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The syllable in Kuki-Chin

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Abstract: The Kuki-Chin group of the Tibeto-Burman language family consists of upwards of 50 languages spoken mainly in western Myanmar, predominantly in Chin State and in neighboring areas of India and Bangladesh (Simons & Fennig (eds.). 2019. *Ethnologue: Languages of the world*, 21st edn. Dallas Texas: SIL International. Online version. http://www.ethnologue.com/). In the many daughter languages of Proto–Kuki-Chin, syllable structure simplification has yielded a synchronic situation in which individual languages are spread along a cline ranging from more conservative languages, some with complex onsets and vowel length distinctions, to more innovative languages, some with no coda consonants at all. The distribution and phonetic realization of these features vary across the Kuki-Chin group, raising a number of relevant questions about the underlying phonological representations of the Kuki-Chin syllable. This paper surveys representative structures from a variety of Kuki-Chin languages in order to highlight issues in syllable structure across these little-studied languages. In doing so, we aim to both unify observations on Kuki-Chin phonology related to the syllable, and to propose research that will further elucidate its structures.

Keywords: Kuki-Chin, syllable structure, cluster simplification, voiceless sonorants, lateral Obstruents

1 Introduction

The Kuki-Chin languages (Tibeto-Burman) show diverse syllable structure inventories. From the Southern Chin languages, which contain complex onsets and nasal pre-syllables, to the Maraic languages, which lack consonant clusters and

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sometimes ban codas, Kuki-Chin languages offer rich variation for the study of diachronic syllable structure simplification. They exemplify, for instance, a divergent set of onset cluster reduction strategies including deletion, coalescence, and epenthesis. Inter- and intra-language variations reveal potential differences in the phonological treatment of shared phenomena such as onglides, lateral affricates, and final glottal stops. Herein, representative structures from a variety of Kuki-Chin languages are surveyed in order to highlight issues in syllable structure across these little-studied languages. Section 2 offers background on Kuki-Chin languages. Section 3 presents an overview of the reconstructed Proto-Kuki-Chin syllable repertoire and diachronic changes observed in the four major Kuki-Chin subgroups. Section 4 and Section 5 survey Kuki-Chin onsets and rhymes, respectively, and Section 6 concludes the paper.

2 Background on Kuki-Chin languages[1]

Although the sub-groupings within Tibeto-Burman are often a source of debate (see, e. g. Matisoff 1989; Van Bik 2009), the grouping of "Old Kuki" with Chin languages and the placement of Kuki-Chin within Tibeto-Burman are well-evidenced (Grierson and Konow 1904; Shafer 1955, Shafer 1974; Benedict 1972; Matisoff 1991; Van Bik 2009). The understudied "Old Kuki" languages of Manipur, India are not clearly a phylogenetic unit (Konnerth 2018) and have been variably grouped with Mara (Shafer 1974) and with Northern Chin languages (Bareigts 1981), an issue not addressed here. A suggested link between Kuki-Chin and the Naga languages of northeast India (Grierson and Konow 1904; Shafer 1955; Benedict 1972; Matisoff 1991) is more contentious. Van Bik (2009) and Peterson (2017a) both divide Kuki-Chin into four major subgroups but differ with regards to their organization. Both separate the Central and Maraic languages from the Peripheral languages based on the development of /ɾ/ into a velar stop or fricative in the latter subgroup, and both divide the Peripheral languages into Northern and Southern subgroups. However, while Peterson adds Khomic as a separate Peripheral subgroup and includes Maraic within

1 We use the term Kuki-Chin in the present work because it is standardly used in linguistics, but note that it is controversial. "Kuki" and "Chin" are used to refer to both languages and ethnic groups in a region where an already complex socio-political situation is further complicated by the legacy of colonialism. While Chin people have occupied the Chin Hills in what is now Myanmar since at least the eighth Century (Lehman 1963), "Kuki" is a particularly loaded term in northeastern India, where there is ongoing political tension around tribal divisions between Kuki and Naga groups (Haokip 2016).

the Central subgroup, Van Bik places Khomic within the Southern subgroup and considers Maraic a separate subgroup. As we do not comment on either of these issues here, for simplicity we adopt Van Bik's (2009) schema for Kuki-Chin as shown in Figure 1. Shared phonological innovations are the main criteria for these subgroupings, so such an analysis works well for the comparative phonological work needed in investigating syllable structure simplification.

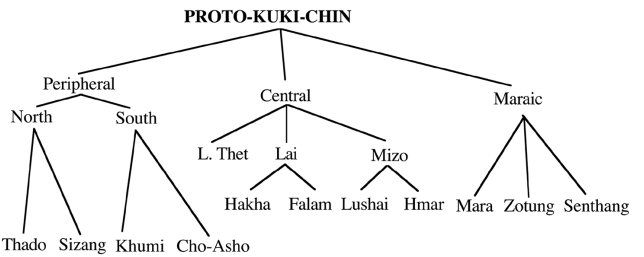

Figure 1: Van Bik's Proto–Kuki-Chin schema (from Van Bik 2009: 23).

To explore the syllable in Kuki-Chin, we survey data from a number of languages from each subgroup. The full list of those addressed herein is presented in Figure 2. In addition to utilizing data from existing work by other scholars – Appendix A presents a comprehensive list of languages paired with sources – we provide primary data based on fieldwork and native speaker intuitions for several languages. Indiana is home to more than 25,000 Burmese refugees who hail largely from Chin State (Berkson et al. 2019), and we are engaged in ongoing field work with native speakers of Hakha Lai, Lutuv, and Zophei who are members of this Chin diaspora community.[2] No previous linguistic work on Zophei or Lutuv (Lautu) exists, and so all reported data and analyses for these languages emerge from our ongoing fieldwork in Indiana.[3] Hakha Lai data and analyses are also based on the intuitions of our co-author Kenneth Van Bik, who is a native speaker.

2 This work, and the community of collaboration that is developing between Indiana University Linguistics and the Chin community in Indianapolis, has been partially described in Berkson et al. (2019).

3 Special thanks are owed to four language assistants who have contributed their voices and intuitions to this and other projects: Zai Sung for Lawngtlang Zophei; Thomas Thawngza for Tlawngrang Zophei; Sui Hnem Par for Hnaring Lutuv; and Peng Hlei Thang for Hakha Lai. See also our other publications on Zophei (Lotven and Berkson 2019; Lotven et al. 2019a), Lutuv (Lotven et al. 2019b), and Hakha Lai (Danaher 2019; Lee and Berkson 2019; Wamsley 2019). Van Bik (2009) uses "Kuki-Chin" rather than "Chin" to include Thado Kuki, which he considers part of the Northern subgroup.

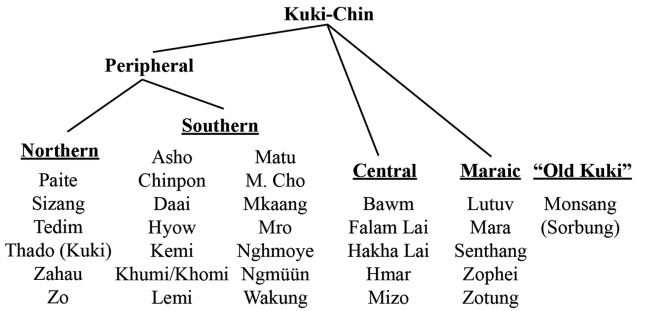

Figure 2: Languages included in this survey.

3 Syllables in Kuki-Chin languages: General trends

Kuki-Chin syllable structure has undergone simplification in many of the daughter languages of Proto–Kuki-Chin (PKC), resulting in a synchronic situation in which individual languages are spread along a cline ranging from the more conservative languages, some of which have complex onsets and vowel length distinctions in closed syllables, to the more innovative languages, some of which ban closed syllables. The extensive reconstruction of PKC presented in Van Bik (2009) reveals more complex onsets and more rhyme types in PKC than in any single modern Kuki-Chin language.[4] A PKC onset could be simplex, beginning with a stop /*p *t *k *ph *th *kh *ɓ *ɗ *ʔ/, affricate /*ts *tsh/, fricative /*θ *s *sʰ *h/, nasal /*m *n *ŋ *hm *hn *hŋ/, liquid /*r *l *hr *hl/, or glide /*w *j/; or it could be complex, beginning with an Obstruent–Liquid cluster /*pl *kl *khl *pr *phr *kr *khr/. Open syllables could contain a long vowel /*aa *ii *uu *ee *oo/, diphthong /*ia *ua/, or triphthong /*iaw/.[5] Closed syllables not ending in a glottal stop /*ʔ/ could have a long or short vowel and could be closed with a glide /*w *j/, liquid /*l *r/, nasal /*m *n *ŋ/, or stop /*p

4 Following Van Bik (2009), aspiration in stops and affricates is generally represented with an unraised <h>, e. g. plain/aspirated voiceless velars are /*k *kh/ respectively. A preposed <h> represents voicelessness in sonorants, e. g. plain/voiceless laterals are /*l *hl/. Where source data differs from this practice, we are faithful to the source. Thus superscripted <h> is used to represent aspiration only if it was used in the source text. <tl> and <thl> are used to represent the lateral affricates, and <ŋ> and <ng> are used variably, based on the data source, to represent the velar nasal.

5 Van Bik considers offglides to be consonantal at least in Proto-Central Chin, so the structure of **triaw* 'disperse' is analyzed as CCVVC, hence the use of /*iaw/ over /*iau/.

*t *k/. Syllables ending in a glottal stop could only have a short vowel /*a *i *u *e *o/ or diphthong /*ia *ua/. PKC also had a system of lexical tone.

In the synchronic syllable structure complexity cline, conservative Southern Chin languages represent one extreme, Northern and Central Chin languages fall in the middle of the continuum, and Maraic languages – which have undergone the most simplification – represent the other extreme. There is also variation within each subgroup. As partially illustrated via correspondences for PKC *s^h*am* 'hair (head)' in Table 1, for example, the Maraic group shows a loss of coda nasal place contrast in Zophei, a reduction in vowel contrasts preceding nasal codas in Lutuv, a loss of VN rhymes in favor of nasal vowels in Zotung, and a loss of nasal vowels in favor of vowel quality contrasts in Mara, further discussed in Section 5.3.

Table 1: Simplification in Maraic correspondences for PKC *s^h*am* 'hair (head)'.

Language	Correspondence	Source
Proto-Kuki-Chin	*s^h*am*	(Van Bik 2009)
Senthang	*sám*	(Par 2016)
Zophei (both varieties)	*sáŋ*	primary data
Lutuv	*soo*	primary data
Zotung	*sã*^{454}	(Shintani 2016)
Mara	*sá*	(Van Bik 2009)

The most complex Kuki-Chin syllables can be found in the Southern Chin languages. Hyow (Zakaria 2017; Baclawski 2012), for example, retains all four PKC Stop-Rhotic clusters /pr kr phr khr/ and one Stop–Lateral cluster /kl/, in addition to innovating a voicing contrast in the Rhotic cluster series /br gr/ and a Nasal–Rhotic cluster /mr/. Hyow also retains most PKC coda consonants as well as the PKC length distinction in syllables ending in non-rhotic sonorants /m n ŋ l j w/, which Zakaria (2017) describes as contrasting coda sonorants with glottal stop-sonorant clusters /ʔm ʔn ʔŋ ʔl ʔj ʔw/ (e. g. long /-am/ contrasted with short /-aʔm/).

Central Chin languages have not retained the PKC /p-/ and /k-/ onset clusters but have retained many PKC rhyme types. Stop–Lateral clusters developed into lateral affricates in PKC: /*pl *kl/ to /tl/ and /*khl/ to /thl/ in Hakha Lai, Falam Lai, and Mizo (discussed in Section 4.3). Stop–Rhotic clusters in those languages developed into apico-alveolar stops, innovating a contrast with lamino-dental stops (e. g. /t̪/ vs. /t̻/, see Section 4.1) (Van Bik 2009).[6] Central

6 We follow the Hakha Lai orthographic conventions and represent dental vs. alveolar stops as <t, th> vs. <tt, tth>.

Chin languages have retained many reconstructed PKC rhyme types, including vowel length distinctions in syllables closed with oral stops and sonorants (e. g. Hakha Lai *laám* 'to dance' vs. *lám* 'road'), though the latter are sometimes analyzed instead as a coda contrast (i. e. between sonorants and glottalized sonorants). See Section 5.4 for more discussion.

Northern Chin languages have not retained /p-/ and /k-/ onset clusters and in some cases have lost PKC coda consonants (Van Bik 2009). Diachronic cluster simplification often involved deletion, as in Tedim where /*khl *khr/ reduced to /kh/, /*kr/ to /k/, and /*kl *pl/ to /t/. In addition, /*pr/ was reduced to /g/ in the word *gáng* 'uncle' (see comparisons in Figure 3), suggesting deletion of /*p/ preceded /*r/ hardening to /g/. Thado also reduced /*khl *kl *pl/ to /hl/, showing a loss of the stop in favor of aspiration of the lateral. Although Mizo and Zahau retain coda /p t k m n ŋ l r j w/, Tedim and Sizang have merged coda /r/ with /k/ and Thado and Zo have further reduced /r k/ to /ʔ/. Northern Chin languages have also lost some glottalized sonorant codas; /lʔ jʔ wʔ/ are retained in Mizo, Zahau, and Tedim while they have merged with /l j w/ in Thado, Zo, and Sizang. /rʔ/ has merged with /k/ in Tedim and Sizang and with /ʔ/ in Thado and Zo. No Northern language retains glottalized nasals, and verb stem alternations reveal that /mʔ nʔ ŋʔ/ likely merged with nasals, hardened to stops, or reduced to /ʔ/ in Northern Chin.

Maraic languages allow limited coda consonants and lack onset clusters, achieving cluster simplification via reduction, deletion, and epenthesis. PKC Stop–Lateral clusters /*pl *kl/ have been reduced to /tl/ in Mara; compare Asho *plük* 'to boil' and *kluak* 'to fall from a height' with their Mara cognates *tlāo* 'to boil' and *tlā* 'to fall from a height' (Van Bik 2009). Similarly, /*khl/ was reduced to /thl/, as in Mara *thlì* 'air' (compare to Asho *k'lí* 'the wind, air, breeze').[7] Maraic used deletion, affrication, and epenthesis to reduce rhotic clusters: deletion of the rhotic in /*phr/ (compare Mara *phā* 'to be good' to the Central language Hakha Lai *tthăa/tthat* 'good, nice.I/II'); affrication of /*kr *khr/ to /ts tsh/ (compare Mara *tsā* 'weep, cry' to Mindat Cho *krap* 'cry, weep'); and epenthesis /*pr/ in *pā-rā* 'uncle' (compare to Khumi *práang* 'uncle-in-law, term of address').[8] Senthang (Par 2016), Zophei, and Lutuv

7 The Asho orthography represents aspiration with an apostrophe.

8 The /pa-/ reduced syllable in Mara may additionally come from prefix retention, as can be seen in comparing *pā-rì* 'snake' with Proto–Tibeto-Burman **s-b-rul* (Van Bik 2009) . Epenthesis is also noted in Monsang ("Old Kuki") *àbɔ̀ráŋ* 'uncle' (Konnerth 2018) under the analysis that the /p/ in /*pr/ was treated as a prefixal element, while /*phr *khr/ were treated as onset clusters. The relation between onset clusters and prefixes is one of the least understood areas of Kuki-Chin linguistics, so the analyses presented here in terms of cluster epenthesis and prefix retention should be taken as provisional.

offer the most rhyme types in Maraic with sesquisyllabic words showing full and reduced syllables, the former of which can be closed in a coda glottal stop or nasal (CV? or CVN), for example Zophei *sáŋ* 'hair' and Lutuv *vaŋ* 'not'.[9] Mara has sesquisyllables and allows CVV and CV? in full syllables, but does not have CVN (Arden 2010). Zotung allows the fewest possible syllable shapes reported in Kuki-Chin, allowing only CVV and CV? according to Shintani (2016).

Taken together, the Southern Chin languages show little reduction in complexity from PKC (and even some complexification), illustrating the full range of syllable types allowed in Kuki-Chin languages. The Central Chin languages reveal ways in which onset simplification has occurred without attendant coda simplification, while the Northern Chin languages reveal information about coda simplification in Kuki-Chin. The Maraic languages complete the picture, showing what happens to onset and rhyme contrasts in more radical simplification. Figure 3 summarizes some of these trends.

	Most simplified ← – – – – – – – – – → **Most Conservative**				
	MARAIC	**CENTRAL**		**SOUTHERN**	
	Mara *pā-rā*	**Falam** *răng*	**Hakha** *ttâng*	**Khumi** *praáng*	**PKC** **prang*, 'uncle'
PROCESS	EPENTHESIS	DELETION	COALESCENCE	RETENTION	

Figure 3: Correspondences of PKC *pr in Kuki-Chin languages.

With limited previous work on the Kuki-Chin languages, many of which are under-studied or completely undescribed, investigation of Kuki-Chin phonology in general and syllable structure in particular are in their infancy. In order to support future work in this area, it is useful to provide an overview of the syllable in Kuki-Chin by pulling together data from languages in all four subgroups. With this in mind, we turn to a more thorough survey of Kuki-Chin Onsets in Section 4 and Rhymes in Section 5. In doing so, we aim to illuminate the range of phenomena observed in Kuki-Chin, with specific emphasis on evidence for and against complex onsets, nuclei, and codas across the many diverse languages in this group.

9 For Zophei words, tone is marked on nouns only. We do not yet have evidence that tone is lexically contrastive in Zophei verbs. Our data suggest that Lutuv has lexical tone, but as our analyses are preliminary, we do not mark it here.

4 Onsets

There is broad variation in the inventories of Kuki-Chin onsets as well as in the phonetic realizations of similar segments within and between languages. While many onsets are clearly single segments, others (especially affricates developing diachronically from PKC onset clusters) may vary in their phonological treatment. This section discusses variation and diachronic change in Kuki-Chin onsets: stops in Section 4.1, fricatives in Section 4.2, affricates in Section 4.3, nasals in Section 4.4, liquids in Section 4.5, and glides in Section 4.6.

4.1 Onset stops

Stops in Kuki-Chin languages are found in labial, dental, alveolar, velar, and occasionally palatal places of articulation, with inter- and intra-language variation in the number of laryngeal contrasts. The tendency is to exhibit a three-way laryngeal contrast between voiceless unaspirated, voiceless aspirated, and voiced stops in onset labials and dentals, /p ph b t th d/. This is true in at least some members of all subgroups in the family, for example, in the Central subgroup for Hakha Lai (Lalremzami 2011), in the Northern subgroup for Thado, Zo, Tedim, and Sizang (Button 2011), and in the Maraic subgroup for Zophei. In the Southern Chin languages (e. g. Daai, Nghmoye, Ngmüün, Mkaang, Matu, Khomi, and Wakung), the voiced labial and dental stops are implosive (So-Hartmann 1988), which Van Bik (2009) considers to have been the case in PKC. Chinpon has only a labial implosive, having lost the voiced coronal stop altogether (So-Hartmann 1988).

Some Central Chin languages – e. g. Hakha Lai (Lalremzami 2011), Hmar (Dutta Baruah and Bapui 1996), Mizo (Chhangte 1986) – show an additional coronal contrast alternately described as plain vs. retroflex (e. g. in Button 2011) or lamino-dental vs. apico-alveolar (Maddieson and Van Bik 2004). Pilot articulatory work with Hakha Lai reveals minimal or no retroflexion (Smith et al. 2018), so we use the term apico-alveolars to differentiate these from Indic or Dravidian retroflexes. These sounds, written <tt tth> in Hakha Lai orthography, likely derived from simplification of the clusters /*kr *pr *khr *phr/. Their advent yields a typologically unusual 5-way coronal stop contrast (e. g. in Hakha Lai, /t th d tt tth/) (Van Bik 2009). Konnerth (2018) also notes the development of retroflex stops from stop-rhotic clusters (/*kr/ to /ʈ/ and /*khr *phr/ to /ʈʰ/) in the "Old Kuki" language of Monsang (/*pr/ was simplified through epenthesis, see footnote 8 in Section 3). A similar process has also

been found in some varieties of Tibetan (Leongue 2018). Scant articulatory work on coronals in Hakha Lai exists (Maddieson and Van Bik 2004; Smith et al. 2018), though phonetic investigation of Kuki-Chin coronals remains limited. Future work will further illuminate their articulatory and acoustic characteristics, as well as their diachronic development and phonological distribution.

Across Kuki-Chin, velar stops diverge from labials and coronals, and usually exhibit a two-way laryngeal contrast. The more conservative aspiration contrast /k kh/ can be found in Southern languages like Daai and Wakung (So-Hartmann 1988), Central languages like Hakha Lai, and Maraic languages like Zophei. In some Northern Chin varieties such as Thado, Zo, and Tedim (Button 2011), a diachronic change where onset /*kh/ lenited to /x/ and onset /*r/ hardened to /g/ has resulted in a voicing contrast /k g/. Hyow (Southern Chin) contains /g/ in loanwords, creating a marginal three-way contrast in velars /k kh g/, and has also innovated a palatal stop /c/ (Baclawski 2012). Kuki-Chin stop inventories, their diachronic development, and their phonetic realizations offer rich variation within and between languages for continued research especially on laryngeal contrasts, coronals, and onset cluster simplification.

4.2 Onset fricatives

Though Van Bik (2009) only reconstructs 4 fricatives in PKC /*θ *s *s^h *h/, others are found in its daughter languages. Some Southern languages like Mindat Cho retain /θ/ (Jordan 1969), but the interdental fricative was lost in favor of /f/ in Central languages like Falam Lai, merged with /s/ in Maraic languages like Mara and Zophei, and hardened to a stop (/t/ in Tedim) or affricate (/ts/ in Thado) in Northern Chin languages (Van Bik 2009). The aspiration distinction in sibilants /s s^h/ is retained in some Southern Chin languages such as Chinpon and Matu (So-Hartmann 1988), but the contrast has been lost elsewhere in Kuki-Chin with only /s/ retained. The glottal fricative /h/ has been retained in all reported Kuki Chin languages, with PKC /*hr/ reducing to /h/ in the Northern Chin languages Tedim and Thado (Van Bik 2009).

Some innovated fricatives also exist. In the Northern Chin subgroup, Thado, Zo, and Tedim have innovated /x/ from the aspirated velar stop /kh/ (Button 2011). Baclawski (2012) reports that Hyow (Southern) has innovated palatal /ç/ (orthographic <hy>, as in the language name), though Zakaria (2017) does not make the same claim. We have also observed /ç/ in Lutuv, for example in *lauçøø* 'over there'. Voiced fricatives /v/ and /z/ have been innovated in Northern,

Central, and Maraic languages from onset glides, /*w/ and /*j/ respectively (Van Bik 2009), with Thado showing variation between /z/ and /ʒ/ (Button 2011). This suggests that in proto-languages for at least these three subgroups, onset glides in CV syllables were consonantal, since they were lost in favor of onset consonants rather than vowel system complexification, as further discussed in Section 4.6 and Section 5.2.

4.3 Onset affricates

Sibilant and lateral affricates are common in Kuki-Chin, with the sibilant affricate series reconstructed for PKC /*ts *tsh/ and the lateral affricate series deriving historically from PKC stop-lateral clusters /*kl *pl *khl/ (Van Bik 2009). Affricate contrasts are often represented as being akin to the laryngeal contrasts found in stop consonants (e. g. /ts tsh/ and /tl thl/), but affricate realizations vary considerably across languages and even within subgroups. Consider the Central Chin languages Hakha Lai and Falam Lai: Hakha features an aspiration contrast in the sibilant affricates /ts tsh/ but not in the lateral affricates /tl tɬ/ (Peterson 2017b; Van Bik 2009), while closely related Falam contains a single sibilant affricate /ts/ and an aspiration contrast in the lateral affricates /tɬ tɬʰ/ (Thuan 2008). Instrumental data related to the acoustic realization of Kuki-Chin affricates is relatively limited at present, so many questions related to their temporal, spectral, and laryngeal characteristics remain open. This phonetic variation may also be indicative of deeper phonological variation, especially in the case of lateral affricates which, developing diachronically from onset clusters, may still be treated as onset clusters in some Kuki-Chin languages.

Sibilant affricates are found in many Kuki-Chin languages, both as retentions from PKC and as innovations resulting from cluster simplification. Central and Maraic varieties largely retained the sibilant affricate series from PKC, though phonetic variation is reported in their realization. The Central language Mizo retains /ts tsh/ (Button 2011) as does Hakha Lai, although our recent fieldwork shows some speakers of both Hakha Lai and the Maraic language Zophei produce the contrast as [ts tʃ]. Accounts vary on this contrast in other Maraic languages as well – in Mara [ts tʃʰ] is reported by Thang (2001) and [tɕ, tɕʰ] by Arden (2010). According to Van Bik (2009), some Peripheral languages show retention of one PKC sibilant affricate, unaspirated /ts/, such as Northern Thado and Southern Mindat Cho, Daai, and Asho; while in Tedim, Sizang, and Khumi, /ts/ has merged with /t/. The PKC aspirated sibilant affricate /tsh/ has been lost in the Peripheral varieties, merging with /th/ in Khumi, /sʰ/ in Daai, and /s/ in Thado, Sizang, and Mindat Cho.

The other source for sibilant affricates in Kuki-Chin languages is PKC Stop–Rhotic clusters, previously mentioned as the origin of Central Chin /tt tth/. This process in Kuki-Chin is most visible in some Southern Chin varieties. Paite (Singh 2006) and Daai (So-Hartmann 2009) neither retained nor innovated sibilant affricates (nor lateral affricates for that matter). Hyow has only a single affricate /dʑ/ in loanwords (Baclawski 2012), variably reported as /ts/ (Zakaria 2017). In Ngmüün the cluster [kɹ] is reported in free variation with the affricate [tʃ], and [kɹʰ] with [tʃʰ] (So-Hartmann 1988).

While Southern languages have largely lost PKC sibilant affricates, they have also been re-innovated in others. Maraic languages, for example, show both retention of PKC sibilant affricates and their re-emergence via innovation, resulting in a merger. For example, Tlawngrang Zophei has *tshaí/tshai* 'generation/to divide' from PKC **tshan* 'generation/era' and **kh(r)en* 'divide/separate', though tonal differences and morphology in noun and verb phrases differentiate the two in context. In addition, Lutuv appears to have an additional voiced sibilant affricate [dʒ], although further research is needed to determine whether it is phonologically contrastive with /ts tsh/. While Maraic languages with their simpler syllable structure suggest treating affricates as single segments, variation in the Southern language of Ngmüün suggests a need for more complicated phonological analysis.

Where Southern languages retain PKC Stop–Lateral clusters and Northern languages have seen them reduced to stops or liquids, Central and Maraic languages have innovated lateral affricates. Apart from So-Hartmann (1988) mentioning /tɬʰ/ in some Matu reflexes of /*khr/ and Button (2011) including /tˡ tˡʰ/ in the inventory of Mizo and Zahau, Peripheral languages are not reported to have innovated lateral affricates. Previous work has reported an absence of lateral affricates in Maraic languages like Mara (Arden 2010) and Senthang (Par 2016), but our recent work with Zophei and Lutuv reveals a two-way lateral affricate contrast in these languages. For example, Zophei has /tl tɬ/ in *tlàng* 'hill, mountain, edge' and *tɬang* 'to loosen', and Lutuv has them in *tlaa* 'to fall' and *tɬaa* 'to drop'. As mentioned previously, Central languages like Hakha Lai and Falam Lai are widely reported to have lateral affricates.

A number of relevant questions can be raised when considering the interplay between affricates and syllable structure in the Kuki-Chin languages. Questions of phonological interest revolve around the segmental representation of affricates – should these be considered a single segment or a cluster? Given that PKC Stop–Liquid clusters have been retained in some daughter languages and reduced to lateral affricates in others, it is possible that the underlying phonological representation of such sounds varies across the languages that contain them. Also of phonological interest is the question of whether affricates

are separate from stops or, as argued by some previous scholars, simply stops with a [+strident] or [+lateral] specification (Hall 2004; see Kehrein 2013 for discussion). Evidence from the phonological inventories and syllable shapes of different varieties of Kuki-Chin have not traditionally been included in these discussions, but given the rich affricate inventory and the degree of variation found within Kuki-Chin, the family offers a rich source of data for future work.

4.4 Onset nasals

PKC is reconstructed with a series of 6 onset nasals contrasting in place and voicing /*m *hm *n *hn *ŋ *hŋ/, which are retained in many Kuki-Chin languages. This contrast holds in Central Chin languages like Hakha Lai and Falam Lai, while Maraic languages tend to retain the voicing contrast in labial and coronal nasals but not in velars. Mara (Van Bik 2009), Senthang (Par 2016), and Lutuv lack /hŋ/, and it appears in a single Zophei lexical item *tsa hngiá* 'wild dog', a possible borrowing. The "Old Kuki" language Monsang has also lost /*hŋ/ in favor /h/ and /ŋ/ variably (Konnerth 2018). The Northern languages Mizo and Zahau retain the full PKC set /m hm n hn ŋ hŋ/ (Button 2011), as do the Southern languages Hyow (Baclawski 2012) and Mindat Cho (Van Bik 2009). Many languages have lost the voicing contrast in nasals altogether, usually resulting in a 3-way contrast /m n ŋ/. This simplification has occurred in some members of each subgroup: in the Northern languages Thado, Zo, Tedim, and Sizang (Button 2011); in the Southern languages Daai, Khumi (Van Bik 2009), and Asho (Houghton 1892); in the Central Chin language Bawm (Reichle 1981); and in the Maraic language Zotung (Shintani 2016).

There is a small but growing body of acoustic work focused on non-modal nasals in Kuki-Chin (Hoffman 2018), in Tibeto-Burman more generally (Bhaskararao and Ladefoged 1991; Chirkova et al. 2018; Dantsuji 1987), and in other language families of South Asia such as Indic (Berkson 2019). These works clearly establish that non-modal nasals (in Kuki-Chin and beyond) can be represented and realized phonetically with variability both within and across languages: as voiceless (N̥); as pre-aspirated (^{h}N); as post-aspirated (N^{h}); as breathy (N^{ɦ}); or as a sequence of /h/ and a nasal (hN). The question can be raised as to whether voiceless nasals are one segment or two, though diachronic reduction evidence shows that these have been treated as single segments historically (e. g. merger of voiced and voiceless nasals rather than, say, breaking up /hn/ with epenthesis), suggesting that these should likely be considered single segments phonologically. Additional work documenting the breadth and range of variation in the family will allow for more commentary on this issue.

4.5 Onset liquids

Like nasals, laterals and rhotics in PKC are reconstructed with a voicing contrast /l hl r hr/, and while /l/ is retained in all Kuki-Chin languages, the same cannot be said for the other three liquids (Van Bik 2009). Central languages like Hakha Lai and Falam Lai, Northern languages like Mizo and Zahau (Button 2011), and Maraic languages like Mara (Van Bik 2009), Zophei, and Lutuv have retained /hl/. However, Northern languages such as Tedim and Sizang have lost the voicing contrast in laterals, retaining only /l/, as have most Southern Chin languages (Van Bik 2009) apart from Hyow (Zakaria 2017). Thado has /hl/, but through innovation rather than retention, since lexical items with this segment correspond to Proto–Northern-Chin /*kl-/ and /*khl/ clusters rather than /*hl/ (Button 2011). As with the lateral affricates, the voiceless lateral is alternately represented as /hl/ and as /ɬ/, presumably because it is frequently produced with some degree of oral frication.

The rhotic series has proved less diachronically stable and the realizations of /r/ and /hr/ vary in the Central and Maraic languages where the contrast is found. In our own Hakha Lai and Zophei recordings, we have seen inter- and intra-speaker variation in /r/ from the rhotic [ɹ] to the trill [r] to the voiced retroflex fricative [ʐ] to the postalveolar fricative [ʒ]. Likewise, we have come across variation in /hr/ from the pre-aspirated rhotic [ʰɹ] or trill [ʰr] to the retroflex fricative [ʂ] or the postalveolar fricative [ʃ]. The peripheral Chin subgroup is largely defined by the loss of /r/, apart from the Northern languages Mizo, Zahau (Button 2011), and Khumi (Southern) which retain it (Van Bik 2009). In the Northern Chin languages Tedim, Zo, and Thado (Button 2011) and the Southern Chin language Mindat Cho (Van Bik 2009), the voiced rhotic has hardened to a stop /g/. Southern languages such as Daai have also innovated /ɣ/, as can be seen even in the modern reflexes of PKC Stop–Rhotic clusters /pɣ pɣʰ kɣ kɣʰ/ (So-Hartmann 2009). Some other innovations exist such as /*r/ merging with /ŋ/ in Sizang (Button 2011) and merging with /j/ in Asho (Van Bik 2009). Where /*hr/ is lost in the Peripheral languages, it usually merges with /h/ as in Tedim, Sizang, Asho, and Khumi, but has also developed into /x/ in Daai (Van Bik 2009). Again, since diachronic development (even in cases of hardening or spirantization) has rendered these liquids as single segments in the many Kuki-Chin daughter languages, it is plausible to posit that they were treated as single segments even in PKC.

4.6 Onset glides

Onset glides are reconstructed for PKC but have largely been lost in favor of fricatives across Kuki-Chin languages. Van Bik (2009) describes the diachronic

loss of onset glides where PKC /*j/ and /*w/ have developed into fricatives /z/ and /v/ in many Kuki-Chin varieties including Maraic languages like Mara, Northern languages like Tedim, Thado, and Sizang, and Central languages like Hakha Lai (Van Bik 2009). The change from /*w/ to /v/ but not /*j/ to /z/ occurred in some Southern languages such as Ngmüün and Mkaang, although onset /j/ and /w/ are retained in others such as Daai and Nghmoye (So-Hartmann 1988). Some other variation is noted: /z/ is realized as [z] or [ʒ] in Thado (Button 2011), and Falam Lai features variation between [j w] ~ [z v], with the latter appearing more often in rapid speech (Thuan 2008).

A phenomenon that is potentially related to the loss of onset glides in favor of fricatives is the presence of rising sonority diphthongs, since it suggests /ia ua/ contrasted with /ja wa/ in PKC (Van Bik 2009). In other words, diachronic spirantization of onglides did not rid Central Chin languages of rising diphthongs as would be expected if such onglides were consonantal. For example, in addition to the previously mentioned glide onsets which vary with fricatives, Thuan (2008) reports Falam has two rising-sonority diphthongs /ia ua/ which can occur without onsets, as in *uam*^{23} 'to ferment'. The analysis of diphthongs is further explored in Section 5.2.

4.7 Summary

Diachronic and synchronic evidence from Chin languages reveals that while stops, fricatives, nasals, liquids, and glides are all likely treated as single segments across Kuki-Chin, affricates show a more complicated picture. In Maraic languages where the most syllable structure simplification has occurred, affricates are more easily analyzable as single segments, yet especially in Southern languages, some of which show free variation between clusters and affricates, it may be the case that affricates are treated as two segments phonologically. Because of how this cline of phonological reduction plays out across Kuki-Chin, these languages offer rich ground for future research on cluster simplification and the phonological treatment of sibilant and lateral affricates.

5 Rhymes

The inventory of PKC rhymes has remained largely stable in the Central Chin languages, especially Hakha Lai, but has seen innovation in the other subgroups including reduction of consonantal and length contrasts, expansion of the vowel

and diphthong inventory, complication of tonal inventories, and development (and loss) of vowel nasality. PKC and nearly all modern Kuki-Chin languages show the "syllable-and-a-half" structure that Matisoff (1989) calls the "bulging monosyllable" or the "sesquisyllable". In sesquisyllabic words, a stressed "major syllable" is preceded by a short, unstressed C or CV "minor syllable" (also called a reduced, pre-, or semi-syllable), resulting in an iambic (unstressed-stressed) word structure.[10] Major syllable rhymes in PKC had access to a five-vowel system /*i *e *a *o *u/ with length contrasts in closed syllables only. Syllables could be closed in a stop /*p *t *k *ʔ/, nasal /*m *n *ŋ/, liquid /*l *r/, or glide /*w *j/; short vowels followed by sonorants are sometimes described as "glottalized sonorants" in PKC's many daughter languages. PKC rhymes also had lexical tone, at least in nouns (Van Bik 2009). Kuki-Chin minor syllables show reduction in available rhymes, onsets, and tones. Vowel quality in major syllables is discussed in Section 5.1, diphthongs and triphthongs in Section 5.2, and coda consonants in Section 5.3. Glottal stops and glottalized sonorants receive special attention in Section 5.4. Segmental and suprasegmental inventory reduction in minor syllables is discussed in Section 5.5, and Section 5.6 summarizes this section.

5.1 Vowel quality in major syllables

The vowel inventory reconstructed for PKC includes the standard /*i *e *a *o *u/, two diphthongs /*ia *ua/, and length distinctions in closed syllables. All of these have been largely maintained in Kuki-Chin languages, with some innovations. In the Central languages, Hakha retains the 5 PKC vowels /i e a o u/ and the length contrast in closed syllables (Melnik 1997) with vowel quality reduction in closed syllables, most notably /a/ which is often phonetic [ə]. Hmar is reported to contain /i e a ɔ u/, all with short and long variants, as well as a short diphthongal [ou] which is represented orthographically as <o>; Hmar's numerous other diphthongs and triphthongs are analyzed as phonologically long (Dutta Baruah and Bapui 1996). Northern languages pattern similarly, retaining PKC quality and length contrasts, and sometimes adding a sixth quality. Paite contains /i e ə a o u/, all of which – including schwa – can be short or long (Singh 2006), while Sizang has an additional rounding contrast in mid back vowels /i e a ɔ o u/ (Stern 1963). The "Old Kuki" language Monsang has /i e a o u/ plus /^{w}u ɘ/, with length contrasts in /i a u/ only.

10 Matisoff (1989) also describes CVN semi-syllables, which are not discussed here since they are not reported in any Kuki-Chin language.

Southern languages often feature expanded inventories. Hyow has a 9-vowel system /i e a o u/ plus /æ ʉ ɘ ɔ/ (Zakaria 2017) while Daai has /i e a ɔ u/ plus /ɛ ə ɯ/ (So-Hartmann 2009). Some Maraic languages have innovated additional rounding contrasts, presumably through coalescence of diphthongs. Mara has an 8-vowel system /i y e ø ɨ ɑ o u/ as well as lowered versions of /i ɑ u/ in closed syllables and weak prosodic positions, such as the first syllable of an iamb (Arden 2010). In our work with speakers of two dialects of Zophei, we find that Tlawngrang Zophei has a 6-vowel system /i e ø a o u/ while Lawngtlang Zophei has an 8-vowel system consisting of the standard /i e a u/, the rounded front vowels /y ø/, and the high central vowels /ɨ ʉ/ (the latter is produced with labial frication similar to [v], a phenomenon also observed in Lutuv). Our work with Hnaring Lutuv reports a 10-vowel system /i y e a ɔ o u ɨ ʉ ə/ with no length contrasts in major syllables.

Debate about vowel length and quality distinctions in Kuki-Chin abounds, with the length contrast sometimes described as a quality contrast (e. g. /i ɪ/ instead of /ii i/). Furthermore, pilot perceptual data suggests that listeners from different Hakha Lai dialects may differ in whether they use vowel quantity (Thantlang variety) or quality (Hakha variety) as their primary cue to this contrast (Mortensen and Van Bik 2002). In what has become a standard refrain, we note that acoustic and perceptual work on Kuki-Chin languages is sparse and will greatly inform future discussion of these and other questions.

5.2 Diphthongs and triphthongs

Diphthongs are characterized phonetically by formant movement between two vowels, but their underlying structure is subject to inter- and intra-language variation. Van Bik (2009) only reconstructs two diphthongs for PKC /*ia *ua/ and two triphthongs /*uai *iau/, which he analyzes as VVC (i. e. /*uaj *iaw/). Only those beginning in /u/ are reconstructed in initial position as in **ʔuaŋ/*ʔuan* 'to brag.I/II'.[11] As mentioned above, PKC also had initial glides as in **waaŋ* 'breadth'. The key to reconstructing the /*ʔua/ vs. /*wa/ contrast is that languages like Hakha Lai kept the vocalic status of the former in *ʔùang/ʔŭang* 'to brag.I/II' while the latter followed the consonantal development from /*w/ to /v/, as in *vâaŋ* 'breadth, width'. This differential treatment suggests a difference between VV /*ua/ and CV /*wa/ existed in PKC. Intra-language differences in the phonological treatment of surface diphthongs are discussed by Pike (1947), who used stress

11 Van Bik's (2009) analysis is that all PKC syllables begin with a consonant, in these cases /*ʔ/, following Melnik's (1997) analysis of Hakha Lai.

patterns to show that some English diphthongs like [o^{u}] and [e^{i}] pattern as single segments (phonological /o/ and /e/) while others like [aɪ] and [aʊ] pattern like two segments. Such variation leads to the following questions: Are diphthongs phonologically one segment or two? If they are two segments, are both segments vowels (VV) or is one a consonant (CV for rising sonority diphthongs like /ia ua/ and VC for falling sonority diphthongs like /ai au/)?

Differential phonotactic treatment of diphthongs within a language may provide evidence of underlying phonological differences. Melnik (1997) reports that Hakha Lai has eleven diphthongs /ei ai oi ui eu au ou ia ua ie/ but only three show a length distinction /aai ooi aau/. This limitation suggests either that those three diphthongs are phonetically diphthongal rather than true diphthongs (e. g. long vowels with offglides, [aa^{i} oo^{i} aa^{u}]) or that they have an underlying VVC structure (/aaj ooj oow/). Either is preferable to the alternative analysis, which would stipulate that VVV structure is available only to /aai ooi aau/ and the two triphthongs /uai iau/. According to Thuan (2008), all Falam Lai diphthongs (both rising and falling sonority) may occur in syllables closed in a glottal stop /ʔ/, but long vowels may not. This patterning could reveal that apparent diphthongs in Falam (e. g. [au] or [ua]) are not phonologically VV (e. g. /au aa^{u}/ or /ua ^{u}aa/) but are phonologically V, VC, or CV (e. g. /a^{u} aw/ or /^{u}a wa/). Sorbung and Paite also show evidence of two categories for diphthongs. Sorbung rising sonority diphthongs /ia ua/ (as well as the height-harmonic /iu/) may occur in closed syllables, but falling sonority diphthongs /ai au/ cannot (Mortensen and Keogh 2011). The same is reported for Paite, which also shows differential treatment of its two triphthongs /iai uau/; only /uau/ can be followed by a glottal stop (Singh 2006).

Diachronic and synchronic evidence shows processes that expand and reduce the inventory of diphthongs across Kuki-Chin. Falling sonority sequences can often be linked diachronically to PKC rhymes closed in a liquid, such as **khur/*khor* 'hole' which corresponds to Mindat Cho *khui* 'hole' (Van Bik 2009) and Tlawngrang Zophei *khaù* 'hole'. Monophthongization is also widely reported: for example, Mara diphthongs surface when words are spoken in isolation but are monophthongized in running speech (Arden 2010). Thuan (2008) also reports that in Falam, diphthongs coalesce in certain contexts. Both processes can be seen playing out in Zophei. Tlawngrang Zophei has both monophthongal /oo/ and diphthongal /au/ as in *poó* 'father' and *hmaú* 'lips' whereas the more innovative Lawngtlang dialect has only /au/, which can be seen in *paú* 'father'. The Tlawngrang /au/ has been monophthongized in Lawngtlang to /uu/, as in *hmuú* 'lips', suggesting both are vocalic. Taken together, the chain shift between dialects is /oo/ ≫ /au/ ≫ /uu/ with diphthongization of the /oo/ and monophthongization of the /uu/ (Lotven and Berkson 2019). Since Tlawngrang Zophei /au/ often corresponds to PKC /*ur

*or/, as mentioned above, we observe a transition from consonantal to vocalic, in this case /*or/ ≫ /au/ ≫ /uu/. This situation exemplifies the cline that plays out across Kuki-Chin where more clearly VC sequences are reinterpreted diachronically as more clearly VV, yet this leaves the phonological treatment of glides variable within and between languages. Continued research on phonotactic restrictions and diachronic changes will continue to inform our understanding of diphthongs in Kuki-Chin.

5.3 Codas

PKC is reconstructed with coda stops, nasals, liquids, and glides /*p *t *k *m *n *ŋ *l *r *j *w/. Glides are discussed in Section 5.2, and the glottal stop in Section 5.4. This section describes the loss of coda consonant contrasts from the most conservative coda systems in Central Chin to the most innovative in Maraic.

Central Chin languages such as Hakha Lai (Melnik 1997), Falam Lai (Thuan 2008), and Mizo (Chhangte 1986) as well as the Northern Chin language Zahau (Button 2011) retain all PKC codas /p t k m n ŋ l r/. Northern languages exhibit further reduction: Tedim and Sizang have lost the rhotic, retaining /p t k m n ŋ l/; Thado and Zo retain only a two-way stop contrast in coda place /p t m n ŋ l/ (Button 2011). So-Hartmann (1988) lists Matu as the only Southern Chin language with a coda liquid, but it lacks the labial stop /t k m n ŋ l/. Nghmoye, Ngmüün, and Mkaang maintain the 3-way place contrast in stops but have no final liquid /p t k m n ŋ/. Khomi maintains the velar stop and a three-way contrast in nasals /k m n ŋ/, and Kemi (Stilson 1866) allows only two nasals /n ŋ/ to occupy coda position. The "Old Kuki" language Monsang has coda /m n ŋ r/, merging /l/ and /r/ (Konnerth 2018).

Maraic languages show the most reduction in coda consonants. Coda stop reduction from /p t k/ to /ʔ/ partially defines the Maraic subgroup (Van Bik 2009) and is also found in Monsang (Konnerth 2018). Senthang permits only nasals and maintains a 3-way place contrast /m n ŋ/ (Par 2016). Zophei and Lutuv allow only the velar nasal /ŋ/, and additional reduction in the number of VN rhymes is observed. Lawngtlang Zophei has 5 VN rhymes /iŋ eŋ aŋ oŋ uŋ/. The more conservative Tlawngrang Zophei (see Section 5.2) has only 4, having lost /eŋ/ in favor of /ai/ (e. g. Lawngtlang *pèŋ* and Tlawngang *pài* 'blanket'). Hnaring Lutuv has only /iŋ oŋ əŋ/, where /oŋ/ as in *lòŋ* 'rock' corresponds to Zophei (both varieties) /uŋ/, as in *lùŋ* 'rock'; and Zophei words (both varieties) with /oŋ/ correspond with Lutuv /ɔɔ/ (e. g. Zophei *toŋ* vs. Lutuv *tɔɔ* 'meet'). If Mara and Zotung have any available coda consonant, it is only /ʔ/. Nasal codas

were lost in Zotung in favor of phonemic nasalized vowels (Shintani 2016). According to Löffler (2004), Old Mara (reconstructed from synchronic dialect comparison) also innovated phonemic nasalized vowels which are lost in synchronic dialects, often in favor of diphthongs (e. g. Löffler reconstructs Old Mara /*u *ũ/ as corresponding with /u ou/ in modern Mara dialects).

From this overview, the general trend seems to be first the loss of liquid contrast, then a loss of liquids and/or some place contrasts in stops, then stop place contrasts altogether, then all stops, then one or more place contrasts in nasals, then all nasals in favor of nasal vowels, then loss of vowel nasality. It is also worth noting that the Maraic languages, though lacking many coda contrasts, have among the most complex tone systems in Kuki Chin with 3 tone registers (High–Mid–Low) described for Senthang (Par 2016) and Mara (Arden 2010), though whether such tonal complications are due to diachronic changes to codas, onsets, or other factors is as of yet largely unexplored. The trends outlined here are partially illustrated in Table 2, which reviews the sonorant onset and coda contrasts available in several Kuki-Chin languages. Included are sounds that are often analyzed as glottalized sonorant codas which are discussed in Section 5.4.

Table 2: Sonorant onset and coda inventories in several Kuki-Chin languages.

		Central	Maraic		Southern
		Hakha	Zophei	Lutuv	Matu
ONSET	RETAINED	m hm n hn ŋ hŋ l hl r hr	m hm n hn ŋ l hl r hr	m hm n hn ŋ l hl r hr	m hm n hn ŋ l hl
	LOST		hŋ	hŋ	hŋ r hr
CODA	RETAINED	m mʔ n nʔ ŋ ŋʔ l lʔ r rʔ	ŋ	ŋ	m n ŋ l lʔ
	LOST		m mʔ n nʔ ŋʔ l lʔ r rʔ	m mʔ n nʔ ŋʔ l lʔ r rʔ	mʔ nʔ ŋʔ r rʔ

5.4 Coda glottal stops and glottalized sonorants

The analysis of coda glottal stop in Kuki Chin languages is of interest because both phonetic (i. e. epenthetic) and phonological (i. e. underlying) glottal stops are reported in the various Kuki-Chin languages, with some languages allowing glottal stops to accompany sonorants in coda position. Final glottal stops are reported in every Kuki-Chin language, even in Zotung (Shintani 2016) and Mara (Arden 2010), both Maraic languages which ban lingual coda stops /p t k/ but have the structures CVV and CVʔ. However, no Kuki-Chin language is reported

to have contrastive vowel length in syllables closed in a glottal stop (i. e. CVʔ vs. CVVʔ), not even those making use of a length contrast in syllables closed with oral stops like Hakha Lai, which allows CVVp, CVVt, and CVVk but not *CVVʔ. That coda /ʔ/ does not pattern with other stops suggests that it is not a coda consonant, but rather part of the phonetic realization of phonological vowel length, quality, or tone.

Some Kuki-Chin languages also allow coda sonorants to be pre- or post-glottalized, where glottal features are variably analyzed as phonological (i. e. as a feature of certain phonemes /ˀn ~ nˀ/ or as a consonant cluster /ʔn ~ nʔ/) or as phonetic (i. e. the realization of a syllable closed in a sonorant and containing either a short vowel, a vowel with centralized quality, or a certain tone). Central Chin languages, having the most conservative rhyme inventories, tend to allow more glottalized sonorant codas, but the phenomenon has been reported in all subgroups. Hakha Lai allows all sonorant codas to be glottalized /lʔ rʔ mʔ nʔ ŋʔ/, and also allows vowel length contrasts in syllables closed with stops (Lalremzami 2011). Hyman and Van Bik (2002b) make explicit the link between vowel length and glottalized sonorants; they describe the Hakha Lai contrast as one of vowel length, noting that the contrast occurs only in closed syllables and referring to sonorants in short syllables as "glottalized". Thuan (2008) analyzes Falam Lai as having only /lʔ rʔ jʔ wʔ/ but also reports vowel length contrasts in syllables closed with stops and nasals. A similar situation is reported for the Southern Chin language Daai, though So-Hartmann (2009) analyzes the contrast in terms of closed syllable vowel length. Other languages are more limited. The Southern language Matu allows a single glottalized sonorant coda, /lʔ/ (Shintani 2015; Hoffmann 2018), as does the Northern language Paite (Singh 2006).[12] The only reported Maraic language with a glottalized sonorant coda is Senthang, which boasts only /mʔ/ (Par 2016). Codas containing glottalized sonorants do not show a vowel length contrast in any reported Kuki-Chin language (e. g. *CVVlʔ) and restriction of glottal stop to short syllables suggests that it is not phonemic but may be a by-product of a different contrast (e. g. vowel length, quality, or tone).

Glottal stops can also have morphological importance, especially in the verb stem alternations described for many Kuki-Chin languages – for example, Hakha Lai in Hyman and Van Bik (2002b), and Senthang in Par (2016) – which illustrate the usefulness of a phonemic analysis for glottal stop. Zakaria (2017) gives evidence that the Hyow grammatical glottal stop acts as a phoneme, while other glottal stops in Hyow do not. For example, glottal stop marks the stem alternation for the verb 'to pick up' *kól* (stem I) and *kóʔl* (stem II). When

12 Given unclear results related to vowel duration in Matu, additional investigation is warranted (Hoffmann 2018).

combined with the departive marker *-âl*, the stem II *kó?l* is resyllabified as *kò?-lâl*, retaining the final (morphological) glottal stop. When the glottal stop carries no grammatical importance, it can be deleted during resyllabification, as in *phámphé?y + ŝng* 'broom + (inessive locative case)' which is resyllabified as *phámphé-yŝng*. This observation reveals potentially divergent treatment of glottal stops even within a language.

Inter- and intra-language analyses of vowel length and glottalized sonorants in Kuki-Chin closed syllables vary, and the phenomenon is of typological interest since Maddieson (2004) illustrates that this contrast plays out in Hakha Lai as only a small syllable duration difference. Specifically, long syllables closed in a sonorant have phonetically longer vowels and shorter rhymes, while short syllables closed in a sonorant have phonetically shorter vowels and longer rhymes. As mentioned in Section 5.1, such length contrasts have also been analyzed in terms of vowel quality, and Chhangte (1986) hypothesizes that this contrast is fruitfully analyzed in terms of tone in Mizo, with Low tone contrasting with glottalized Low tone. Analyses where glottalization/creaky voicing are considered part of the phonological tone system have been discussed for other languages, such as Burmese and Vietnamese (Yip 2002).

The link between glottal stop and tone category has been variably reported for Hakha Lai. Lehman (1973), in arguing for the predictability of Hakha Lai tone patterns on the basis of rhyme length, groups CVVC, CVVN, and CVVL syllables with CVN? and CVL? syllables (for Lehman, ending in sonorant-glottal stop clusters) to make up the class of long syllables. Long syllables contrast with the short syllable class: CVV, CVC, and CV? major syllables as well as CV proclitic minor syllables. Lehman's analysis relies on tone but argues glottal stop can be found in both tonal categories (e. g. short CV? vs. long CVN?). Hyman and Van Bik (2002a), on the other hand, include 3 syllable categories in their tone analysis of Hakha Lai: smooth syllables (CVV, CVC, and CVVC where C is a sonorant), checked syllables (CVC where C is an oral or glottal stop and CVVC where C is an oral stop or glottalized sonorant), and reduced syllables (CV). Differing analyses suggest possible variation in the treatment of the glottal stop by tonal processes even within the same language.

In sum, final glottal stops are a central feature of the Kuki-Chin syllable. Their analysis as phonetic or phonological varies within and between languages, with the contrast variably reported as consonantal, vocalic, or tonal, and future phonological and phonetic studies will continue to illuminate the nature of this contrast.

5.5 Minor (or reduced) syllables

The term "minor syllable" itself was coined by Henderson (1952) in describing those Cambodian syllables that lack the full set of segmental and suprasegmental contrasts available to "major syllables". The nature of this reduction is both phonological and phonetic. Kuki-Chin languages often allow fewer consonantal, vocalic, and tonal contrasts in reduced syllables than in major syllables, and minor syllables are produced with lower amplitude and shorter duration than their major syllable counterparts. Thomas (1992) describes a range of attested semi-syllable types: C-only, Cə (with no vowel contrast), CV (with a reduced vowel inventory), and unstressed CVC. The first two types generally are termed "pre-syllable" and the latter two "minor syllable". This distinction highlights that C and Cə syllables can be described as an underlying consonant, with or without an epenthetic vowel, whereas reduced CV and CVC syllables act like full syllables that are reduced due to prosodic position – in these iambic languages, that position is the left edge of the prosodic word.

Onset inventory reduction in minor and pre-syllables is reported especially for Southern Chin languages. So-Hartmann (2009) describes these "presyllables" as weakly stressed, taking the form of a syllabic nasal /m n ŋ/ (whose identity is lexically not phonologically determined), /ə/, or /ʔ/. Most varieties, such as Daai, Nghmoye, Ngmüün, Chinpon, Matu, Khomi, and Wakung, show a reduced inventory of pre-syllable (C-only) consonants. Chinpon allows only /m/; Nghmoye and Ngmüün allow /ʔ m ŋ/; Matu allows /p n ŋ/; Wakung allows /t k m/; and Khomi allows /p t k/ (So-Hartmann 1988). Baclawski (2012) notes that Hyow has lost nasal and glottal presyllables available to other Southern Chin languages but has retained plosives and fricatives. This reduction of contrasts has not been widely reported for CV-type minor syllables in Kuki-Chin but merits further investigation.

Vowel quantity and quality reduction as well as tonal reduction are also reported for Kuki-Chin minor syllables. Vowel quantity reduction in Hakha Lai is synchronic in compounding, where CVV syllables on the left edge of a compound are reduced to CV, as in *di ʔîn* 'thatch house' (from *diî* 'thatch' and *ʔîn* 'house'). CVN syllables in the same position are unreduced. Such positional reduction deletes the tone of the reduced syllable, and minor syllable tone does not participate in tonal phonology through conditioning or being conditioned by any phonological process (Hyman and Van Bik 2002a). Centralization of short vowels is also reported, although such reduction has not been investigated in minor syllables specifically (Mortenson and Van Bik 2002). In some cases, minor syllable vowel identity is dependent or fixed, in which case it is possible to describe the vowel as epenthetic. In Hyow some pro-clitics undergo vowel

harmony, for example the vowel in the 1st person possessive is dependent on the following major syllable vowel in *ká-lá* 'my land', *kɔ́-tsɔ̂* 'my son, and *kú-tsúhnú* 'my daughter' (Zakaria 2017). In Sorbung, a language of Manipur possibly related to the "Old Kuki" branch of Kuki-Chin, /ə/ is the only available vowel in minor syllables, which lack the three-way tone contrast of full syllables (Mortensen and Keogh 2011). The fact that reduced vowels in compounds cannot readily be analyzed as epenthetic, while those in certain clitics can, suggests the need to tease apart the two phenomena in future research.

Phonetic and phonological reduction in minor syllables may also lead to onset cluster complexification. Van Bik (2009) reconstructs the word **s^haa p^hruu* 'pangolin' in PKC – in Mara and Hakha, we find *sa-phùu*, but in Khumi, which has retained r-clusters, we find *sphruu*. This effect may be more widespread. Our Tlawngrang Zophei data finds *sa tleé poó* 'boyfriend' variably pronounced with or without the initial minor syllable vowel. This type of vowel devoicing/deletion is a fruitful topic for future research, as Kuki-Chin languages are ripe with potential data for the study of the relationship between iambic structure, positional phonological contrast reduction, and onset complexification.

5.6 Summary

While Southern Chin languages have shown the most conservative onsets in Kuki-Chin, the most conservative rhyme systems belong to the Central Chin languages. Maraic again shows the most innovation. Languages with the most rhyme types show coda stops, nasals, liquids, and glides with lexical tone and at least five monophthongs, as well as various diphthongs and triphthongs. In addition, many languages show a contrast in syllables variably described in terms of a segmental contrast involving final /ʔ/, a vowel quality or quantity contrast, or a tonal contrast. Those more innovative languages without coda consonants have developed additional vocalic, tonal, and vowel nasality contrasts. The many rhyme types available to full syllables are unavailable to minor syllables, which show segmental and suprasegmental contrast reduction and vowel devoicing. In some cases, that reduction appears to lead to onset complexification.

6 Conclusion

Kuki-Chin languages offer a myriad variations on the diachronic process of syllable structure simplification, presenting opportunities for its continued study, most notably because phonological changes have not proceeded in a

uniform direction. While Southern Chin languages held onto PKC complex onsets (with some languages even complexifying the system) and lost rhyme contrasts, Central Chin languages saw onset simplification while largely retaining rhyme contrasts. Northern Chin languages saw some reduction in both categories and Maraic languages have seen the most reduction overall, some with no coda consonants at all. Reduction in consonantal contrasts have in some cases led to category mergers, and in other cases to innovated contrasts in vowel qualities, tones, and nasality.

Certain issues that arise in surveying syllables in Kuki-Chin merit further investigation, especially those where inter- and intra-language variation is reported. Onset consonant cluster simplification, most notably the reduction from Cl- clusters to /tl thl/, requires further study since cognate forms are clearly two segments in Southern Chin varieties (as is reconstructed for PKC) and likely single segments in the Maraic varieties. Synchronic phonological patterning of /tl thl/, particularly in Central Chin languages, will further elucidate this process. Glides pattern in some cases as consonantal and in some cases as vocalic, and differences within and between languages in glide patterning may reveal which languages allow complex onsets and codas, and which do not. Variations in glide treatment are also relevant to the question of whether Kuki-Chin syllables have obligatory onsets, making phonemic /ʔ/ or epenthetic [ʔ] necessary for apparent vowel-initial syllables. The relationship between reduced coda inventories and onset clusters needs to be investigated, especially for the Southern Chin languages, in light of the Split Margin approach to the syllable which predicts a specific relationship between them (Davis and Baertsch 2011).

Issues related to consonant clusters over a syllable boundary, and indeed syllable contact in general, are not discussed in this paper. Also, of interest for future work is the issue of final glottal stops and glottalized sonorants, which may be treated as a contrast between segments (e. g. between plain and glottalized segments) or between singletons vs. clusters (e. g. /m/ vs. /mʔ/), or as a contrast along some other dimension (e. g. vowel length, quality, or tone). Further, the phonological patterning of these contrasts may vary between and within languages. Kuki-Chin languages also show an array of minor syllable phenomena including contrast reduction and vowel devoicing, which may lead to onset complexification and is worthy of further research.

Studies on Kuki-Chin are not large in number, and for those languages fortunate enough to see even minimal linguistic description, topics are divided across the many linguistic disciplines, making systematic cross-linguistic study difficult. It is our hope that this paper will help inform future research by highlighting relevant issues in the syllable structure of Kuki-Chin languages.

Appendix

A Languages and sources

Language	Subgrouping	Source(s)
Asho	Southern	Houghton 1892; Van Bik 2009
Bawm	Central	Reichle 1981
Chinpon	Southern	So-Hartmann 1988
Daai	Southern	So-Hartmann 1988, So-Hartmann 2009; Van Bik 2009
Falam Chin	Central	Mortenson and Van Bik 2002; Thuan 2008; Van Bik 2009
Hakha Chin (Hakha Lai)	Central	Melnik 1997; Mortenson and Van Bik 2002; Hyman and Van Bik 2002a; Hyman and Van Bik 2002b; Maddieson 2004; Maddieson and Van Bik 2004; Van Bik 2009; Lalremzami 2011; Peterson 2017b; Smith 2018
Hmar	Central	Dutta Baruah and Bapui 1996
Hyow	Southern	Baclawski 2012; Zakaria 2017
Kemi	Maraic?	Stilson 1866
Khomi/Khumi	Southern	So-Hartmann 1988; Van Bik 2009
Lutuv (Lautu)	Maraic	*primary data, fieldwork*
M. Cho	Southern	Jordan 1969; Van Bik 2009,
Mara	Maraic	Thang 2001; Van Bik 2009; Arden 2010
Matu	Southern	So-Hartmann 1988; Shintani 2015; Hoffmann 2018
Mizo	Central/ (Northern)	Chhangte 1986; Button 2011
Monsang	"Old Kuki"	Konnerth 2018
Mkaang	Southern	So-Hartmann 1988
Nghmoye	Southern	So-Hartmann 1988
Ngmuun (Ngmüün)	Southern	So-Hartmann 1988
Paite	Northern	Singh 2006
Senthang	Maraic	Par 2016
Sizang	Northern	Stern 1963, Button 2011
Sorbung	"Old Kuki"	Mortenson and Keogh 2011
Tedim	Northern	Van Bik 2009; Button 2011
Thado (Kuki)	Northern	Van Bik 2009; Button 2011
Wakung	Southern	So-Hartmann 1988
Zahau	Northern	Button 2011
Zo	Northern	Button 2011
Zophei	Maraic	*primary data, fieldwork*
Zotung	Maraic	Shintani 2016

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