	117.737	59.033	139.704	133.298	129.866	128.252
1_3_La_moon.mat	A	829.596	990.672	161.076	140.615	140.946	140.143	141.344	140.506	140.14
1_3_La_moon.mat	B	2169.594	2275.439	105.845	60.805	145.383	141.329	19.119		
1_3_La_moon.mat	C	4144.334	4296.965	152.631	129.908	128.232	137.36	136.037	127.488	120.808
				141.3895556		**131.5293333**	**147.4487778**	**112.2073333**	**125.0254286**	**124.9987143**

	ALL	cha	ka	la
1	131.5293333	127.862	128.539	138.187
2	147.4487778	152.033	150.7026667	139.6106667
3	112.2073333	123.9966667	113.792	98.83333333
4	125.0254286	106.974	143.131	133.997
5	124.9987143	124.408	120.4095	130.474
	128.2419175	**127.0547333**	**131.3148333**	**128.2204**

We have followed the same analysis for both monosyllabic and disyllabic words. In our research, we only checked the three repetitions of a word but did not check the phrasal intonation pattern across different clans in Marma. Future work can be conducted on checking the intonation in Marma discourse.

5.3.1 f0 calculation method

This section will describe the step-by-step method for finding each tone's mean f0. The following tables represent f0 and rhyme duration calculations of each tone category in the monosyllabic environment for the male speaker of the Plengsa dialect. Table 5.3 shows the f0 measurement of the falling tone for the vowel **ɜəː** with three words chhâ (salt), châ (eat), and fâ (frog). The following method will be used to measure of f0 of the other two tones of all vowels under relevant vowel quality.

f0	**Level**	**F0 seg 1**	**F0 seg 2**	**F0 seg 3**	**F0 seg 4**	**F0 seg 5**
chhâ (salt)	A	134.47	128.613	81.075	116.363	102.375
chhâ	B	147.061	135.079	125.476	115.419	100.761
chhâ	C	74.763	121.707	113.916	109.557	16.832
Mean F0		118.7646667	128.4663333	106.8223333	113.7796667	73.32266667
f0		**F0 seg 1**	**F0 seg 2**	**F0 seg 3**	**F0 seg 4**	**F0 seg 5**
châ (eat)	A	152.735	138.679	133.481	129.043	76.226
châ	B	129.461	139.336	133.624	130.11	123.58
châ	C	75.714	131.894	121.677	34.338	105.031
Mean F0		119.3033333	136.6363333	129.594	97.83033333	101.6123333
f0		**F0 seg 1**	**F0 seg 2**	**F0 seg 3**	**F0 seg 4**	**F0 seg 5**
fâ (frog)	A	130.53	150.482	141.698	84.541	122.638
fâ	B	154.666	145.344	140.387	134.503	127.622
fâ	C	124.101	128.037	121.657	114.32	110.819
Mean F0		136.4323333	141.2876667	134.5806667	111.1213333	120.3596667
Total Mean f0		124.8334444	135.4634444	123.6656667	107.5771111	98.43155556

Table 5.2: F0 values (in Hz.) for chhâ (salt), châ (eat), and fâ

When analyzing the data sometimes we have encountered some spurious results because the automatic pitch extraction algorithm of software applications is unable to extract an f0 measurement for some parts of the rhyme. However, it does not follow a continuous trend and appears sporadically only. While we encountered such spurious results, we tried to collect f0 manually. Also, it was difficult to collect f0 data accurately when there is also non-modal phonation like a creak or breathy voice because the pitch periods are more sporadic, but we were careful to double-check things to remove spurious data points.

Using **MATLAB**, the f0 measurements for three words—chhâ (salt), châ (eat), and fâ (frog) —were divided into five segments. Then the values were averaged to obtain a mean f0 for each target word. For example, the mean f0 for chhâ was calculated by averaging its segmental f0 values, resulting in 108.2311333 Hz. Similar calculations were replicated for châ and fâ , resulting in mean f0 values of 116.9952667 Hz and

128.7563333 Hz, respectively. To calculate the overall mean f0 for the vowel ಅಃ across three words, we added the f0 values of each segment separately and then determined the mean value of the third tone ಅಃ (Male speaker) which is 117.9942444, added in Table 5.5 (f0 Comparison in Monosyllabic Words).

It's also important to look into the mean f0 for each segment (seg 1-5) because that stays true to the contour of each tone. And the contour that more accurately distinguishes the three tones under each vowel quality. Often the average of all five segments is going to obscure these important differences, especially between low and falling tones. Because their mean f0 is almost close.

The more accurate way to understand the overall f0 of each tone is through looking at the segmental version, so the set of averages taken by segment, because this maintains the contour. With those segments, we have charted graphs for each tone under the relevant vowel quality which we will see in later sections of the paper.

5.3.2 Vowel Duration

We calculated the difference between the segment start and end values to determine the duration of each rhyme/TBU. Table 5.3 presents the mean duration of each word and the overall duration of the vowel ಅಃ across three words we recorded.

	Label	**Seg start**	**Seg End**	**Duration**
chhâ (salt) (start)	A	1836.461	2064.871	228.41
chhâ	B	3142.791	3312.084	169.293
chhâ	C	4870.527	4994.138	123.611
			Mean Duration	173.7713333
	Label	**Seg start**	**Seg End**	**Duration**
châ (eat)	A	607.259	820.7661	213.507
châ	B	1885.259	2058.959	173.7
châ	C	3696.034	3882.4	186.366
			Mean Duration	191.191
fâ (Frog)	A	921.338	1155.128	233.79
fâ	B	1930.268	2113.448	183.18
fâ	C	3481.606	3641.234	159.628
			Mean Duration	192.1993333

Table 5.3: Calculating Vowel Duration(ಅಃ) for male speaker in monosyllabic environment

For the word chhâ (salt), the durations of the segments (A,B,C) were 228.41,169.293, and 123.611, resulting to a mean duration of 173.7713333. Similar methods were

applied for the word châ (eat) and the mean duration was 191.191. For the word fâ (frog) the mean duration was 192.1993333. After combining these three mean values, the overall mean duration for the vowel အး was 192.1993333.

We applied the same method to analyze the rhymes/TBU of the di-syllables.

5.4 The data and results

This section shows the data from both male and female participants. We categorized the vowels according to their vowel quality, and for each vowel category, we analyzed two to three representative words (A total of 96 words). These steps allowed us to comprehensively assess each vowel's behavior in the mono-syllabic and di-syllabic environments. For the open vowel quality Set A:[a, e, ɛ, i, o, ɔ, u] we have observed the same three-tone effects (i.high and creaky, ii. low and iii. falling). And for the other two vowel qualities (ei) and (3?), they have two-tone effects. [ei] has falling and high and [3?] has low and high tones.

5.4.1 Vowel Quality-Front and low [a]

Three tones has been identified under this category. Based on the data we have analyzed, we have categorized the tones as follows. We will refer to the first tone simply as high and the third tone simply as falling throughout the paper.

- I. အ (High and creaky)
- II. အာ (low)
- III. အား (falling, and breathy)

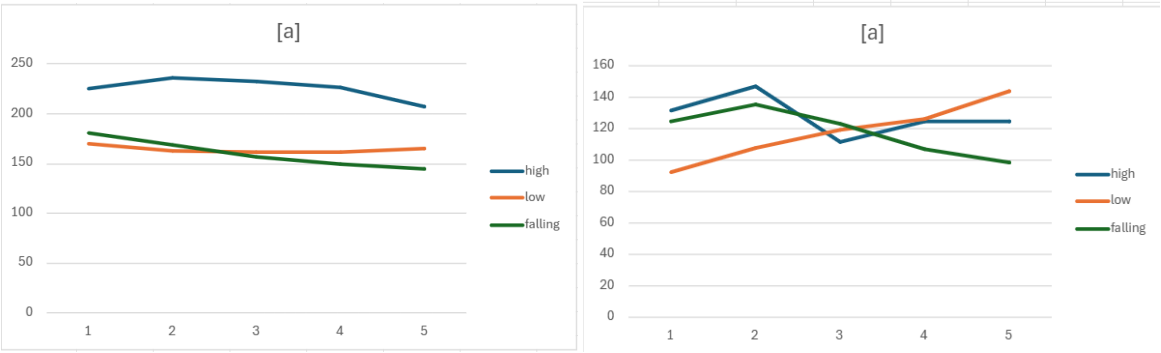
The following table shows the distribution of f0 of three tones from two speakers. Instead of showing each word individually for each tone or vowel, we have shown the mean average f0 across three words for each tone, as shown in Table 5.2. We calculated the mean f0 of each vowel tone by averaging the mean values of five segments across three words. We observed that the high tone's f0 is significantly higher than the low and falling tones supporting our hypothesis. The mean f0 of low and falling tones are very close, however, the low tone f0 is slightly higher than the falling tone.

Monosyllablic Word list for Vowel Quality [a]			
Vowel	Word	Gloss	Tone
◌	စ (=chá)	start	high and creaky
◌	က(=ká)	Dance	high and creaky
◌	လ(=lá)	Moon	high and creaky
◌◌	စ(=chà)	education	low
◌◌	ကာ (=Kà)	Cover	low
◌◌	ဖာ (=phà)	alter	low
◌◌ः	ဆား (=chhâ)	salt	Falling
◌◌ः	စား (=châ)	eat	Falling
◌◌ः	ဖား (=phâ)	Frog	Falling

Table 5.4: Monosyllabic Word List

f0 Comparison of Three Tones =[a]			
	Vowel ◌	Vowel ◌◌	Vowel ◌◌ः
Female Speaker	225.3114	163.9022	160.3009
Male Speaker	128.2419	118.2563	117.9942

Table 5.5: f0 Comparison in Monosyllabic Words



The left graph shows the data from the female speaker and the right graph is the data from the male speaker. For the female speaker, we see a falling contour for the high one at the end. However, for the male speaker, the graph was bit odd for the high tone and also has a slight rising contour at the end but still, it starts higher than the other two tones. So we went back to the original data, which has some spurious results such as 0. As mentioned sometimes the automatic pitch extraction algorithm of software applications is unable to extract an F0 measurement for some parts of the rhyme when there is creaky voice phonation in the signal or some degree of glottalization immediately preceding a glottal stop closure (Coupe 2014).

We also have measured the average duration of the vowels [1]. For both speakers, the low tone has a longer duration than the high and creaky one. However, for the female speaker the falling tone [အား] is longer than the other two. For the male speaker, the low tone [အာ] is longer than the high and falling one.

Vowel Duration of three Tones =[a]			
	Vowel အ	Vowel အာ	Vowel အား
Female Speaker	96.607	284.0584444	307.6206667
Male Speaker	141.3895556	254.3431111	185.7205556

Table 5.6: Vowel Duration in Monosyllabic Words

Di-syllabic Words

We have chosen words with di-syllables and ensured the target tone we are going to analyze comes at the end of the word/ second syllable. We did not extensively examine whether the tone in the previous syllable affects the other one.

Di-syllabic Word list for Vowel Quality [a]			
Vowel	Word	Gloss	Tone
အ	မစ (=máchá)	neg start	high and creaky
အ	အဖ(=áfá)	Father	high and creaky
အ	လပ(=lábá)	Moon	high and creaky
အာ	မကာ(=mákà)	neg cover	low
အာ	အာကာ (=àgà)	Sky	low
အာ	ဖတ်စ (=phétchà)	read	low
အား	အစား (=áchâ)	food	Falling
အား	တရား (=tárâ)	religion	Falling
အား	မလား (=málâ)	Neg go	Falling

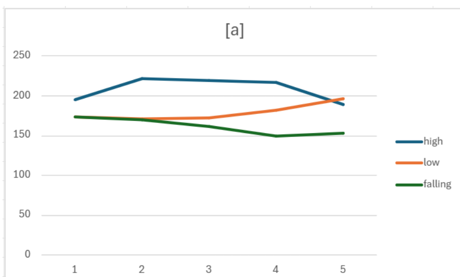
Table 5.7: Word List

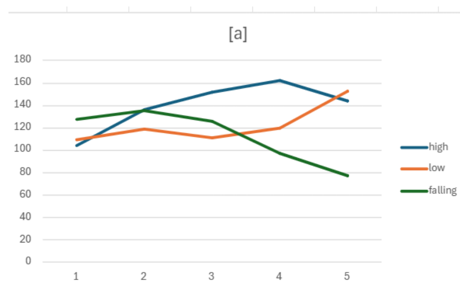
The following table shows the f0 of three tones in disyllabic words. Again the mentioned f0 is the mean f0 which is taken for each tone by averaging the mean values of five segments across three words. For both male and female speakers, the f0 is higher in the first vowel (high and creaky).

[1] "Cross-linguistically, there is a tendency for vowel duration to be inversely related to the approximate average f0. In particular, vowels on low and falling tones are longer than those on high tones, while vowels on rising tones are longer than those on falling tones" (Gandour 1977)

f0 Comparison of Three Tones =[a]			
	Vowel အ	Vowel အာ	Vowel အား
Female Speaker	208.2421556	178.8304889	161.4028444
Male Speaker	139.7167467	122.5382083	112.7073778

Table 5.8: f0 Comparison in disyllabic Words





The left graph shows the data for the female speaker, while the right graph shows the data for the male speaker. For female speaker, the high-tone vowel starts higher than the other two and exhibits a falling contour at the end as predicted. For the male speaker, although the high tone starts lower, then it rises and then falls. For both the male and female speakers, the low tone rises at the end while the falling tone exhibits a steady falling for the female and a sharp falling contour for the male at the end.

For the disyllables, we also have measured the average duration of the vowels. Both for the male and female speakers the falling tone [အား] is longer than the other two.

Vowel Duration of three Tones =[a]			
	Vowel အ	Vowel အာ	Vowel အား
Female Speaker	128.9964444	195.065	273.173
Male Speaker	130.3513333	334.3331111	403.5546667

Table 5.9: Vowel Duration in Disyllabic Words

Comment

Both in the monosyllabic and di-syllabic environment, the high and creaky vowel အ has the highest f0 among the three. The vowel with low tone အာ and the falling one အား start almost with similar f0 but exhibit rising and falling contours respectively supporting our hypotheses 2 and 3.

5.4.2 Vowel Quality-Front and high [i]

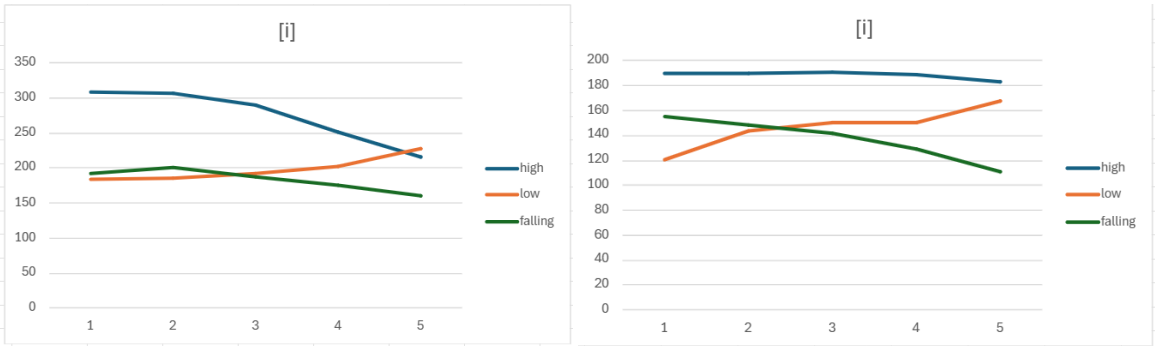
There are two vowels (ကြ and ကြီ) and three tones under this vowel quality. The symbol [ိ] is realized for the alphabet ကြ that represents the high and creaky tone. The symbol [ီ] is realized for the alphabet ကြီ that represents the low tone. The other extended sound [ီး] represents the falling tone.

Monosyllabic Words

For the high tone, we have analyzed three words [သိ ထိ ပိ]. For the low tone, we analyzed three words [လီ ဆီ ရီ]. For the falling tone, we analyzed three words [မီး တီး ဆီး]. Based on the data in Table 5.11, vowel 4 (အိ) has the highest f0 than the other two vowels.

f0 Comparison of Three Tones =[i]			
	Vowel အိ (High)	Vowel အီ (low)	Vowelအီး (falling)
Female Speaker	275.0601056	198.0751556	182.9498667
Male Speaker	188.6261	146.6617133	136.951

Table 5.10: f0 in monosyllabic words



The left graph shows the pitch track of the female speaker and the right one is the data of the male speaker. We see a similar trend to the previous vowel [a] where the difference between low and falling is that the low tone has a rising contour at the end and the falling tone has a sharp fall at the end. For both male and female speakers, the high tone is higher than the other two tones and gives a falling contour at the end but remains at a higher pitch compared to the low and falling tones.

In the following table 5.11, we see the high tone [အိ] has the lowest duration of the other two vowels. The low-tone vowel [အီ] duration is higher than the other two.

Vowel Duration of three Tones =[i]			
	Vowel အိ	Vowel အီ	Vowel အီး
Female Speaker	164.422	366.2773333	305.9615556
Male Speaker	115.0794444	283.347	267.6386667

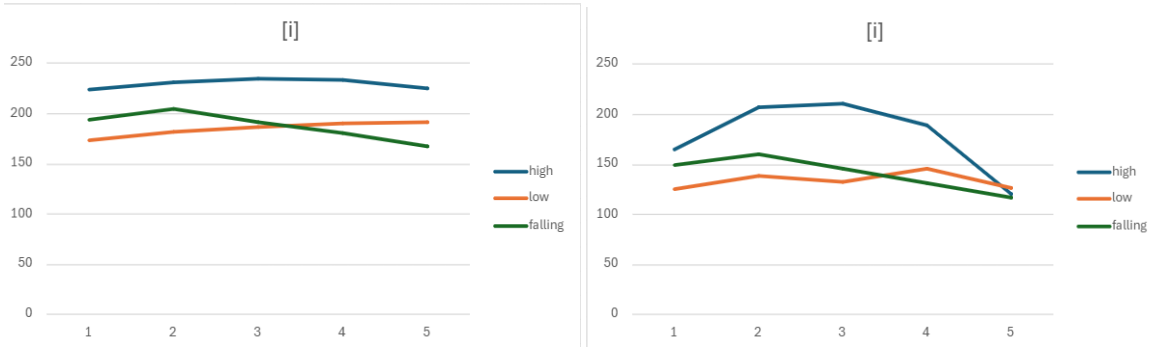
Table 5.11: Vowel Duration in monosyllabic Words

Disyllabic Environment

Following the table 5.1, for the vowel 4, we have analyzed two words [မသိ အမိ]. For the vowel 5, we analyzed three words [အဆီ အညီ အရီ]. For the vowel 6, we analyzed three words [အစီး မတီး မဆီး].

f0 Comparison of Three Tones =[i]			
	Vowel အိ	Vowel အီ	Vowel အီး
Female Speaker	229.9086667	184.7981333	187.7040445
Male Speaker	178.5478667	133.6930805	141.0184667

Table 5.12: f0 in Disyllabic words



The left graph shows the pitch track of the female speaker and the right one is the data of the male speaker.

In a disyllabic environment, the high tone also exhibits the highest f0 among the three tones both for male and female speakers. Also, the falling tone has a slightly higher f0 than the low tone in this setting for both speakers. The graph also shows that the f0 contours at the end for the low and falling tones are quite close. Unlike in the monosyllabic environment, the low tone does not rise significantly leaving the assumption that the previous tone may affect the pitch lowering in the disyllabic environment.

Vowel Duration of three Tones =[i]			
	Vowel ◌	Vowel ◌	Vowel ◌
Female Speaker	115.2465	257.632	224.3715556
Male Speaker	239.847	548.3935556	359.8751111

Table 5.13: Vowel Duration in Di syllabic Words

Comment

This experiment on vowel quality [i] supports our hypothesis that low tone has a rising contour and falling tone exhibits a falling contour in a monosyllabic environment. However, the low tone may be affected in a disyllabic environment since it does not show a significant rise in the pitch contour at the end.

5.4.3 Vowel Quality: (Back and high [u]) and (Front close-mid unrounded vowel [ɛ])

Since these two vowel qualities exhibit similar phonation patterns for three tonal characteristics (high, low, and falling) we have discussed, in this section I will show the pitch contour with graph analysis from the female speaker only.

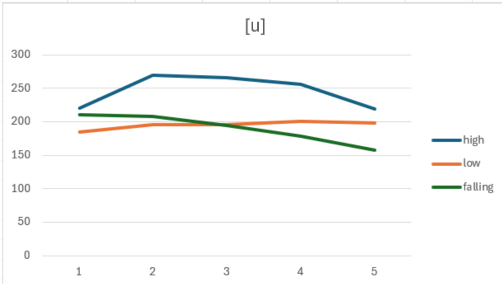
For the vowel quality [u], there are three tones as well. The symbol [◌] is realized for the alphabet [ဥ] that represents the high and creaky tone. The symbol [◌] is realized for the alphabet [ဦ] that represents the low tone. The other extended sound [◌ း] represents the falling tone.

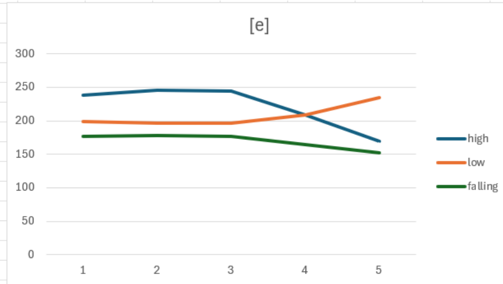
Vowel [ဧ/ [ɛ̀]] can be extended to three different tones category.[ဧဘ] carries the low tone, [ဧဘ့] carries the creaky tone and [ဧဘး] carries the falling tone.

Monosyllabic Environment

Vowel Quality [**u**]: We analyzed three words (ကု ဖု ဆု) for the vowel ဥ. Three words (က ခ တ) for the sound ဤ. Then analyzed three words (ကး ပး ဇး) for the vowel◌ း.

Vowel Quality [ɛ]: We analyzed two words (ဧပ ဧဝ) for the sound ဧ◌. Two words (ဧန့် ဧပ့်) for the sound ဧ◌့. This diacritics ◌့ is used for making long sound shorter, or creakier. We only analyzed one word (ဧလး) for the sound ဧ◌း. The vowel ဧဘ့ with the creaky sound has the highest f0 than the other two.



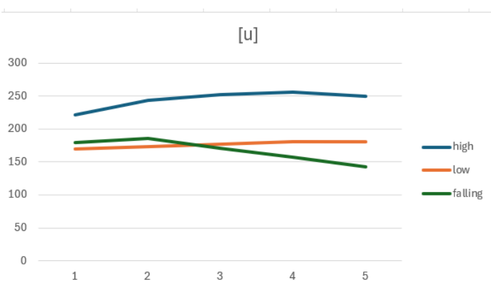


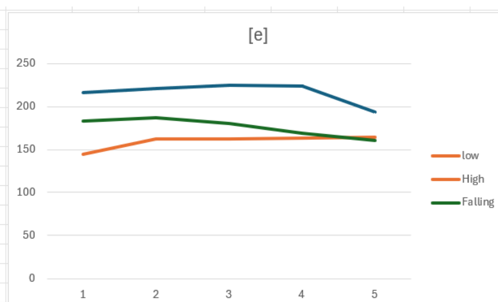
Both graphs are from the female speaker for two vowel qualities. In the monosyllabic environment, the low tone exhibits a slight rising contour, while the falling tone shows a falling contour at the end. The high tone is higher than the other two tones and falls at the end. However, in the vowel quality [u] the falling tone has a higher start than the low one, whereas in the vowel quality [e] low tone has a higher start than the falling one.

Di-syllabic environemnt

Vowel Quality [u]:We analyzed three words (မအု မစု မနု) for the sound ု. Three words (အကူ မအူ အတူ) for the sound ူ. We only analyzed two words (မပူး မကူး) for the sound အူး .

Vowel Quality [ɛ]: We analyzed two words (လားရေ စါရေ ပြောရေ) for the sound (ေ). Two words (မပေ့ ဒေနေ့) for the sound (ေ့). We only analyzed one word (နေး) for the sound ေး.





Comment

For the vowel qualities in both monosyllabic and disyllabic environments, the low tone exhibits a rising contour, and the falling tone shows a falling contour at the end. In the disyllabic environment, the low and falling tone contour comes very close at the end. And it could be possible that the previous tone affects the pitch fall of the

low tone in the disyllabic context, however more work is needed to confirm this. For the vowel quality [u] we see the pitch of low and high tones at some point becomes the same height then the low tone rises and falling tone falls.

5.4.4 Vowel Quality: (Front close-mid unrounded vowel [e]) and (Front and open mid [ei])

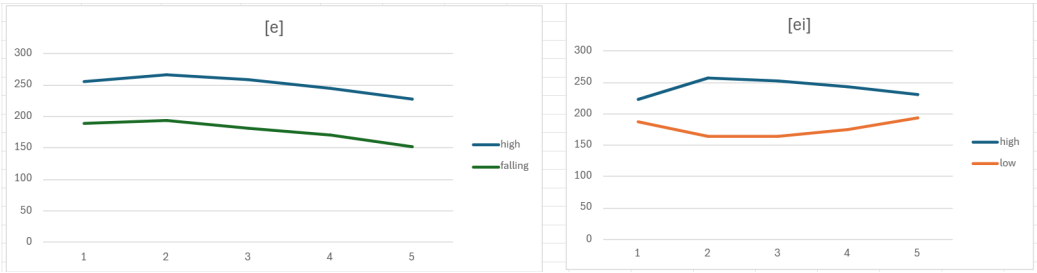
In this section, I will show data for two vowel qualities from the female speaker.

Vowel quality [e] or [ɛ̀]/ has two tones. One is falling i) (ဘဲ) and the other one is high and creaky ii (ဘဲ့). Another vowel quality [ei] or [ဘံ] has two tones i)low [ဘံ] and ii)high [ဘံ].

Monosyllabic Environment

Vowel quality [e]: We analyzed three words (ဘဲ တဲ ခဲ) for the vowel (ဘဲ). Two words (တဲ့ ဖဲ့) for the sound (ဘဲ့).

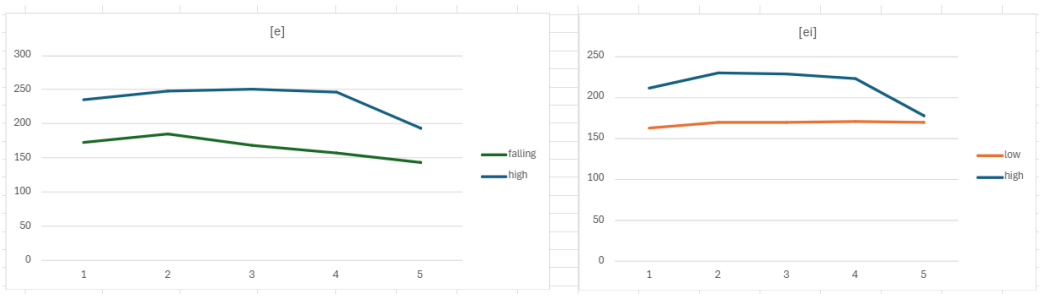
Vowel quality [ei]: For another vowel quality ဘံ/[ei], we analyzed three words ကံ ဖံ low tone vowel [ဘံ] and two words တံ့ ခံ့ for the high tone vowel sound [ဘံ].



Di-syllabic environment

For the vowel [ɛ̀]/ [e] We analyzed two words (မီးခဲ ဘခဲ) and two words (မပဲ့ မဖဲ့) for the sound ဘဲ့.

For another vowel quality [ဘံ]/[ei], we analyzed three words ဘတံ မဘံ low tone vowel [ဘံ] and two words မဘံ့ ဘခံ့ for the high tone vowel sound [ဘံ့].



Comment

In both environments and for both vowel qualities, the high tone is higher than the falling and low tones. In the monosyllabic environment, both the low and falling tones start from a higher f0 (Close to 200) than in the disyllabic environment. This may be due to the influence of the previous tone, leaving the assumption that it is a result of tone sandhi effects.

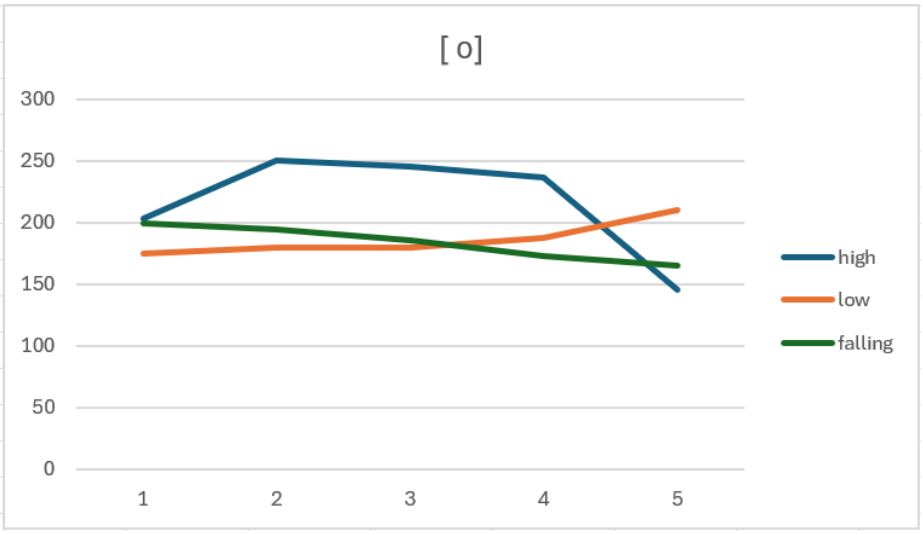
5.4.5 Vowel Back and close mid [o]

Vowel သ can be extended to two sounds ော ော့ .[ေအာ] carries the low tone, [ေအာ့] carries the creaky tone. The individual vowel sound [ေအာ်] carries the falling tone.

Below are the data from the female speaker.

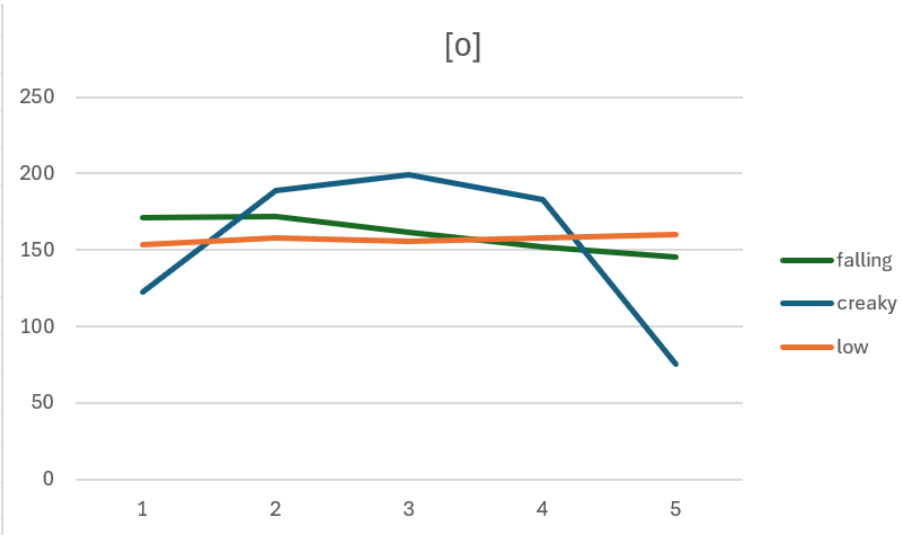
Monosyllabic Environment

We analyzed three words (တော မော စော) for the sound ေအာ. Two words (ခေါ့ ဖေါ့) for the sound ေအာ့. We analyzed two words (ခေါ် ကော်) for the sound ေအာ်. The vowel ေအာ့ with the creaky sound has the highest f0 than the other two.



Di-syllabic environment

We analyzed three words (အရော် မရော် စေါ်ဇော) for the sound (ေအ). Three words (မတော့် မအော့် တရွှေ့) for the sound (ေအာ့). We only analyzed two words (မခေါ်) for the sound မကျော်. In the disyllabic environment, the creaky vowel (ေအာ့) also has the highest f0 than the other two.



Comment

In both environments, the high tone starts with a lower f0 that rises before experiencing a sharp fall. Although the falling tone begins with a slightly higher onset f0

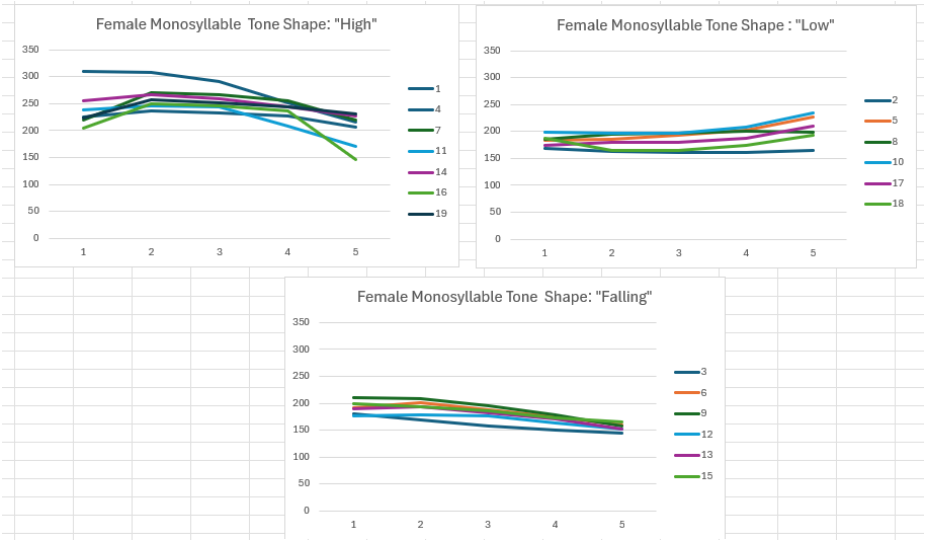
than the low tone. The f0 of the low and falling tones becomes similar at some point, then the low tone rises while the falling tone falls. The very low start of the high tone in the disyllabic environment may be the tone sandhi effect.

5.5 Discussion on f0 as a variable

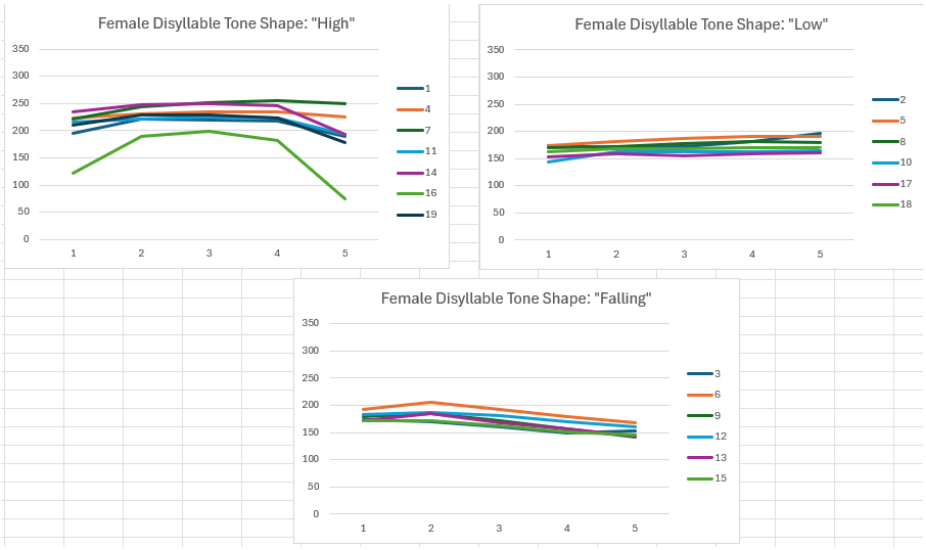
In our experiment we have observed that f0 is a significant variable for the tones in Marma. In all the vowel qualities for both male and female participants, the high and creaky tone remains higher with a higher f0 than the other two. Even though the high and falling tone has both falling contours it's easily distinguishable by their pitch ranges.

5.5.1 Female Speaker Tone

Monosyllabic Environment: In the following graph, we have grouped all the monosyllabic tone data from the female speaker. The high tones (1,4,7,11,14,16 and 19) start above 200 and also fall higher than the low and falling tones. All the low tones start between 150-200Hz and show the rising contour at the end. If we compare the low and falling tones, they both start at the same pitch level but the falling tones completely fall.



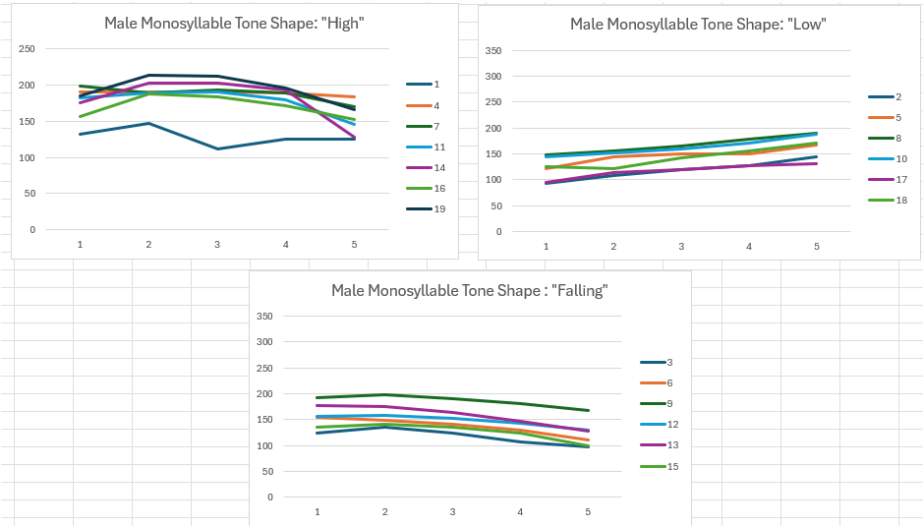
Disyllabic environment: We also grouped all the tones for the disyllabic words and observed a similar pattern.



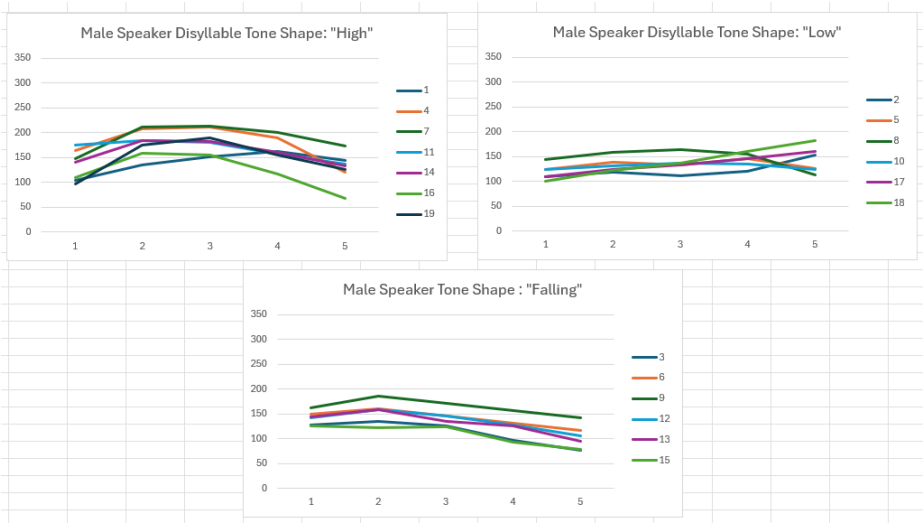
In the disyllabic environment, the high tone starts at a higher f0 point compared to the other tones, then rises and falls. An exception is vowel 16 (high), which starts much lower than the other high, low, and falling tones of other vowel qualities but it then rises significantly and reaches the peak f0 and then falls completely. For the other two (low and falling tone), the pitch starts lower than the high one, then the low tone rises at the end but the rise is less pronounced than in the monosyllabic environment. This tonal alternation is much likely due to the effects of 'tonal sandhi' , which further alters the pronunciation of both the tone and the neighboring segments (Watkins, 2000). And the falling tone falls at the end similar as monosyllabic ones.

5.5.2 Male Speaker Tone

In a monosyllabic environment, high tones typically start at a higher pitch, rise in the middle and, even fall higher than low tones, except for vowel 1. And we checked the f0 manually from the data set and we compared the three tones which falls under vowel quality [a]. The high tone, vowel 1 (128.24 Hz) has a higher pitch than low tone (vowel 2; 118.26 Hz) and falling tone (vowel 3; 117.99 Hz). Overall, the low tones start much lower (below 150 Hz) and exhibit a rising contour at the end. Some of the falling tones exhibit falling contours. Comparing the tones under same or relevant vowel quality is very important to identify the tones in Marma.



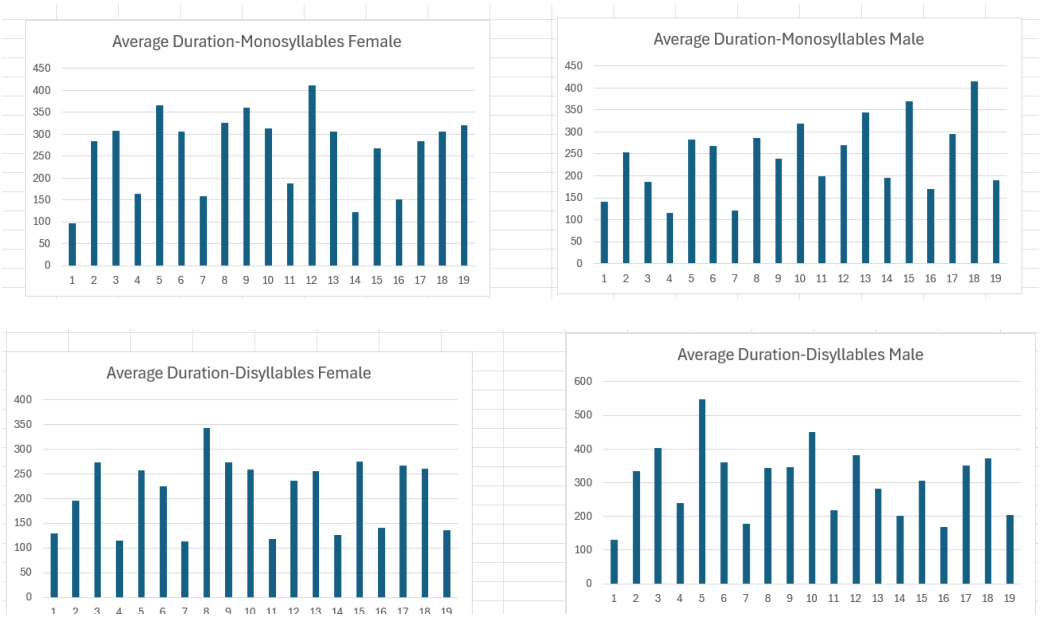
We then checked all the tones with di-syllabic words. In the disyllabic environment, the starting pitch of the high and falling tones seem to be affected because they start lower than what we have seen in the monosyllabic environment. But then the high tones rise in the midway and fall at the end higher than the low tone. But the high tone 16 also has a sharp fall at the end, similarly we have seen in the female speaker. In this setting as well, the low tones show rising contour and falling tones show falling contours at the end.



5.6 Data on Vowel Duration

Our findings show that low and falling tones are longer than the high ones. In the current experiment, however, the female speaker had a high tone (19) in the

monosyllabic environment that was longer than the low tone under the same vowel quality. But in the disyllabic environment, it behaves normally as we expected which is shorter than the low one.



5.7 Discussion

5.7.1 Listing the tones of all vowels

Based on the above observation, we have listed the tones of each vowel in the following table 5.14. Based on the experiment we are proposing

1. 6 vowels with creaky tones (1,4,7,11,16 and 19) which are high simultaneously.
2. 7 vowels with low tones (2,5,8,10,14, 17, and 18)
3. 6 vowels with falling tones (3, 6, 9, 12, 13, and 15)

Our research claim's that f0 is a significant variable for the tones in Marma while we compare three tones under the same vowel quality except the vowel quality [ei] which has two tones (18 and 19 from table 5.1). In particular, the high (creaky) has a higher f0 which is true for both monosyllabic and di-syllabic environments. However, vowel 16 (high and creaky) is an exceptional case, becuase it's f0 gets lower (both for

Tones in vowels and their extended sounds			
	Vowel	**Vowel Quality**	**Tone**
1	အ	front and low [á]	high, creaky
2	အာ	front and low [à]	low
3	အး	front and low [â]	Falling
4	အိ	Front and High [í]	high, creaky
5	အီ	Front and High [ì]	low
6	အီး	Front and High [î]	Falling
7	အု	Back and high [ú]	High, creaky
8	အူ	Back and high [ù]	low
9	အူး	Back and high [û]	falling and breathy
10	ဧအ	front and close mid [ɛ̀]	low
11	ဧအ့	front and close mid [ɛ̀]	high and creaky
12	ဧအး	front and close mid [ɛ̂]	Falling
13	အဲ	front and close mid [è]	Falling
14	အဲ့	front and close mid [è]	High and creaky
15	ဧအာ	Back and close mid [ɔ̂]	falling and breathy
16	ဧအာ့	Back and close mid [ɔ̂]	High and creaky
17	ဧအော်	Back and close mid [ɔ̂]	low
18	အံ	Front and open mid	low
19	အံ့	front and open [éi]	high and creaky

Table 5.14: Marma Vowels

male and female speakers) than the low tone in a disyllabic environment. But in the monosyllabic environment, this has the highest f0 among three tones as expected.

The high or creaky tone in Marma has a high f0 and a falling contour, but it remains higher than the other two tones. While we compared between the low and falling tones under same vowel quality, we did not find f0 to be a distinguishing factor as f0 differences were minimal. While we assesed all the vowel qualities, we observed that sometimes the low tone's f0 is slightly higher than the falling tone, while in some other cases, the falling tone's f0 is slightly higher than the low tone. No consistent results were found that one tone is always higher than the other one. The only consistent factor we found is that the low tone has a lower start and exhibits a rising contour at the end. Therefore, the observations from our research contradict the previous findings in Burmese in some way. Such as our study has shown that the falling tone (mentioned as high in Burmese) has a falling contour at the end. However previous findings from Watkins (2005) and Kelly (2012) claimed the falling tone is rising where we show it's falling.

Although, in this study we did not check the acoustic correlates of voice quality quite extensively but we still have taken it into account because Marma is a language or has a system in which tone interacts with phonation. As we have seen the falling tone has a breathy phonation in vowel 3, 6, 9, 12, 13, and 15. Pitch height and pitch contour were equally important in distinguishing Mandarin tones (Chen and Massaro 2008) which might be a similar case in Marma as well.

5.8 Syllables that end with diacritic [်]-(stops, glottal stop, and the homorganic nasal)

In Marma orthography, a special diacritic [်] is used with 10 consonants [က င စ ဉ ည တ န ပ မ ယ]. Using this diacritic results in the assimilation of the vowel sound associated with the consonant. For example, က is pronounced as Ka and to pronounce the consonant without the vowel sound [a], we need to use this [်] sign/diacritics above the consonant ကျ်.

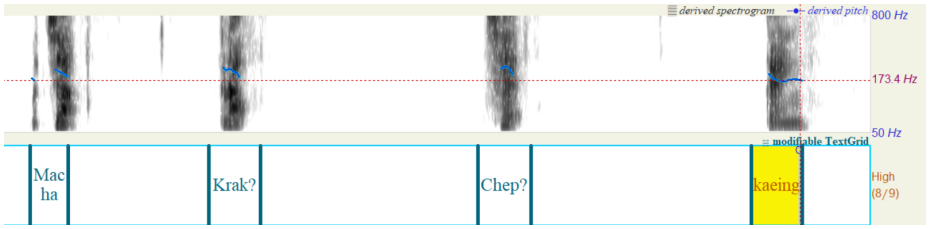
1	**က်**	**Closed Glottal Stop**	**Tone**
	ကျောက်	kjok? (stone)	High and creaky
2	**န်**	**Nasalization**	**Tone**
	ကန်	Kaeing (pond)	low
	ကန်း	Kaeing (pass)	falling

Table 5.15: Use of diacritic [်]

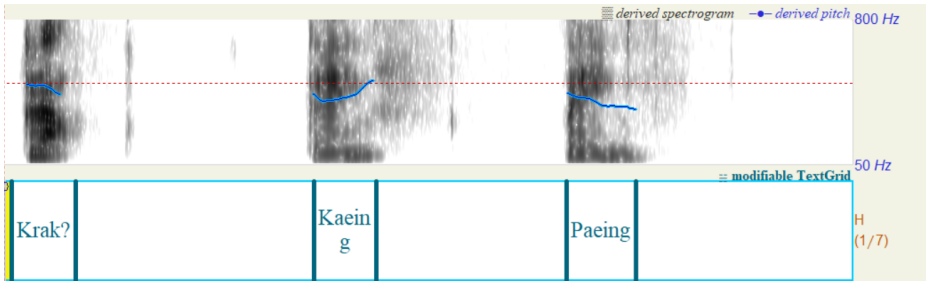
Based on the use of these diacritics, we have two proposals for the tones in Marma.

- Words that end with a final glottal stop of a closed syllable are voiceless stops: /p/, /t/, /k/ ([က တ ပ p, t, and k]) and the voiceless postalveolar affricate /[tʃ] [စ] ch/. I propose that, when this sign [်] is used with the four mentioned consonants at the end of a syllable, it acts like a high (creaky) tone. Researchers in Burmese has claimed this as a fourth tone named 'checked/killed' and there is debate as well whether this "checked/killed" can properly be counted as a tone (Watkins 2000). But in Marma, we will refer to this as the high (creaky) tone.
- And when the syllable ends with nasal consonants [န် င် မ် င်း]း](m,n,ng) those exhibit similar characteristics as the low and falling tones.

Through a visual observation in the following spectrogram, the creaky/high tone vowels and words that end with a final glottal stop of a closed syllable (/p/, /t/, /k/) exhibit nearly identical tonal contours. In the following spectrogram, the (cha) syllable in the word (Macha/Neg start) demonstrates a high and creaky tone. The other two words, (Krak?/Chicken) and (Chep?), end with voiceless stops (k and p). In all three words, we observe a falling pitch contour. The fourth word [ကန်/ Kaeing], which ends with a nasal consonant, behaves similarly to a low tone. But detailed research study needed to conclude the current findings.



We propose that Marma has only three tones—High, Low, and Falling—present in both orthographically open and closed syllables. In the following spectrogram, there are three words with distinct tonal and phonetic characteristics. The first word, (ကြက် /krak?), ends with a glottal stop and exhibits properties of a high and creaky tone. The second word is an example of consonant nasalization, (ကန် /kaeŋ), begins at a very low pitch and rises towards the end, indicating it has a low tone. The third word, (ပန်း /Paeŋ), starts at a similar pitch height as the low tone but falls at the end, displaying characteristics of a falling tone.However, we just analyzed the wave/spectrogram impressionistically and detailed research work need to be conducted in future in Marma.



5.9 Conclusion

Previously some researchers have claimed that Burmese can be applied to Marma and from our experiment we show isn't true in all cases. Marma language requires it's own careful acoustic study and observation. The existing studies for Burmese also

don't look at the full vowel inventory. For our study, we thoroughly analyzed all the vowels which are orthographically present in both Marma and Burmese.

Our research study concludes that Marma has only three tones and determination of these tones depends on how the syllable ends of a word, vowel quality, mean f0 and pitch contour, and vowel duration. There is some experimental evidence that Burmese also has three tones, which interact with sonority and syllable structure, but more work is needed to understand this for both languages. I leave an analysis of Marma sonority to future work.

References

Aannestad, A. A. (2021). *A Typology of Morphological Argument Focus Marking*. Ph.d. thesis, University of North Dakota.

Aissen, J. (2017). Documenting topic and focus.

Davis, H. A. (2014). Consonant correspondences of burmese, rakhine, and marma with initial implications for historical relationships. Master's thesis, University of North Dakota. Available online: `https://commons.und.edu/theses/1640`.

Erlewine, M. Y. (2020). Lectures on focus 1: Introduction, alternative semantics, sentential vs constituent particles. YouTube. https://www.youtube.com/watch?v=C3sk0pdSBHo.

Falaus, A. (2013). Introduction: Alternatives in semantics and pragmatics. In *Alternatives in Semantics*, Palgrave Studies in Pragmatics, Language and Cognition, pages 1–35. Palgrave Macmillan.

Hartmann, K. and Zimmermann, M. (2009). Morphological focus marking in gùrùntùm (west chadic). *Lingua*, 119(9):1340–1365.

Keisuke, H. (2011). *Nominalization and Related Phenomena in Marma*, chapter 7. Cambridge University Press.

Kratzer, A. and Selkirk, E. O. (2020). Deconstructing information structure. *Glossa: a journal of general linguistics*.

Krifka, M. (2008). Basic notions of information structure. *Acta Linguistica Hungarica*, 55(3–4):243–276.

Lambrecht, K. (1994). *Information Structure and Sentence Form: Topic, Focus, and the Mental Representations of Discourse Referents*. Cambridge Studies in Linguistics. Cambridge University Press, Cambridge.

Nichols, J. (1986). Head-marking and dependent-marking grammar. *Language*, 62(1):56–119.

Onea, E. (2011). Focus marking and focus interpretation. *Lingua*, 121:1651–1670.

Rooth, M. (1992). A theory of focus interpretation. *Natural Language Semantics*, 1:75–116.

Skopeteas, S., Fiedler, I., Hellmuth, S., Schwarz, A., Stoel, R., Fanselow, G., Féry, C., and Krifka, M. (2006). Questionnaire on information structure (quis): reference manual.

Zimmermann, M. and Onea, E. (2011). Focus marking and focus interpretation. *Lingua*, 121(11):1651–1670. Focus Marking Strategies and Focus Interpretation.

Biswas, P. (2012). Reanalyzing Definiteness in Bangla.

Blakemore, D. (1987). Semantic Constraints on Relevance.

Büring, D. (2003). On D-Trees, Beans, And B-Accents. Linguistics and Philosophy, 26, 511-545.

Chen, P. (2003). Indefinite determiner introducing definite referent: a special use of 'yi 'one'+classifier' in Chinese. Lingua, 113, 1169-1184.

Chen, T.H., Massaro, D.W. (2008). Seeing pitch: visual information for lexical tones of Mandarin-Chinese. The Journal of the Acoustical Society of America, 123 4, 2356-66 .

Collins, J.N. (2017). Definiteness determined by syntax: A case study in Tagalog1.

Cresswell, M. J. (1985). Structured meanings. Cambridge, MA: The MIT Press.

Cresswell, M. J., Von Stechow, A. (1982). "De Re" Belief Generalized. Linguistics and Philosophy, 5(4), 503–535. http://www.jstor.org/stable/25001110

Cruse, D. A. (1980). John A. Hawkins, Definiteness and indefiniteness: a study in reference and grammaticality prediction. London: Croom Helm, 1978. Pp. 316. Journal of Linguistics, 16(2), 308–316. doi:10.1017/S0022226700006654

Clark, H. H.: 1975, Bridging, in R. C. Schank and B. L. Nash-Webber (eds), Theoretical issues in natural language processing, Association for Computing Machinery, New York

Datz, Margaret J. Dickeman. 1980. Jacaltec syntactic structure and the demands of discourse. Doctoral Dissertation, University of Colorado.

Enç, Mürvet. 1991. The semantics of specificity. Natural Language and Linguistic Theory 22:1-25.

Enç, Mürvet. 2007. Untitled ms., University of Wisconsin-Madison.

Farkas, D. 1994. Specificity and scope. In Langues et Grammaires 1, L. Nash and G. Tsoulas (eds), 119-137.

Fraser, B. (1990). An approach to discourse markers. Journal of Pragmatics, 14(3), 383–398. https://doi.org/10.1016/0378-2166(90)90096-V

Gandour, Jack. 1977. On the interaction between tone and vowel length: Evidence from Thai dialects. Phonetica 34: 54-65.

GIVÓN, T. (1981). ON THE DEVELOPMENT OF THE NUMERAL 'ONE' AS AN INDEFINITE MARKER. Folia Linguistica Historica, 15(Historica-vol-2-1), 35 54. https://doi.org/10.1515/flih.1981.2.1.35

Gruber, J. (2011). An Articulatory, Acoustic, and Auditory Study of Burmese Tone. Georgetown University-Graduate School of Arts Sciences.

George, Tegan (2023). explanatory research | definition, guide, examples. scribbr. https://www.scribbr.com/methodology/explanatory-research/

Hawkins, John A. 1978. Definiteness and indefiniteness: a study in reference and grammaticality prediction. London: Croon Helm.

Heusinger, K.V. (2002). Specificity and Definiteness in Sentence and Discourse Struc ture. J. Semant., 19, 245-274.

Heusinger, K.V. (2014). Definiteness- Linguistics- Oxford Bibliographies-.

Htin, K.M. (2015). The Marma from Bangladesh: A 'de-Arakanized' Community in Chittagong Hill Tracts.

Jackendoff, R. (1972). Semantic Interpretation in Generative Grammar.

Janes, A. (2000). The interaction of style-shift and particle use in Japanese dia logue. Journal of Pragmatics, 32(12), 1823-1853. https://doi.org/10.1016/S0378 2166(99)00118-6

Jenks, P. (2015). Two kinds of definites in numeral classifier languages. Semantics and Linguistic Theory, 25, 103-124.

Jenks, P. 2007. Burmese tone? An analysis of the four-way Burmese tone system as due to intersecting tone and classical phonation features. Harvard University.

Jenks, P. (2018). Articulated definiteness without articles. Linguistic Inquiry, 49(3), 501–536. https://doi.org/10.1162/ling$_{a0}$0280

Jenny, M., Tun, S.S. (2013). Differential subject marking without ergativity: The case of colloquial Burmese. Studies in Language, 37, 693-735.

Jones, R. B. (1970). Classifier Constructions in Southeast Asia. Journal of the American Oriental Society, 90(1), 1–12. https://doi.org/10.2307/598428

Kelly, N.E. (2012). An acoustic analysis of Burmese tone.

Kibrik, Andrej, Reference in Discourse, Oxford Studies in Typology and Linguistic Theory (Oxford, 2011; online edn, Oxford Academic, 19 Jan. 2012), https://doi.org/10.1093/acprof:oso/
accessed 14 Aug. 2024.

Kilarski, M., Allassonnière-Tang, M. (2021). Classifiers in morphology. In M. Aronoff (Ed.), Oxford Research Encyclopedia of Linguistics (pp. 1-28). Oxford University Press. https://doi.org/10.1093/acrefore/9780199384655.013.546

Konow, S. (1903). Notes on the Maghī dialect of the Chittagong Hill Tracts. Zeitschrift Der Deutschen Morgenländischen Gesellschaft, 57(1), 1–12. http://www.jstor.org/stable/43363071

Lee, Chungmin. 1995. Definiteness and specificity.Linguistics in the Morning Calm(Selected papers from SICOL-1992)3. 663–677.

Lyons C. Definiteness. Cambridge University Press; 1999.

Lyons, C. (1999). Defining definiteness. In Definiteness (pp. 253–281). chapter, Cambridge: Cambridge University Press.

Mooney, Kate Repetti-Ludlow, Chiara. (2021). Sonority and syllable structure: The case of Burmese tone. Proceedings of the Linguistic Society of America. 6. 24. 10.3765/plsa.v6i1.4900.

Ozerov, P. (2015). Information structure without topic and focus: Differential Object Marking in Burmese. Studies in Language, 39, 386-423.

Okell, J., Allott, A.J. (2001). Burmese/Myanmar dictionary of grammatical forms.

Pain, F. (2017). Towards a Panchronic Perspective on a Diachronic Issue: The Rhyme <-uiw> in Old Burmese. Australian Journal of Linguistics, 37(4), 424–464. https://doi.org/10.1080/07268602.2017.1350129

Pesetsky, D. (2000). Phrasal Movement and Its Kin.

Pesetsky, D., Torrego, E. (2012). Case. In C. Boeckx (Ed.), The Oxford Handbook of Linguistic Minimalism (Online ed.). Oxford University Press. https://doi.org/10.1093/oxfordhb/97801

Reinhart, T. (1981). Pragmatics and Linguistics: an analysis of Sentence Topics. Philosophica.

Rooth, M. (1992). A theory of focus interpretation. Natural Language Semantics, 1, 75-116.

Richards, N.W. (2013). Lardil "Case Stacking" and the Timing of Case Assignment. Syntax, 16, 42-76.

Safir, K. (1982). Syntactic chains and the definiteness effect (Doctoral disserta tion, Massachusetts Institute of Technology). Massachusetts Institute of Technology. Available at http://hdl.handle.net/1721.1/15616

Schourup, L.C. (1985). Common Discourse Particles in English Conversation (1st ed.). Routledge. https://doi.org/10.4324/9781315401584

Schwarz, F. (2009). Two Types of Definites in Natural Language.

Schwarz, F. (2013). Two Kinds of Definites Cross-linguistically. Lang. Linguistics Compass, 7, 534-559.

Scott, D., Usher, R. (Eds.). (1996). Understanding Educational Research (1st ed.). Routledge. https://doi.org/10.4324/9780203131923

Sera, M. D., Soh, H. L., Brinker, D., Kuo, J. Y., Fuller, J. W., Hammerly, C. M., Stevens, J., Shao, R., Batteen, C., Li, D., Davis, N., Cai, W. (2023). A cross-cultural study of language and cognition: Numeral classifiers and solid object categorization. Memory and Cognition, 51(3), 601-622. https://doi.org/10.3758/s13421-022-01376-1

Sera, M.D., Soh, H.L., Brinker, D., Kuo, J.Y., Fuller, J.W., Hammerly, C., Stevens, J., Shao, R., Batteen, C., Li, D., Davis, N., Cai, W. (2022). A cross-cultural study of language and cognition: Numeral classifiers and solid object categorization. Memory Cognition, 51, 601-622

Shields, R.R. (2008). What's so Special about D-Linking?

Spencer, A. (2012). Case as a morphological phenomenon. In A. L. Malchukov A. Spencer (Eds.), The Oxford Handbook of case (Online ed.). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199206476.013.0013

Stalnaker, R. (2002). Common Ground. Linguistics and Philosophy, 25, 701-721.

Thazin Myint Oo, Ye Kyaw Thu, Khin Mar Soe. (2019). Neural machine transla tion between Myanmar (Burmese) and Rakhine (Arakanese). In Proceedings of the Sixth Workshop on NLP for Similar Languages, Varieties and Dialects (pp. 80–88). Association for Computational Linguistics.

Walker, M.A., Prince, E.F. (1996). A bilateral approach to givenness : A hearer status algorithm and a centering algorithm. Pragmatics and beyond. New series, 38, 291-306.

Watkins, J.W. (2000). Notes on creaky and killed tone in Burmese.

Wheatley, J.K. 1987. Burmese. In Handbook of the worlds major languages, ed. B. Comrie, 834854. Oxford: Oxford University Press.

Tables

Abbreviations

ACC=Accusative Marker

A=Agent

CLF=Classifier

CT=Contrastive Topic

CF=Contrastive Focus

NP=Noun Phrase

VP=Verb Phrase

PM=Postpositional Marker

P=Patient

SM=Subject Marker

OM=Object Marker

Spec=Specifier

TBU =Tone Bearing Unit

IS=Information Structure

This document is written using LaTeX.