Chapter 7: CONCLUSION

7.1. Introduction

This study provided a comprehensive analysis of the phonetics and phonology of tone in Chokri, highlighting its integral role in both lexical contrast and grammatical encoding. The primary objective was to investigate the tonal system of Chokri in relation to its broader phonological structure, including phoneme inventory, phonotactics, and morphophonological interactions. The findings contribute to our understanding of how tone functions as a central linguistic mechanism in Chokri. This chapter summarizes the key insights gained from the study, discusses its theoretical implications, acknowledges its limitations, and outlines directions for future research.

7.2. Phoneme Inventory

The phoneme inventory of Chokri comprises 34 consonants and 7 vowels. The minimal pairs provided in chapter two establish the phonemic status of these phonemes. We also provided spectrographic evidence to showcase the status of voicing and aspiration properties of the consonants. The study of stop consonants revealed that voiced stops exhibit a long negative VOT, voiceless stops have a short positive VOT, and voiceless aspirated stops demonstrate a long positive VOT. Additionally, the study identified some typologically rare sounds, including voiceless aspirated nasals, voiceless unaspirated rhotics, and voiceless aspirated affricates, which add to the phonetic complexity of the language.

A controlled production experiment was conducted to examine the acoustic properties of the vowels present in this language. Vowel analysis confirmed the presence of seven vowels: /i, ɛ, a, ə, ə, ɔ, u/ which were validated based on their F1, F2, and F3 values. The language exhibits a symmetrical vowel system where front and central vowels are unrounded, while back vowels are rounded. These findings contribute to Chokri's phonological structure and provide a foundational reference for future comparative studies within the Angami-Pochuri group.

7.3. Phonotactics and Phonological Processes in Chokri

In chapter three, we discussed the phonotactic properties of Chokri. Chokri follows an open syllable structure (C)(C)V, where consonant clusters are restricted and adheres to the Sonority Sequencing Principle (SSP). The phonotactic constraints observed indicate that while coda positions are generally disallowed in native words, nasals and liquids may occasionally appear in borrowed words.

Several phonological processes were observed, including:

- Vowel deletion (apocope), consonant deletion, and morpheme deletion, which modify syllable structure
- Lenition, leading to consonant weakening in specific environments
- Tone-driven modifications reinforcing the interaction between tone and segmental phonology
- Consonant simplification, particularly in borrowed words

Chokri's phonotactic tendencies align with its tonal system, as tone serves a structural function in distinguishing word forms. The systematic integration of tone into phonology suggests that tone in Chokri extends beyond lexical contrasts to shape syllable structure and word formation processes.

7.4. Tone

Chapter 4 explores the tonal properties of Chokri both in terms of quantity and quality. The tonal analysis confirms the presence of five contrastive tones: extra high, high, mid, low, and rising. Acoustic measurements show that the rising tone is longer in duration than the level tones, indicating that both f0 and temporal cues contribute to tonal contrasts.

The distribution of tones varies depending on word structure:

- In monosyllabic words, all five tones can occur.
- In bisyllabic words, the final syllable carries the full tonal contrast, while the initial syllables are restricted to mid tone.

This suggests a strong positional asymmetry, where the final syllable serves as the primary tone-bearing unit (TBU) while the initial syllable(s) is(are) tonally neutralized.

A perception experiment further demonstrated that Chokri speakers rely exclusively on f0 for tone identification, with no significant reliance on secondary acoustic cues such as duration or intensity. This reinforces the idea that Chokri is a fundamentally pitch-driven tone language.

7.5. Grammatical Tone

Chapter five examined the phenomenon of Grammatical Tone (GT) in Chokri, illustrating how it arises through segment deletion. When a functional morpheme is deleted, its tone does not vanish but persists as a floating tone that subsequently attaches to the verbal root. This process

allows the tone to carry the grammatical function originally encoded in the deleted morpheme, ensuring that essential grammatical information is preserved. Notably, GT does not modify the inherent lexical tone of the root; rather, it concatenates with it, maintaining the tonal structure of the host word.

Strict linguistic constraints govern the emergence of GT in Chokri. The deletion of segments follows an adjacent conditioning rule, meaning only the morpheme directly adjacent to the verb can undergo deletion. Furthermore, syntactic hierarchy influences deletion patterns, prioritizing the removal of the lowest functional element first. However, the language enforces structural integrity by ensuring that at least one overt functional marker remains, as seen in cases where the declarative marker compensates for a deleted aspectual marker to maintain grammatical well-formedness.

Beyond its role in encoding aspect and mood, GT also contributes to morphological derivation, facilitating the transformation of verbs and adjectives into nouns. This demonstrates that GT is not merely an effect of deletion but an active and systematic mechanism within Chokri's morphosyntactic structure. Ultimately, GT serves as a structurally conditioned and functionally significant linguistic feature, reinforcing its role in both syntax and word formation within the language.

7.6. Morphophonology of Tone

Chapter six explores the role of tone in morphophonology. The findings reveal that tone in Chokri is not merely a lexical feature but an active component of the language's grammatical system. Unlike many tonal languages where affixes lack inherent tone and adopt the tone of the root, Chokri affixes possess their distinct (underlying) tones that are retained when they are attached to roots with varied tonal properties.

A key finding of this study is that inflectional affixes in Chokri do not alter the tone of the root word, maintaining tonal stability across various morphosyntactic constructions. The plural, dual, progressive, and negation affixes, for instance, do not trigger tonal changes in the root. This suggests that inflectional processes operate independently of tonal modification, reinforcing the idea that tone in Chokri is governed by a set of structured rules rather than arbitrary tonal shifts.

In contrast, derivational affixes, particularly the nominalizer prefixes /thɛ-/ and /kə-/, systematically modify the tone of the root. When these prefixes attach to a verbal root with an

underlying mid or high tone, they raise the tone of the root to extra high (EH) or mid-rising (MR) tones, respectively. However, roots with low or extra high tones remain unchanged upon affixation. This pattern indicates that derivational processes in Chokri actively engage with tone, creating predictable tonal alternations that contribute to word formation. Notably, this tonal alternation applies only to monosyllabic roots, as bisyllabic roots retain their original tone when affixed.

7.6.1. Compounding

Chapter six also exhibits that *compounding* in Chokri exhibits further evidence of tonal interaction in morphology. In endocentric and left-headed compounds, the first element's tone is neutralized to mid, reflecting a default pattern observed in bisyllabic words, where the first syllable naturally carries a mid tone. So, for example, when a noun is derived from a noun + noun combination, the second element retains its tone. Similarly, when a noun is derived from a noun + verb or noun + adjective, the tone of the first element is neutralized to mid tone while the second element retains its original tonal specification. This suggests that compound formation follows a tonal realignment process, ensuring that tonal patterns conform to the prosodic structure of the language. However, exocentric and coordinate compounds do not undergo this tonal neutralization, maintaining the original tone of both elements. This reveals that tonal change in compounding is conditioned by both morphological structure and syntactic category.

7.6.2. Reduplication

Furthermore, chapter six also shows that *reduplication* in Chokri involves systematic tonal modifications, particularly in iterative reduplication. Distributive reduplication conveys meanings such as 'one each' or 'two each' and involves a faithful copy of the base word's segmental and tonal properties. In monosyllabic words, full reduplication occurs, and both copies retain the original tone. In bisyllabic words, only the final syllable is reduplicated, and its tone remains unchanged. This pattern reinforces the notion that distributive reduplication is primarily a morphological process, with tone remaining structurally stable.

On the other hand, iterative reduplication, which expresses repetition or intensity, introduces both tonal and segmental modifications. In this process, the first occurrence of the reduplicated element undergoes lengthening, signaling intensity, and its tone is raised to extra high (EH). The second occurrence, however, retains the original tone of the base word. Unlike distributive reduplication, both syllables of a bisyllabic root are fully reduplicated, rather than just the final

syllable. This tonal alternation emphasizes the iterative nature of the action, distinguishing it clearly from distributive reduplication.

The morphophonological analysis of tone in Chokri demonstrates that tone is deeply integrated into both morphological and syntactic structures. While inflectional processes maintain tonal stability, derivational processes systematically modify tone, and compounding follows predictable tonal realignment patterns. Additionally, reduplication patterns confirm that tone is preserved in distributive reduplication but manipulated in iterative reduplication, illustrating the dynamic interplay between tone, morphology, and semantics. Most importantly, this study establishes that affixes in Chokri are not toneless but bear inherent tones, which interact with the tones of the root under specific morphological conditions.

7.7. Implications and Future Directions

The findings of this study contribute to both tonal phonology and morphophonology, offering insights into how lexical tone, grammatical tone, and affixation interact in a tonally complex Tibeto-Burman language. The results align with typological patterns observed in other Southeast Asian and African tone languages (Yip, 2002; Hyman, 2011). Chokri's tonal system shares certain similarities with other Tibeto-Burman languages in Northeast India, such as Tenyidie (Dutta et al., 2012; Savio, 2015), Ao (Coupe, 2003), and Meitei (Chelliah, 1997) with register tone system.

This research provides a foundational reference for further phonetic, phonological, morphophonological, and morphosyntactic studies on Chokri and related languages. Potential avenues for future research could include:

7.7.1. Comparative Tonal Studies in the Angami-Pochuri Group

Since this study has established the phonological structure of Chokri, further research can compare its tonal system with closely related languages, such as Tenyidie, Khezha, and Pochuri. This would provide deeper insights into the historical development of tone in this language group and clarify the role of tonogenesis in their divergence.

7.7.2. Phonetic and Acoustic Analysis of Tonal Interactions

While this study has examined tonal contrasts using F0 values and duration, future research could explore additional phonetic cues, such as voice quality and spectral tilt, to determine whether secondary cues play a subtle role in tonal perception.

7.7.3. Diachronic and Historical Development of Tone

A diachronic study could trace the development of Chokri tone through historical reconstruction. Comparative studies with Proto-Tibeto-Burman could shed light on the origins of its five-tone system.

7.7.4. Computational Modelling of Chokri Tone

With advancements in computational phonology, future research could develop a rule-based or machine-learning model of Chokri's tone system to test hypotheses about tone assignment system that can potentially enhance several NLP applications such as *automatic speech recognition* (ASR) systems, *text-to-speech* (TTS) or *speech-to-text* (STT) systems and so on. Such models could contribute to broader typological studies of tone in Tibeto-Burman languages.

7.8. Conclusion

This thesis provided a comprehensive analysis of Chokri's tone, from its phonetic realization to its grammatical and morphophonological functions. By combining acoustic analysis, perceptual experiments, and morphophonological investigations, this study sheds light on the rich tonal structure of Chokri and its interaction with morphology. The findings contribute to the broader field of tonal linguistics, demonstrating how tone is not merely a prosodic feature but a core grammatical component in this language.