WEST-CENTRAL THAILAND PWO KAREN PHONOLOGY[1]

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Abstract

West-Central Thailand Pwo Karen (Karenic, Tibeto-Burman) is one of several mutually unintelligible varieties of Pwo Karen found in Myanmar and Thailand. This paper represents an updated version of a phonological description (Phillips 2000). The study includes a comparison of the phonologies of Burmese Eastern Pwo Karen (Hpa-an and Tavoy) and the Thailand Pwo Karen varieties, West-Central Thailand Pwo Karen and Northern Pwo Karen. While the consonant inventories are similar, the vowel inventories exhibit diphthongization of some nasalized vowels. Also, some former nasalized vowels have lost their nasalization. This denasalization is most pronounced in the Burmese Eastern Pwo Karen varieties. Moreover, these varieties have either lost the two glottalized tones, or are in the process of losing them, while this process has only begun in West-Central Thailand Pwo Karen. In contrast, all six tones are present in Northern Pwo Karen.

Keywords: Karenic, Pwo Karen, phonology, nasalization, diphthongization, denasalization
ISO 639-3 codes: kjp, pww, pwo

1 Introduction

The Pwo Karen branch of the Karenic subgroup of the Tibeto-Burman language family is comprised of several mutually unintelligible language varieties. These varieties include Western, Eastern, and Htoklibang Pwo Karen in Myanmar (Kato 2009) and West-Central Thailand Pwo Karen (WCT Pwo) and Northern Pwo Karen (N. Pwo) in Thailand (Dawkins & Phillips 2009a).[2] In addition, the intelligibility status of other Pwo Karen varieties of northern Thailand, which are found in northern Tak, Lamphun, Lampang, Phrae, and Chiang Rai provinces, are not as certain (Dawkins & Phillips 2009b).

Table 1: *WCT Pwo Karen phonologies by area, north to south*

Location	Resources
Phop Phra District, Tak	(Noinaj 1996)
Sisawat district, Kanchanaburi	(Griffiths 1976); (Samermit 1983); (Phillips 2000)
Ban Rai District, Uthaithani	(Kaewsilpa 1982)
Suanpheung District, Ratchaburi	(Samranchit 1973)

Jones (1961) was the first to provide short phonological descriptions of both Bassein (Western) and Moulmein (Eastern) Pwo Karen. Kato (1995) has since described and compared the phonologies of one dialect of Western Pwo Karen (Kyonbyaw) and two dialects of Burmese Eastern Pwo Karen (Hpa-an and Tavoy). In addition, Kato (2009) provides a first description of the Htoklibang variety of Pwo Karen. On the Thai side, two dialects of Northern Pwo Karen have been described in Cooke et al. (1976) and

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[2] Pwo Karen speakers of Myanmar refer to the two main varieties of Pwo Karen in Myanmar as Western and Eastern Pwo Karen.

Phillips (2009), respectively. In addition, several phonological descriptions of WCT Pwo have been provided over the years, which describe the phonology by area, as detailed in Table 1.

WCT Pwo speakers live in southern Tak, Kanchanaburi, Uthaithani, Suphanburi, Nakhorn Pathom, Ratchaburi, Phetchaburi and Prachuapkhirikhan provinces. The population ranges anywhere from 20,000 (Tribal Research Institute 1986) to 500,000 (George Pierce p.c.). Dialectal variation studies of WCT Pwo show at least two major dialects (Phillips 1996). The northern variety is spoken in Kanchanaburi province and the southern variety is spoken in Ratchaburi, Phetchaburi and Prachuapkhirikhan provinces. The results of intelligibility testing in these provinces shows that the Sisawat, Kanchanaburi variety is the most widely understood throughout the testing area. As for southern Tak, Uthaithani and Suphanburi provinces, the Pwo Karen in Kanchanaburi report mutual intelligibility and the author has seen this demonstrated at meetings with Pwo Karen from these provinces. Between the dialects, phonological differences centre mainly in the vowels. No tonal variation has been observed and variation in the consonants is minimal. In terms of language use, the WCT Pwo are currently undergoing a profound shift from WCT Pwo to Thai, based on the belief that the only way to prosper is to abandon WCT Pwo and to speak Thai exclusively.

Thailand Pwo Karen locations are illustrated in Figure 1. In Figure 1, the Pwo Karen of northern Thailand comprise the Northern Pwo Karen, whose speakers reside in southern Mae Hong Son and Chiang Mai provinces. Other possible distinct varieties of Pwo Karen are found in the rest of northern Thailand. In contrast, the West-Central Thailand Pwo Karen encompass at least two dialects, which are mutually intelligible with each other.

Figure 1: *Pwo Karen habitation in Thailand (Used with permission. Copyright 2008 SIL International)*
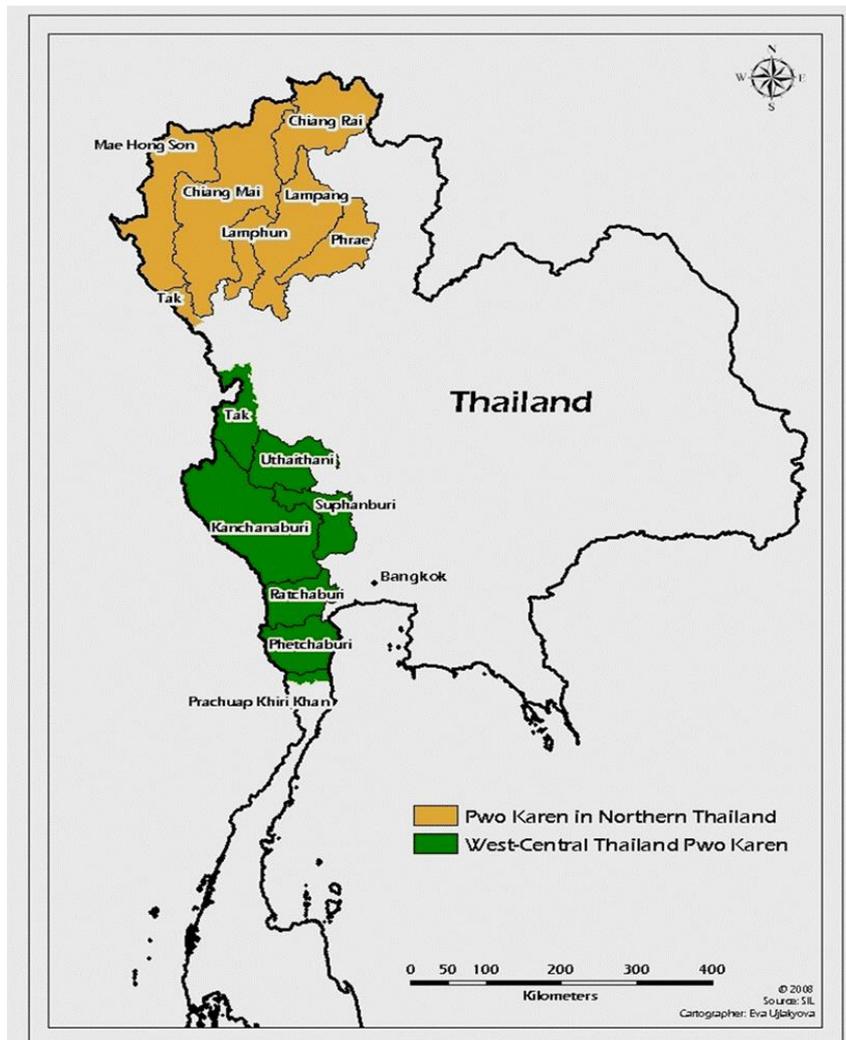
Figure 2 shows the locations of Pwo Karen centres in Myanmar. The two Burmese Eastern Pwo Karen phonologies in Kato (1995) describe the phonology of the Hpa-an Pwo Karen. In Figure 2, Hpa-an is located west of the Thai town of Mae Sot. The other Burmese Eastern Pwo Karen phonology is centred in Dawei (Tavoy), which is west of Bangkok. Western Pwo Karen is spoken near Pathein (Bassein), which is located west of Yangon.

Figure 2: *Pwo Karen locations in Myanmar³*

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³   This map was drawn with substantial help from Tyler Davis.

Data for this paper was collected at different times during language survey throughout Kanchanaburi, Ratchaburi, and Phetchaburi provinces, between 1992 and 1999. This was followed by a 20-month period of research in Plainaasuan village, Sisawat district, Kanchanaburi, under the auspices of the National Research Council of Thailand, 2000-2001. The lexical database consists of nearly 4000 words. The contents of this paper were first presented at the 33rd Sino-Tibetan Language and Linguistics Conference, Bangkok, Thailand, in October 2000. This study presents a reanalysis based on insights gained during the author's work on N. Pwo. Recordings of the WCT Pwo consonants, vowels, tones, and word structure can be found at DOI:10.5281/zenodo.1162502. Word lists of four WCT Pwo varieties, as well as some short texts, can be found in Phillips (1996).

The discussion begins in Section 2 with a description of the segmental phonemes, tones, and intonation. Word structure is the focus of Section 3, while Section 4 discusses similarities and differences between the phonological systems of the two varieties of Burmese Eastern Pwo Karen, WCT Pwo, and N. Pwo. The paper ends, in Section 5, with the conclusion and directions for further research.

2 WCT Pwo Karen phonemes

The phoneme inventory of WCT Pwo is standard for Pwo Karen languages. The vowel inventory includes both oral and nasal vowels, while the tonal system includes four modal and two glottalized tones. The discussion begins with the consonant phoneme inventory (§2.1), followed by vowels (§2.2), and then tones and intonation (§2.3).

2.1 Consonants

The WCT Pwo consonant phonemes are listed in Table 2, followed by examples of each phoneme. All of the WCT Pwo consonants have been reconstructed in Proto-Karen, except for /ɕ, x, ɥ/.

Table 2: *WCT Pwo consonant phonemes*

	Bilabial	Dental	Alveolo-palatal	Palatal	Velar	Glottal
Voiceless unaspirated stops	p	t	tɕ		k	ʔ
Voiceless aspirated stops	p^h	t^h	$tɕ^h$		k^h	
Voiced implosives	ɓ	ɗ				
Nasals	m	n			ŋ	
Voiceless fricatives		s	ɕ		x	h
Approximants	w	ɹ		j	ɥ	
Lateral approximant		l				

Below are examples of consonant phonemes.

/p/   voiceless unaspirated bilabial stop [p].
         /pî/ 'be.little', /pə̀/ '1.ACC.PL', /pè̆ⁱ/ 'tease', /plè/ 'allow' /pé/ 'CL.thread.hank'
/t/   voiceless unaspirated dental stop [t].
         /tè̆ⁱ/ 'do', /tú/ 'CL.pills', /téⁱˀ/ 'CL.week', /tɔ̂/ 'thick', /tə̀/ 'basket'
/tɕ/   voiceless unaspirated alveolo-palatal stop [tɕ].
         /tɕí/ 'left', /tɕè̆ⁱ/ 'walk', /tɕɔ̃̀/ 'tie', /tɕó/ 'be.wet'
/k/   voiceless unaspirated velar stop [k].
         /kwè/ 'play', /ké/ 'be.difficult', /kə́/ 'lamp', /kɨ̄/ 'INTENS', /kè̆ⁱˀ/ 'cough', /kē/ 'be'
/ʔ/   glottal stop [ʔ].
         /ʔɤ́/ 'be.much', /ʔē/ 'be.narrow'
/pʰ/   voiceless aspirated bilabial stop [pʰ].
         /pʰî/ 'rice.husk', /pʰə̀/ 'cooking.pot', /pʰè̆ⁱˀ/ 'skin', /pʰɨ́/ 'younger.sibling', /pʰíˀ/ 'weed', /pʰí̃/ 'pus'
/tʰ/   voiceless aspirated dental stop [tʰ].
         /tʰè̆ⁱ/ 'return', /tʰú/ 'bird', /tʰɔ̂/ 'gold', /tʰè̆ⁱˀ/ 'arrive', /tʰí̃/ 'CL.instance'
/tɕʰ/   voiceless aspirated alveolo-palatal stop [tɕʰ].
         /tɕʰí/ 'some', /tɕʰè̆ⁱ/ 'be.sour', /tɕʰɔ̂/ 'chicken', /tɕʰɤ́/ 'animal.feed'
/kʰ/   voiceless aspirated velar stop [kʰ].
         /kʰwè/ 'crawl', /kʰɤ́/ 'chin', /kʰə̂/ 'cutting.board', /kʰwì/ 'nine'
/ɓ/   voiced labial implosive [ɓ].
         /ɓè̆ⁱ/ 'pull', /ɓlè/ 'be.sated', /ɓè̆ⁱˀ/ 'massage', /ɓɨ́/ 'paddy.rice', /ɓí/ 'goat', /ɓé/ 'be.correct',
         /ɓɤ́/ 'CL.flat.thing'
/ɗ/   voiced dental implosive [ɗ].
         /ɗú/ 'hit', /ɗĕⁱˀ/ 'put.in', /ɗè̆ⁱˀ/ 'still', /ɗí̃/ 'egg', /ɗè̆ⁱ/ 'sesame.seed'
/m/   voiced bilabial nasal [m].
         /mə̀/ 'drunk', /mé/ 'tooth', /mɨ́/ 'be.female', /mí/ 'fire', /méⁱˀ/ 'be.well', /mè/ 'do:want'
/n/   voiced dental nasal [n].
         /nə̀/ '2.ACC', /néⁱˀ/ 'enter', /ní̃/ 'tube.skirt', /nɔ̃̀/ 'win'
/ŋ/   voiced velar nasal [ŋ]. Thus far, I have only discovered three instances of this phoneme.
         /ŋə̀/ 'fin:hackles', /ŋɔ̃́/ 'be.confused', /tʰɔ̃́mè̀ˀŋɨ́/ 'chant'
/s/   voiceless dental fricative [s̪ ~ θ].
         /sú/ 'sheep', /sɔ̂/ 'CL.night', /sí̃/ 'medicine', /sî̃/ 'die', /sí/ 'be.skilled', /sɔ̃̀/ 'three', /sɤ́/ 'fruit'
/ɕ/   voiceless alveolo-palatal fricative [ɕ].
         /ɕɔ̂/ 'be.poor', /ɕú/ 'lunge', /ɕɤ́/ 'star'
/x/   voiceless velar fricative [x].
         /xwì/ 'buy', /xɔ̂/ 'be.heavy', /xè̆ⁱˀ/ 'field', /xə̀/ 'mushroom', /xɤ́ˀ/ 'winnow'
/h/   voiceless glottal fricative [h]. This phoneme is rare.
         /hē/ 'dear'
/w/   voiced labial-velar approximant [w ~ v ~ β].
         /wé/ 'older.sibling', /wí̃ˀlɔ̃̀/ 'sweep', /wí̃/ 'first', /wɤ́/ 'NEG', /wɤ̃́/ 'fishnet'
/ɹ/   voiced alveolar approximant [ɹ]. This phoneme is rare.
         /ɹwí/ 'choose', /ɹéⁱˀ/ 'burlap.bag'
/j/   voiced palatal approximant [j].
         /jí/ 'some', /jè̆ⁱ/ 'pound', /jə̀/ '1.ACC', /jô/ 'be.easy', /jé/ 'fish', /jé/ 'five'
/ɰ/   voiced velar unrounded approximant [ɰ ~ w].
         /ɰɤ́/ 'evening', /ɰè̆ⁱˀ/ 'husk(v)', /ɰɔ̂/ 'hear', /ɰɨ́/ 'cleanse', /ɰə̀/ '1.ACC.PL', /ɰé/ 'be.spicy'
/l/   voiced dental lateral approximant [l].
         /lɔ̃̀/ 'at', /léⁱˀ/ 'completely', /lí̃/ 'four', /lè̆ⁱ/ 'motorcycle'

2.2 Vowels

The Pwo Karen vowel phonemes are of two types: oral and nasalized. Nasalized vowels /ĩ, ũ, õ, ɔ̃/ are articulated as steady-state monophthongs with strong nasalization, often involving a post-vocalic velar coda [Vŋ]. The remaining vowel positions /ɨ̃, ẽ, ɘ̃/ are diphthongized phonetically with weak nasalization and no postvocalic nasal effect. Finally, /õ/ is pronounced as [ɤⁱ], a non-nasalized diphthong, by younger speakers. Oral, nasal, and stop or glottal-final rhymes are reconstructed for Karen, including the diphthongs *-ai and *-aw (L-Thongkum 2014a).

The WCT Pwo vowel phonemes are listed in Table 3.

Table 3: *WCT Pwo vowel phonemes*

	Front	**Central**	**Back**	**Diphthongs**
Close	i ĩ	ɨ ɨ̃	u ũ	
Close-mid	e ẽ	ə ɘ̃	o õ	
Open-mid		ɐ	ɔ̃	ɐⁱ ẽⁱ ɐɨ

The following are examples of vowel phonemes.

/i/   Close front unrounded oral vowel [i].
     /mí/ 'fire', /míʔ/ 'eye', /pʰîʔ/ 'rice.husk', /pʰíʔ/ 'weed', /tɕì/ 'silver', /tɕʰí/ 'some', /ɗì/ 'navel', /lì/ 'go', /líʔ/ 'switch(for.spanking)'

/e/   Close-mid front unrounded oral vowel [ę ~ ɛ ~ æ].
     /mé/ 'tooth', /pʰê/ 'necklace', /nè/ 'believe', /ʔè/ 'garlic' /ɰé/ 'be.spicy', /tɕèʔ/ 'CL.bit', /kʰwé/ 'type.of.forest.fruit', /kʰwéʔ/ 'cup', /xèʔ/ 'be.careful'

/ĩ/   Close front unrounded nasalized vowel [ɨ̃ⁱ].
     /mĩ́/ 'alcohol.fruit', /nĩ́/ 'tube.skirt', /pʰĩ̂/ 'grandmother', /lĩ̀/ 'wind(n)', /tɕʰĩ́/ 'urine, /lĩ́/ 'four'

/ẽ/   Close-mid front unrounded nasalized diphthong [ẽⁱ].
     /mẽ́/ 'first', /nẽ́/ 'year', /sẽ́/ 'tree', /ɰẽ́/ 'house', /kʰẽ̂/ 'scale'

/ɨ/   Close central unrounded oral vowel [ɨ].
     /tɕʰɨ́/ 'write', /kʰɨ́/ 'CONT', /ɗɨ̀/ 'CL.animal', /pʰɨ́/ 'be.short'

/ə/   Close-mid central unrounded oral vowel [ə].
     /tɕʰə́/ 'mortar', /kʰə́/ 'dig', /nə̀/ '2.ACC', /ʔə̀/ '3.ACC', /pʰə̀/ 'cooking.pot', /tʰə́/ 'ant', /jə̀/ '1.ACC'

/ɐ/   Open-mid central unrounded oral vowel [ɐ].
     /lɐ̀/ 'moon', /nɐ̀/ 'CL.night', /ɕɐ́/ 'star', /ɕɐ́ʔ/ 'gold', /klɐ̀/ 'middle', /klɐ̀ʔ/ 'crow', /mɐ̂/ 'wife', /sɐ̀ʔ/ 'heart', /kɐ̀ʔ/ 'be.tight'

/ɨ̃/   Close central unrounded nasalized vowel [ɨ̃].
     /pʰɨ̂̃/ 'jump', /mɨ̃́/ 'be.female', /kʰɨ̃́/ 'wind(v)', /pʰɨ̃́/ 'younger.sibling'

/ɘ̃/   Close-mid central unrounded nasalized diphthong [ɘ̃ⁱ].
     /pʰɘ̃́/ 'CL.occasion', /sɘ̃́/ 'liver', /mɘ̃̂/ 'CL.thousand', /ɓɘ̃̀/ 'lime(betel.chewing)', /nɘ̃̀/ 'win', /pʰɘ̃̀/ 'inside'

/u/   Close back rounded oral vowel [u].
     /kʰú/ 'top', /kʰúʔ/ 'sting', /ʔù/ 'yonder', /ʔùʔ/ 'peel', /pʰú/ 'child', /pʰúʔ/ 'beat', /jū/ 'look', /kú/ 'sweets', /kúʔ/ 'every', /tʰùʔ/ 'pig'

/o/   Close-mid back rounded oral vowel [o ~ ɔ]. When stressed, /o/ is pronounced [ɔ]. For example, /jò/ 'this' is often pronounced [jɔ̀] when calling someone's attention to something you want to give them.
     /kʰó/ 'CL.hand', /ʔò/ 'drink', /lò/ 'tell', /lòʔ/ 'CL.ten.thousand', /pʰô/ 'flower', /pʰlò/ 'coconut', /ɗõ̀ʔ/ 'more:again'

/ũ/   Close back rounded nasalized vowel [ũ].
     /pʰũ̂/ 'grandfather', /tʰũ̂/ 'roll', /jũ̄/ 'mouse', /kṹ/ 'be.round', /tʰũ̀/ 'bridge'

/õ/   Close-mid back rounded nasalized vowel [õ ~ ɤ̈]. Some words pronounced [õ] by older speakers are pronounced with the close-mid back unrounded diphthong [ɤ̈] by younger speakers. For example, [núʔtʰõ̂ / núʔtʰɤ̈̂] 'spoon'.
        /pʰõ̂/ 'raft', /tʰõ̂/ 'gold', /ɓõ̌/ 'CL.long.thin', /lõ̌/ 'chase', /pʰlõ̌/ 'Karen', /ɗõ̂/ 'place'

/ɔ̃/   Open-mid back rounded nasalized vowel [ɔ̃].
        /ɓɔ̃̌/ 'be.yellow', /lɔ̃̌/ 'down', /ɗɔ̃̀/ 'mountain.top', /nɔ̃́/ 'grass'

/ɐⁱ/   Open-mid central front unrounded oral diphthong [ɐⁱ]. The central front unrounded oral diphthong only occurs with the glottalized tones.
        /sɐ̀ⁱʔ/ 'liquor', /kɐ̀ⁱʔ/ 'kapok', /ɓɐ̀ⁱʔ/ 'massage', /tʰɐ́ⁱʔ/ 'cut', /pʰɐ̀ⁱʔ/ 'skin', /tɕʰɐ́ⁱʔ/ 'rice.field'

/ɐ̃ⁱ/   Open-mid central front unrounded nasalized diphthong [ɐ̃ⁱ].
        /mɐ̃̂ⁱ/ 'be.ripe', /ɓɐ̃̌ⁱ/ 'pull', /kɐ̃̌ⁱ/ 'be.achy, /tʰɐ̃̀ⁱ/ 'return', /nɐ̃̌ⁱ/ 'backbasket', /tɕɐ̃́ⁱ/ 'walk'

/ɐⁱ/   Open-mid central unrounded diphthong [ɐⁱ ~ əⁱ]. The open-mid central unrounded diphthong only occurs with the glottalized tones.
        /kɐ̀ⁱʔ/ 'cough', /çɐ́ⁱʔ/ 'be.busy', /ɓɐ̀ⁱʔ/ 'close', /tʰɐ́ⁱʔ/ 'ride', /jɐ̀ⁱʔ/ 'already'

2.3 Tone and intonation

The WCT Pwo tonal system consists of four modal tones and two glottalized tones, which exhibit final glottal closure. All six tones are contour tones. Thus, the IPA word accent marks are used just to label the tones and do not indicate the nature of the tone. Descriptions of the tones can be found with the examples of each tone.

     Although Haudricourt (1946) reconstructs three tones for Proto-Karen, two modal tones and one glottalized or checked tone, Haudricourt (1975), as well as Manson (2009; 2011) and Shintani (2012), reconstruct three modal tones (*A, *B, *B′ and one glottalized tone (*C). Manson (2017b:155) acknowledges that the *B′ tone is marginal, while Solnit (2013) considers the *B′ tone yet to be determined. In contrast, L-Thongkhum (2013; 2014a; 2014b) reconstructs two modal tones (*A, *B) and one glottalized tone (*D). Splits in these original three or four tones have yielded the current six-tone system in WCT Pwo.

     While acknowledging the wider acceptance of the Haudricourt (1975) four-tone reconstruction, L-Thongkum (2013) comments that the *B′ tone was reconstructed for only a few words. She also notes that the *B′ tone merges with the other three tones in all the modern Karenic languages. In any case, more data is needed to clarify the status of a *B′ tone. The L-Thongkum (2013; 2014b) account of the development of tones in WCT Pwo is detailed in Table 4.

Table 4: *The development of tones in WCT Pwo (L-Thongkum 2013; 2014b)*

	*A	*B	*D
1 (voiceless aspirated stops, voiceless nasals, fricatives, approximants)	53		
		45	21ʔ
2 (voiceless unaspirated stops, implosives, preglottalized nasals and approximants)	31		
3 (Voiced stops, nasals, and approximants)		33	45ʔ

In Table 4, there were three categories of initial consonants which influenced the split in the three original tones. Tone *A was split between high falling and low falling tones, Tone *B was split between the high and mid tones, and Tone *D was split between the low and high glottalized tones.

     Within the current WCT Pwo tonal system, there are no co-occurrence restrictions between tones and initial consonants. In addition, a rising intonation pattern has been observed for polar questions. The six phonemic tones of WCT Pwo are detailed in Table 5.

Table 5: *WCT Pwo tonemes*

Tone name	Tone symbol	Tone numbers
High rise	/ é /	45
Mid rise	/ē /	34
Low falling	/è /	21
High falling	/ê /	51
High glottalized	/ɛ́ˀ/	45ˀ
Low glottalized	/ɛ̀ˀ/	21ˀ

The following are examples of tonemes.

/ɛ́/   The high rising tone is pronounced with a rise from high to extra-high [45]. It co-occurs with oral and nasalized vowels.
/mí/ 'fire', /mɛ́/ 'be.wrong', /nĩ́/ 'tube.skirt', /tʰí́/ 'CL.instance'

/ē/   The mid tone is pronounced at mid-level with a slight rise before a slight fall [34]. It co-occurs with oral and nasalized vowels.
/ɯ̄ī/ 'rattan', /mī/ 'tail', /tɕʰə̄/ 'thing', /nĩ̄/ 'laugh:smile', /tʰō̃/ 'pound(mortar)'

/è/   The low falling tone begins a little lower than the mid tone and falls to low [21]. It co-occurs with oral and nasalized vowels.
/ɯ̀ì/ 'be.good', /mè/ 'do:want', /mì̃/ 'cooked.rice', /nì̃/ 'two'

/ê/   The high falling tone begins high and quickly falls to low [51]. It co-occurs with oral and nasalized vowels.
/mê/ 'wife', /tɕʰə̂/ 'be.sweet', /tʰî̃/ 'water', /mî̃/ 'sleep', /tʰỗ/ 'gold'

/ɛ́ˀ/   The high glottalized tone is pronounced with a rise from high to extra-high [45ˀ]. It co-occurs with oral vowels.
/mí́ˀ/ 'face', /tʰɛ́ˀ/ 'small.drum'

/ɛ̀ˀ/   The low glottalized tone begins low and falls lower [21ˀ]. It co-occurs with oral vowels.
/mìˀ/ 'box', /tʰɛ̀ˀ/ 'iron'

Finally, during interactions in the village, I have noticed that rising intonation (↗) can be used to indicate a polar question, instead of a final question particle, as illustrated in (1) – (3).

(1)   *ʔò   tʰî̃*   [ʔò tʰî̃↗]
       drink   water:liquid
       'Do you want a drink?'

(2)   *kʰùlè   nə̃̂*   [kʰùlè nə̃↗]
       foreigner   win
       'Did the foreigner win?

(3)   *nə=   mɛ́ⁱˀ   lô*   [nə=mɛ́ⁱˀ lo↗]
       2.NOM   be.well   !!
       'Are you well?

The polar questions in (1) – (3) are not indicated by a question particle. Instead, the interrogative status of these otherwise declarative sentences is indicated by rising intonation alone. This rising intonation seems to be a property of the clause and not a word, although further instrumental study is required.

3 WCT Pwo Karen word structure

All WCT Pwo syllables are open and of two kinds: reduced "minor" syllables and full "major" syllables. Minor syllables comprise a single consonant (C_I), with a non-contrastive vowel [ə] and no tonal contrast. They are bound forms which never occur word-finally. The WCT Pwo minor syllable can be diagrammed as C_I[ə]. These types of syllables are represented as C. in transcriptions; the C represents the consonant of the minor syllable and the period indicates a syllable break between the minor syllable and the following major syllable, as in *k.tɕʰi̋* 'sneeze'.

In many cases, minor syllables have no apparent morphemic status. For example, the first syllable of *p.nā* 'water.buffalo'. In other cases, the source is clear, as in *tɕʰ.tɕʰâ* 'disease:sick.one', which is composed of the nominalizing proclitic *tɕʰə =* 'NMLZ_thing' and the stative verb *tɕʰê* 'be.painful'. The proclitic, *tɕʰə =*, is a member of a large inventory of proclitic morphemes. These include most of the nominative pronouns and possessive determiners, along with *mə =* 'IRR' and *lə =* 'one'. After the predicate, the segmentally identical accusative pronouns are stressed with low tone. Thus, these pre-predicate reduced variants seem to be due to rhythmic patterns at the phrase and clause level in WCT Pwo. Donegan and Stampe (1983:345) suggest that most Southeast Asian languages have stress-timed rhythm, "an unmistakable symptom of which is the polarization of their accented and unaccented syllables into…"major" and "minor" types, the latter having a vowel we would call "reduced" in English."

In contrast, all consonants, vowels, and tones are possible in a major syllable, which is diagrammed as $C_I C_M V^T$. In the initial consonant position (C_I) any consonant is possible, while in the medial consonant position (C_M), only the liquids and glides /ɹ, l, j, w/ occur. Vowels (V) are either oral or nasal with no distinctive vowel length. The six distinctive tones (T) are high, mid, low, high-falling, high glottalized, and low glottalized.

The distinction between major and minor syllables and the way in which they combine in words is an areal feature of Mainland Southeast Asian languages (Matisoff 2001; Enfield & Comrie 2015). In WCT Pwo disyllabic words, two patterns are possible. The first pattern is a combination of two major syllables, as in *mĩ̄mí̓* 'sun' or *kʰúsũ̄* 'head.hair'. The second pattern is a minor + major syllable combination, as in *p.dê* 'rabbit' or *t.wɔ̂* 'village'. Matisoff (1973:86) characterizes these words as a syllable-and-a-half and calls them *sesquisyllables*.

In the literature, the term, sesquisyllable, has had several definitions and been used to name a variety of phenomena. Pittayaporn (2015) provides the most recent typology of sesquisyllabicity. In this typology, both complex onsets in monosyllables, or complex monosyllables, and sesquisyllables are considered. Furthermore, both are included in what Matisoff (1978; 2001) terms the *compounding/prefixation cycle*. This cycle characterizes a pattern of change in which complex monosyllables reduce to simple monosyllables. Then, to deal with the homophony that results, compounds are formed, comprising two or more syllables. The first syllable of this compound then reduces, yielding a sesquisyllable. The minor syllable of the sesquisyllable continues to reduce to a complex monosyllable and the cycle begins again.

Pittayaporn (2015:503) defines a sesquisyllable "as a prosodic word consisting of a full stressed syllable preceded by a consonant or sequence of consonants." Furthermore, any vowels that occur with these preceding consonant(s) are not phonemically contrastive. Then, languages are grouped based on whether they allow complex monosyllables and whether these complex monosyllables and sesquisyllables contrast. Based on these criteria, WCT Pwo fits within Type C, which includes languages that allow complex monosyllables with phonologically distinct sesquisyllables.

The WCT Pwo complex onset inventory is extensive, with obstruent, nasal, liquid, and glide initial consonants that occur with the medial consonants /ɹ, l, w, j/. The complex onsets in the data are exemplified in Table 6, along with the available Proto-Karen reconstructions. In the WCT Pwo column non-word-initial complex monosyllables are bolded. The S. Pwo column provides the L-Thongkum (2014b) transcription of S. Pwo, her designation for WCT Pwo. This is followed by the L-Thongkum (2014b) reconstruction in the Proto-Karen column. Greyed-out columns indicate that no data were available.

Table 6: *Complex onsets in WCT Pwo/S. Pwo and Proto-Karen*

	WCT Pwo	S. Pwo	Proto-Karen
pɹ	pɹɔ̂ 'thresh'		
pl	plò 'be.plain'		
pw	pwè^{i^ʔ}sè^ʔ 'be.tired'		
pj	pjù^ʔ 'vomit'	pju^{ʔ21}	*prɔ^{ʔD} 'vomit'
tw	k.mẽ̂ⁱtwè 'metal.bowl'		
kɹ	kɹṹtɕè̃ⁱtɕẽ̂ 'be.depressed'		
kl	mẽ̌lé^ʔ**klè̀** 'forest'	kla³¹	kla^A 'forest'
kw	kwè 'hive.bee'	kwɛ³¹	*k(h)wat^D 'bee (Apis cerana)'
kj	kjə̀sè^ʔ 'be.lazy'		
ʔw	ʔwí̃ 'be.tasty'	ʔwi⁵⁵	*ʔwi^B 'delicious'
	ʔwè̀ 'white'	kwa³¹	*ʔbwa^A 'white'
pʰl	pʰlố 'CL.body'	phlõu⁵⁵	*phloŋ^B 'clf. [-human, flat]'
pʰj	pʰjē̄ 'temple'		
tʰw	tʰwí̃ 'dog'	thwi⁵⁵	*thwi^B 'dog'
tɕʰw	tɕʰwé 'crab'	chwe⁵⁵	chwɛ^B 'crab'
kʰɹ	t.**kʰɹ**í^ʔé 'sugar'		
kʰl	kʰlú 'snail'	khlu⁵⁵	*khlo^B 'snail (land)'
kʰw	kʰwê 'be.male'	khwa⁵³	khwa^A 'man'
ɓɹ	ɓɹə̀ 'be.quick'		
ɓl	ɓlè 'be.sated'		
ɓj	ɓjɔ̂ 'treat'		
ɗw	ɗwè^ʔ 'pluck'		
ml	mlõ̂ 'elephant.trunk'	mlõ³¹	*k-mlɔN^A 'elephant.trunk'
mw	mwē̄ 'be.true'	mwɛ³³	*mwɛ^B 'yes'
mj	mjé^ʔɓố 'granule'		
nw	nwè 'seven'		
nj	njé 'Tuesday'		
sw	swí̃ 'blood'	θwi⁵⁵	*swi^B 'blood'
ɕw	ɕwémjù 'siblings'		
xw	xwí̃ 'bone'	xwi⁵⁵	*khrwit^D 'bone'
jw	jwè̀ 'mirror'		
wj	pʰútʰ.**wjɛ́** 'Wednesday'		
ɹw	ɹwí̃ 'choose'		
ɹj	tɕʰ.**ɹjɛ́**^ʔ 'kneading.bowl'		
lw	tʰú**lwí** 'dove'	~ lwi³³	*tho^B**lwi^B** 'dove'

In Table 6, WCT Pwo complex clusters are the same as Proto-Karen in some cases, whereas in other cases there is a change. For example, no change is observed between WCT Pwo *mᵉ̀lᵉ́ʔklᵉ̀* 'forest' and Proto-Karen *kla^A* 'forest' or WCT Pwo *ʔwᵢ́* 'be.tasty' and Proto-Karen **ʔwᵢ^B* 'delicious'. However, WCT Pwo *ʔwᵉ̀* 'white' is reconstructed as **ʔbwa^A* 'white', a more complex onset, while WCT Pwo *xwᵢ́* 'bone' is reconstructed as **khrwit^D* 'bone'. Finally, the vowel is raised and the medial consonant changes to /j/ from /*r/ between WCT Pwo *pjù^ʔ* 'vomit' and Proto-Karen **prɔ^ʔD* 'vomit'.

The pronunciation of WCT Pwo complex onsets can range from no transition to an epenthetic schwa transition and even the interpretation of the medial glide as the first member of a diphthong, especially with liquid or glide initial consonants. For example, *jwᵉ̀ [jᵊwᵉ̀ ~ jùᵉ]* 'flow'. The presence or absence of a transition in WCT Pwo complex onsets seems to be dependent to some extent on whether the complex onset adheres to the Sonority Sequencing Principle or not, which states that the least sonorous sounds (e.g. obstruents, nasals) occur at the edges of the syllable while the more sonorous sounds (liquids, glides) occur closer to the vowel (Selkirk 1984; Clements 1990). The Clements (1990:12) sonority scale assigns a number value to each sound type, as in Figure 3.

Figure 3: *Clements (1990) sonority scale*

Obstruents	Nasals	Liquids	Glides	Vowels
0	1	2	3	4

Thus, in Figure 3, the difference between the sonority of an obstruent and nasal is 1, while the sonority difference between an obstruent and a liquid is 2, and so on.

WCT Pwo exhibits sesquisyllables with initial consonants that do not necessarily follow the Sonority Sequencing Principle and/or they do not have a corresponding complex onset. For example, obstruent+ɥ onsets, such as *tɕʰ.ɥé* 'chili.pepper', obstruent+nasal onsets, such as *p.nã̂ⁱ* 'candle', and obstruent+obstruent onsets, such as *k.tɕʰɔ̂* 'elephant'. With no corresponding complex onset, these forms are clearly sesquisyllables.

In contrast, the syllable-initial consonants in other sesquisyllables pattern like complex monosyllables. With these pairs, it is necessary to determine whether the complex monosyllable and the sesquisyllable are phonologically distinct. In situations where the sonority distance between consonants is greater than 2, the contrast between the complex monosyllable and the sesquisyllable is clearer, since the complex onset is less likely to be pronounced with a transition. For example, *pɹɔ̂* 'thresh' and *p..ɹɔ̂* 'seek' or *ɓlᵉ̀* 'be.sated' and *ɓ.lᵉ̀* 'what'. For those complex monosyllables and sesquisyllables in which the sonority distance is less than 2, phonological contrast is less clear due to a likely transition between the initial and medial consonants of the complex monosyllable. For example, *jwᵉ̀* 'flow versus *j.wᵉ̀* 'my husband'. Instrumental research will be required to determine contrast in these cases.

The WCT Pwo complex onsets, sesquisyllables, and their sonority distance are tabulated in Table 7.

Table 7: *WCT Pwo complex onsets, sesquisyllables, and sonority distance*

Initials	Monosyllable	Sesquisyllable	Sonority distance
Single C	✓	✗	n/a
Obstruent+Glide	✓	✓	3
Obstruent+Liquid	✓	✓	2
Nasal+Glide	✓	✓	2
Nasal+Liquid	✓	?	1
Liquid+Glide	✓	?	1
Glide+Glide	✓	?	0
Obstruent+ɥ	✗	✓	2
Obstruent+Nasal	✗	✓	1
Obstruent+Obstruent	✗	✓	0

In Table 7, obstruent + glide and obstruent + liquid onsets have a sonority distance of 3 or 2 between the initial and medial consonants. Liquid + glide onsets have a sonority distance of 1, while glide + glide onsets have a sonority distance of 0. It is unclear whether complex monosyllables with a sonority distance of less than 2 contrast with sesquisyllables.

In summary, like other Mainland Southeast Asian languages, WCT Pwo has both minor and major syllables. In disyllabic words, two patterns are possible: 1) major syllable + major syllable and 2) minor syllable + major syllable, which is called a sesquisyllable.

Along with a rich sesquisyllable inventory, WCT Pwo also has an extensive set of complex onsets in monosyllables, some of them reconstructed in Proto-Karen, while others have arisen from more complex clusters or changes in vowel quality, along with a change of medial consonant. In terms of the Pittayaporn (2015) typology of sesquisyllabicity, WCT Pwo patterns with Type C in which sesquisyllables and complex monosyllables contrast, with no sonority constraints in sesquisyllables.

4 Thailand and Burmese Eastern Pwo Karen phonologies compared

WCT Pwo and the Burmese Eastern Pwo Karen varieties are mutually intelligible to some extent. Therefore, they would be expected to have similar phonological systems. In contrast, N. Pwo has been shown to be mutually unintelligible with WCT Pwo and, by extension, Burmese Eastern Pwo Karen (Dawkins & Phillips 2009a). Therefore, differences between the phonological systems of N. Pwo, WCT Pwo, and Burmese Eastern Pwo Karen are expected. For this phonological comparison, the Burmese Eastern Pwo Karen phonologies of Hpa-an and Tavoy, as detailed in Kato (1995), are compared and contrasted with WCT Pwo and N. Pwo (Phillips 2009).

Beginning with word structure, the syllable structures of Burmese Eastern Pwo Karen, WCT Pwo, and N. Pwo are essentially the same, except that neither WCT Pwo nor N. Pwo exhibit any final phonemic consonants, such as a final nasal or a final glottal. Part of the reason for this difference is the analysis of two glottalized tones for WCT Pwo and N. Pwo instead of a glottal vowel series, as proposed for the Tavoy variety of Burmese Eastern Pwo Karen. Concerning a final nasal, N. Pwo syllables with nasalized vowels end occasionally in a velar nasal stop, while a final velar nasal occurs intermittently in WCT Pwo with certain vowels. In both cases, this is a non-phonemic variation. All four varieties exhibit both major and minor syllables. A stress-timed rhythm is also characteristic of all four varieties which is realized as reduced vowels in the pre-predicate personal pronouns and some markers, such as the irrealis marker, *mə=*. Note that in all varieties, post-predicate pronouns are not reduced. In addition, N. Pwo, alone, has a small inventory of enclitics, with no initial consonant, which include the question particle, *=ê*, and the third-person accusative pronoun, *=ê^{ʔ}*. Finally, all four varieties of Pwo Karen have extensive complex onset inventories with /ɹ, l, w, j/ as the medial consonant.

Concerning the obstruent inventories, only the phonetic realization of /s/ differs. In N. Pwo, /s/ is pronounced [s] most of the time and occasionally pronounced [θ]. Whereas in WCT Pwo, this pronunciation pattern is reversed with [θ] pronounced most of the time and [s] pronunciations on occasion. In contrast, Kato (1995:74), in his description of the Tavoy and Hpa-an varieties of Burmese Eastern Pwo Karen, describes /θ/ as a voiceless unaspirated interdental stop [t̪], which is realized as the affricate [t̪θ] when "it is released slowly."

For the nasals, all the Pwo Karen varieties include both the /m/ and /n/ phonemes. A palatal or alveolo-palatal nasal is reported for the Hpa-an variety of Burmese Eastern Pwo Karen and N. Pwo. For WCT Pwo, a similar sound is analyzed as the complex onset, /nj/, which fits in with the complex onset patterns with /j/ as the medial consonant. In all cases, this phoneme or complex onset is relatively rare. Furthermore, it appears in Mon borrowings for Hpa-an Pwo Karen and N. Thai borrowings for N. Pwo. The velar nasal as a syllable-initial consonant is also rare and only occurs in WCT Pwo and N. Pwo.

Both Kato (1995:75, 82) and Jones (1961) report a voiced velar fricative for the Burmese Eastern Pwo Karen varieties, while the same sound is identified as a voiced velar approximant in WCT Pwo and N. Pwo. Henderson (1985) describes this sound as a "frictionless continuant", a type of semivowel, which is symbolized by /ɰ/. She also observes that /ɰ/ is cognate with /w/ in other Karenic varieties. This relationship between /ɰ/ and /w/ is borne out in WCT Pwo, in which /ɰ/ and /w/ are in free variation for some words.

The tones are the next most stable between the Burmese Eastern Pwo Karen and Thailand Pwo Karen varieties. The four modal tones, High, Mid, Low, and Falling are similar between Burmese Eastern Pwo Karen and WCT Pwo, barring the phonation differences reported by Kato for the Burmese Eastern Pwo Karen varieties. However, the three varieties differ concerning the glottalized tones. Both glottalized tones have been lost in Hpa-an Pwo Karen. The loss of the low glottalized tone in WCT Pwo was also observed by the author while experimenting with the development of a Thai-based orthography with some WCT Pwo children in Sangkhaburi in 2007. As for the Tavoy variety of Burmese Eastern Pwo Karen, Kato (1995:86) reports a series of rhymes with a final /ʔ/ which are limited to the mid-level and low-level tones. This would seem to indicate that the Tavoy variety still has both glottalized tones, but these tones do not occur with all vowels. In contrast, the N. Pwo tones do not parallel the Burmese Eastern Pwo Karen or WCT Pwo tones. Rather, they correspond as detailed in Table 8.

Table 8: *Correspondences between N. Pwo, WCT Pwo, Tavoy, and Hpa-an tones*

N. Pwo	WCT Pwo	Tavoy	Hpa-an
High	Falling	Falling	Falling
Mid	High	High	High
Low	Mid	Mid	Mid
Falling	Low	Low	Low
Mid glottalized	High glottalized	Mid glottalized	—
Falling glottalized	Low glottalized	Low glottalized	—

The vowel inventories show the greatest variation. This is, in large part, due to vowel nasalization from original final nasals, which changes the vowel quality, including diphthongization. Then, the nasalized vowel is denasalized. This process is the most pronounced in the Burmese Eastern Pwo Karen varieties and is in the early stages in WCT Pwo, whereas N. Pwo only has one nasalized diphthong, /ẽ [ẽⁱ]/.

This denasalization process is not unique to Pwo Karen. Benedict (1972:142) observes that "Pwo Karen parallels Modern Burmese in replacing final nasals by nasalization." Matisoff (Benedict 1972:14, Fn. 51) provides further detail for Lolo-Burmese languages, commenting that "final nasals either reduce to vowel nasalization (Mod. Burmese, some Akha dialects) or disappear altogether after altering the vowel quality (Lahu, Lisu, etc.)." For Burmese, Wheatley (1987:842) notes that "vowels in closed syllables *(-n, -ʔ)* tend to be noticeably centralised or diphthongized compared to those in open syllables." In addition, Mathias Jenny (p.c.) relates that "some vowels are diphthongized when nasalized, /i, u/ are lowered to /ɪ, ʊ/, /a/ is raised to /ae/." Further afield, Quebec French nasal vowels are produced with diphthongization in open and closed syllables (Carignan 2013). The reason for the compatibility of diphthongization and nasalized vowels is that nasalized vowels are produced by "a variety of articulations", including the position of the velum, tongue position, lip rounding, and lip protrusion (Carignan 2013:32).

The effects of nasalization and then denasalization of vowels is illustrated using the forms for 'wind' in Table 9.

Table 9: *The denasalization of /ĩ/*

N. Pwo	WCT Pwo	Tavoy	Hpa-an
/ĩ/ [ⁱĩ]	/ĩ/ [ⁱĩ]	/eⁱ/	/i/ [ⁱi]
lĩ̂ 'wind'	lĩ̂ 'wind'	lèⁱ 'wind'	lì 'wind'

As shown in Table 9, both N. Pwo and WCT Pwo still retain the nasalized /ĩ/, which is pronounced with a close central vowel onglide. However, in the Tavoy variety, the former nasalized /ĩ/ has lowered to the oral non-nasalized diphthong /eⁱ/, while in the Hpa-an variety, the diphthong [ⁱi] is not nasalized.

To summarize, the consonant inventories are almost the same across all four Pwo Karen varieties, except for the /s/ phoneme. In N. Pwo the sound is primarily sibilant [s] with occasional pronunciations as non-sibilant [θ]. In WCT Pwo, although [s] is sometimes heard, [θ] is more common. In Hpa-an, the

pronunciation ranges from a dental non-sibilant fricative to a dental stop and in Tavoy, it is pronounced as a dental stop only. Concerning the tonal inventories, N. Pwo has four modal tones and two glottalized tones which do not occur in the same words as those of WCT Pwo and Burmese Eastern Pwo Karen. Between WCT Pwo and the Burmese Eastern Pwo Karen varieties, the only tonal differences are whether the two glottalized tones are retained or not. WCT Pwo retains both glottalized tones, the Tavoy variety retains the glottalized tones with some vowels, and the glottalized tones have been lost completely in the Hpa-an variety. Finally, all four varieties have nasalized vowels, some of them diphthongized. Some Burmese Eastern Pwo Karen nasalized vowels have denasalized, while the diphthong remains. This has only happened with the /ɤ̃/ phoneme in WCT Pwo, which is pronounced as the diphthong [ɤⁱ] by younger speakers. In N. Pwo, only /ẽ/ is pronounced as a nasalized diphthong [ẽⁱ].

5 Conclusion

This account of WCT Pwo phonology has demonstrated a consonant inventory of unaspirated and aspirated stops at four places of articulation; labial and dental voiced implosives; labial, dental, and velar nasals; dental, alveolo-palatal, velar, and glottal voiceless fricatives; labial, dental, palatal, and velar voiced approximants; and a lateral approximant. The vowel inventory includes oral and nasalized vowels at three positions and three heights, along with the diphthongs /ɐⁱ, ẽⁱ, ɐⁱ/. The tonal system includes four modal tones and two glottalized tones.

Like other Mainland Southeast Asian languages, WCT Pwo exhibits sesquisyllables, along with an extensive inventory of complex onsets with /ɹ, l, w, j/ as the medial consonant. Complex monosyllables and sesquisyllables are contrastive. This places WCT Pwo in the Type C group in the Pittayaporn (2015) sesquisyllabicity typology.

Comparison between Burmese Eastern Pwo Karen, WCT Pwo, and N. Pwo shows that all four varieties have similar consonant inventories and some variation in the vowel inventories, which is largely due to the denasalization of nasalized vowels. The result is a larger inventory of oral vowels and diphthongs which further affect the vowel system. In terms of tonal inventories, while both WCT Pwo and N. Pwo retain a six-tone system, the glottalized tones have been lost in Hpa-an Burmese Eastern Pwo Karen and glottalized tones are limited to certain vowels in Tavoy Burmese Eastern Pwo Karen. Finally, the N. Pwo tones are not the same as the Burmese Eastern Pwo Karen and WCT Pwo tones, although there is a pattern of correspondence between them.

This paper represents a start in the understanding of WCT Pwo phonology. More work is needed on the distinction between complex monosyllables and sesquisyllables, as well as tonal patterns in polysyllables. In addition, more data is needed from Pwo Karen varieties in Myanmar and Thailand, to contribute to the reconstruction of Proto-Karen.

References

Benedict, Paul K. 1972. *Sino-Tibetan: A Conspectus*. (Ed.) James A. Matisoff. (Princeton-Cambridge Studies in Chinese Linguistics II). Cambridge: Cambridge University Press.

Carignan, Christopher. 2013. When nasal is more than nasal: The oral articulation of nasal vowels in two dialects of French. Urbana-Champaign: University of Illinois at Urbana-Champaign PhD Thesis.

Clements, G. N. 1990. The role of syllabification cycle in core syllabification. In John Kingston & Mary E. Beckman (eds.), *Papers in Laboratory Phonology I: Between the Grammar and Physics of Speech*, 283–333. Cambridge: Cambridge University Press.

Cooke, Joseph R., J. Edwin Hudspith & James A. Morris. 1976. Phlong (Pwo Karen of Hot District, Chiang Mai). In William Smalley (ed.), *Phonemes and Orthography: Language Planning in Ten Minority Languages of Thailand*, 187–220. (Pacific Linguistics C 43). Canberra: Australian National University.

Dawkins, Erin & Audra Phillips. 2009a. *An Investigation of Intelligibility between West-Central Thailand Pwo Karen and Northern Pwo Karen*. Chiang Mai, Thailand: Payap Linguistics Institute.

http://li.payap.ac.th/images/stories/survey/An%20Investigation%20of%20Intelligibility%20Between%20West-Central%20Thailand%20Pwo%20Karen%20and%20Northern%20Pwo%20Karen.pdf.

Dawkins, Erin & Audra Phillips. 2009b. *A Sociolinguistic Survey of Pwo Karen in Northern Thailand*. Chiang Mai, Thailand: Payap Linguistics Institute. http://li.payap.ac.th/images/stories/survey/A%20Sociolinguistic%20Survey%20of%20Pwo%20Karen%20in%20Northern%20Thailand.pdf.

Donegan, Patricia Jane & David Stampe. 1983. Rhythm and the holistic organization of language structure. In John F. Richardson, Mitchell Marks & Amy Chukerman (eds.), *Papers from the parasession on the interplay of phonology, morphology and syntax*, 337–353. Chicago: Chicago Linguistic Society.

Enfield, N. J. & Bernard Comrie. 2015. Mainland Southeast Asian languages: State of the art and new directions. In N. J. Enfield & Bernard Comrie (eds.), *The languages of Mainland Southeast Asia: The state of the art*, 1–27. Berlin/Boston: De Gruyter Mouton.

Griffiths, Rosemary. 1976. Pwo Karen, Kanchanaburi dialect. ms.

Haudricourt, A.-G. 1975. Le système des tons du karen commun. *Bulletin de la Société de Linguistique de Paris* 70. 339–43.

Haudricourt, André-Georges. 1946. Restitution du karen commun. *Bulletin de la Société de linguistique de Paris* 42(1). 103–111.

Henderson, Eugénie J. A. 1985. Greenberg's "universals" again: A note on the case of Karen. In Graham Thurgood, James A. Matisoff & David Bradley (eds.), *Linguistics of the Sino-Tibetan area: The state of the art. Papers presented to Paul K. Benedict for his 71st birthday*, 138–40. Canberra: Department of Linguistics, Research School of Pacific Studies, Australian National University.

Jones, R. B. 1961. *Karen Linguistic Studies*. (University of California Publications in Linguistics 25). Berkeley: University of California Press.

Kaewsilpa, Chutima. 1982. A description of Pho Karen: A Tibeto-Burman language of Thailand. Salaya: Mahidol University M.A. thesis.

Kato, Atsuhiko. 1995. The phonological systems of three Pwo Karen dialects. *Linguistics of the Tibeto-Burman Area* 18(1). 63–103.

Kato, Atsuhiko. 2009. A basic vocabulary of Htoklibang Pwo Karen with Hpa-an, Kyonbyaw, and Proto-Pwo Karen forms. *Asian and African Languages and Linguistics* 4. 169–218.

L-Thongkum, Theraphan. 2013. Problems of the B′ tone in Proto-Karen (PK). Paper presented at the 23rd Meeting of the Southeast Asian Linguistics Society, Bangkok, Thailand. http://www.jseals.org/seals23/luangthongkum2013problemsh.pdf.

L-Thongkum, Theraphan. 2014a. Karenic as a branch of Tibeto-Burman: More evidence from Proto-Karen. Paper presented at the 24th Meeting of the Southeast Asian Linguistics Society, Yangon, Myanmar. http://jseals.org/seals24/luangthongkum2014karenicH.pdf.

L-Thongkum, Theraphan. 2014b. Proto-Karen (*k-rjaŋA) fauna. *Manusya* Special Issue 20. 86–123.

Manson, Ken. 2009. Prolegomena to reconstructing Proto-Karen. *La Trobe University Papers in Linguistics* 12. http://www. latrobe. edu. au/linguistics/LaTrobePapersinLinguistics.

Manson, Ken. 2011. The subgrouping of Karen. Paper presented at the 21st Meeting of the Southeast Asian Linguistics Society, Bangkok, Thailand. http://www.jseals.org/seals21/manson11subgroupingd.pdf.

Manson, Ken. 2017a. Bibliography of Karen linguistics, 3rd ed. https://www.academia.edu/34578587/Bibliography_of_Karen_linguistics_3rd_ed_.

Manson, Ken. 2017b. The characteristics of the Karen branch of Tibeto-Burman. In Picus Sizhi Ding & Jamin Pelkey (eds.), *Sociohistorical linguistics in Southeast Asia: New horizons for Tibeto-Burman studies in honor of David Bradley*, 149–168. (Languages of the Greater Himalayan Region 20). Leiden: Brill.

Matisoff, James A. 1973. Tonogenesis in southeast Asia. In Larry M. Hyman (ed.), *Consonant Types and Tone*, 73–95. (Southern California Occasional Papers in Linguistics 1). Los Angeles: Linguistics Program, University of Southern California.

Matisoff, James A. 1978. *Variational semantics in Tibeto-Burman: The "organic" approach to linguistic comparison*. (Occasional Papers of the Wolfenden Society on Tibeto-Burman Linguistics 6). Philadelphia: Institute for the Study of Human Issues.

Matisoff, James A. 2001. Genetic versus contact relationship: Prosodic diffusibility in South-east Asian languages. In Alexandra Y. Aikhenvald & Robert M. W. Dixon (eds.), *Areal diffusion and genetic inheritance: Problems in comparative linguistics*, 291–325. Oxford: Oxford University Press.

Noinaj, Wasana. 1996. A phonological study of Pwo Karen as spoken in Phop-Phra, Tak Province. Salaya: Mahidol University M.A. thesis.

Phillips, Audra. 1996. Dialect comparison among the Pwo Karen of Central Thailand. *Proceedings of the Fourth International Symposium on Languages and Linguistics*, vol. III, 1122–1162. Bangkok, Thailand. http://sealang.net/sala/archives/pdf8/phillips1996dialect.pdf.

Phillips, Audra. 2000. West-Central Thailand Pwo Karen phonology. *The 33rd International Conference on Sino-Tibetan Languages and Linguistics*, 99–110. Bangkok, Thailand: Ramkhamhaeng University. http://purl.org/sealang/phillips2000west.pdf.

Phillips, Audra. 2009. Omkoi Pwo Karen phonology and orthography. *PYU Working Papers in Linguistics* 5. https://www.academia.edu/745060/Omkoi_Pwo_Karen_Phonology_and_Orthography.

Pittayaporn, Pittayawat. 2015. Typologizing sesquisyllabicity. In Nicholas J. Enfield & Bernard Comrie (eds.), *Languages of Mainland Southeast Asia: The state of the art*, 500–528. (Pacific Linguistics 649). Berlin: De Gruyter Mouton.

Samermit, Potchanat. 1983. Phonetics and phonology of Phlow spoken at Srisawat district, Kanchanaburi province. Bangkok: Chulalongkorn University M.A. thesis.

Samranchit, Weerawat. 1973. Phonology of the Pwo Karen of Suanpheung sub-district. Salaya: Mahidol University M.A. thesis.

Selkirk, Elizabeth. 1984. On the major class features and syllable theory. In Mark Aronoff & Richard T. Oehrle (eds.), *Language Sound Structure*, 107–136. Cambridge, Mass.: MIT Press.

Shintani, Tadahiko L. A. 2012. *A Handbook of Comparative Brakaloungic Languages*. Tokyo: Research Institute for Languages and Cultures of Asia and Africa (ILCAA).

Solnit, David B. 2013. Proto-Karen rhymes. Ms. Paper presented at the 46th International Conference on Sino-Tibetan Languages and Linguistics, Dartmouth College, Hanover, New Hampshire. https://www.academia.edu/4211900/Proto-Karen_Rhymes.

Tribal Research Institute. 1986. Population of major hill tribes of Thailand. Chiang Mai, Thailand, ms.

Wheatley, Julian K. 1987. Burmese. In Bernard Comrie (ed.), *The World's Major Languages*, 834–853. Oxford: Oxford University Press.