

Chapter 5

Muak Sa-aak tones

Muak Sa-aak is a tonal language, with three tones which will be described in this chapter. The tones are closely linked with syllable structure. Because the existing literature on Angkuic languages suggests that tone in Angkuic languages develops out of vowel length, resulting in a loss of contrastive vowel length, tone presents a special problem in the phonology. Muak Sa-aak is tonal, yet it retains contrastive vowel length; it has a vowel inventory approximately twice as big as would be expected in an Angkuic language with tone, such as U (see Section 2.1.2). Therefore this chapter will present the tones found in Muak Sa-aak, then examine the relationship of tone to syllable structure, and finally present a discussion of tonogenesis.

5.1 Tones

In Muak Sa-aak, there are three distinctive tones, a low tone, a checked tone, and a falling tone. All main syllables have one of these. Presyllables do not display tonal contrast; although speakers labeled them all as Tone 1, the fact that they routinely identified them as the same tone shows that there is no contrast in tone.

In Muak Sa-aak, voice quality is not distinctive but is an accompanying feature of tone. This is most apparent in words with long vowels. Except for the falling Tone 3, these voice qualities are not produced consistently and showed a high degree of both intra- and interspeaker variation.

5.1.1 Low tone: Tone 1

The first tone, Tone 1, is a low tone. In one of the four recorded speakers (Speaker D), it tends to rise a little. In some words it is realized with stiff voice, a tight, tense phonation type which is more tense than modal voice but less tense

than creaky voice³³ such as in Example (138), below. In that example, /t^ha:k¹/, “tongue” was often pronounced with even creaky voice, [t^h̠a:k¹]. However, no contrast could be identified based on voice phonation, and this phonation was not even heard consistently with the same word and the same speaker on different occasions.

| | | | |
|-------|------|------------------------------------|----------------------|
| (138) | 17 | /t ^h a:k ¹ / | “tongue” |
| (139) | 987 | /le:k ¹ / | “pig” |
| (140) | 1100 | /t.lɿ: ¹ / | “lizard” |
| (141) | 1313 | /c ^h aj: ¹ / | “sky” |
| (142) | 1408 | /li: ¹ / | “come out, exit” |
| (143) | 1493 | /rɿ:m ¹ / | “fade” |
| (144) | 1499 | /naj ¹ / | “melt” ³⁴ |

Tone 1 occurs only in long syllables: syllables with long vowels or diphthongs (regardless of final consonant), or short vowels if followed by a sonorant final.

Presyllables form an exception in that they do have short vowels, and no final consonant; they do not display tonal contrast, but if asked, speakers consistently identify them as having this tone. This suggests that Tone 1 may be the default tone; as Yip describes, tone languages may be considered to have a default, or unmarked, tone, and another tone or tones which are marked (Yip 2002: 62).

The final lateral occurs only rarely and the final palatal nasal does not occur with this tone. Although the other final nasals do occur with this tone, they occur more frequently with the falling Tone 3; those occurring with Tone 1 are commonly borrowed words (see Section 6.1.3). Syllable rhymes which occur with Tone 1 in the data are shown in Table 31.

³³ See Ladefoged and Maddieson (1996: 48-50) for further discussion of these voice phonation types.

³⁴ Probably a borrowed word from Tai Lue.

Table 31. Tone 1 rhymes

| | p | t | c | k | m | n | ɲ | ŋ | l | j | w | (open) |
|----|-----|-----|-----|-----|-----|-----|---|-----|-----|-----|-----|--------|
| i | | | | | | in | | iŋ | | | | |
| i: | i:p | i:t | | | | | | | | | | i: |
| e | | | | | | | | | | e:j | | |
| e: | e:p | e:t | | e:k | | e:n | | | | | | e: |
| ɛ | | | | | | | | | | | ɛw | |
| u | | | | | | un | | uŋ | | | | |
| u: | u:p | u:t | u:c | | u:m | | | u:ŋ | | | | u: |
| ɤ | | | | | | ɤn | | ɤŋ | ɤl | ɤj | | |
| ɤ: | | ɤ:t | | ɤ:k | ɤ:m | ɤ:n | | ɤ:ŋ | | | | ɤ: |
| a | | | | | am | an | | aŋ | al | aj | aw | |
| a: | a:p | a:t | a:c | a:k | a:m | a:n | | a:ŋ | | a:j | a:w | a: |
| u | | | | | um | un | | uŋ | ul | | | |
| u: | u:p | u:t | | u:k | | u:n | | u:ŋ | u:l | | | u: |
| o | | | | | om | | | | | oj | | |
| o: | o:p | o:t | o:c | o:k | | o:n | | o:ŋ | | o:j | | o: |
| ɔ | | | | | | ɔn | | ɔŋ | | ɔj | | |
| ia | iap | iat | iac | iak | iam | ian | | iaŋ | | | iaw | |
| ua | uap | uat | | uak | uam | uan | | uaŋ | | uaj | | ua |

5.1.2 Checked tone: Tone 2

Tone 2 occurs only on checked syllables, and has two allotones in complementary distribution: high tone on short syllables, and high falling tone on long syllables. The first allotone is a high tone. It occurs only with syllables that have short vowels, with either stop final consonants or a phonetic glottal stop.

The high-falling allotone occurs less frequently. It occurs in phonologically open syllables with long vowels, or in closed syllables which have either long or short vowels followed by sonorant finals. This allotone has very creaky voice, and long vowels with this allotone of Tone 2 are slightly shorter than long vowels with either Tone 1 or Tone 3.

With the falling allotone, there are no final stop consonants other than the glottal stop. All syllable types with this allotone can occur with a final glottal stop; however, final glottal stop occurs only with Tone 2 (either allotone), and should be considered a suprasegmental feature of this tone.

There is a complementary distribution between the types of syllables which can occur with the high allotone of Tone 2, and the types which may occur with the

falling allotone (Table 32, below). The two allotones are identified by speakers as being the same tone.

Table 32. Tone 2 final consonant types distribution by allotone

| | High allotone (short) | High-falling allotone (long) |
|---------------------------|-----------------------|------------------------------|
| Open syllable-short vowel | X | |
| Open syllable-long vowel | | X |
| Stop consonant finals | X | |
| Nasal consonant finals | | X |

Examples (145)-(149) are words with short vowels and the high allotone of Tone 2.

| | | | |
|-------|-----|----------------------------------|-----------------------|
| (145) | 802 | /rɤp ² / | “fishing net” |
| (146) | 50 | /t ^h i ² / | “arm” |
| (147) | 136 | /sut ² / | “smell” ³⁵ |
| (148) | 806 | /pa ² / | “have” |
| (149) | 991 | /c ^h ɔ ² / | “dog” |

Examples (150)-(153) are words which take the falling allotone of Tone 2.

| | | | |
|-------|------|--------------------------------------|--------------------------------|
| (150) | 1143 | /p ^h rɤ:ŋ ² / | “bee” ³⁶ |
| (151) | 1130 | /cu: ¹ ci: ² / | “dung beetle” ³⁷ |
| (152) | 1370 | /p.ni: ² / | “today” |
| (153) | 1461 | /ma:ŋ ² / | “destroy, spoil” ³⁸ |

³⁵ There is a Tai Lue word /sew¹/, “to have a strong odor” (Hudak 1996: 851). The initial consonant is similar, but the original source of this word is not clear.

³⁶ Probable borrowed word from Tai Lue, although in Tai Lue it is /ph/, not /phr/.

³⁷ Probable borrowed word from Tai Lue.

³⁸ Borrowed word from Tai Lue.

A problem with these examples is that all but one are probably borrowed words. This is characteristic of words with this allotone of Tone 2, and will be discussed further in Chapter 6.

Syllable rhymes found in the data for Tone 2 are shown in Table 33.

Table 33. Tone 2 rhymes

| | p | t | c | k | m | n | ɲ | ŋ | l | j | w (open) | |
|----|-----|-----|----|----|-----|-----|---|-----|----|-----|----------|----|
| i | ip | it | ic | ik | | in | | iŋ | | | iw | i |
| i: | | | | | | | | | | | | i: |
| e | | et | | ek | | | | eŋ | | | | e |
| e: | | | | | | | | | | | | e: |
| ɛ | ɛp | ɛt | | ɛk | ɛm | ɛn | | ɛŋ | | | | |
| ʊ | | | ʊc | ʊk | | | | | | | | ʊ |
| ʊ: | | | | | | | | | | | | |
| ɤ | ɤp | ɤt | ɤc | ɤk | | ɤn | | ɤŋ | | | | ɤ |
| ɤ: | | | | | | | | ɤ:ŋ | | | | |
| a | ap | at | | ak | am | an | | aŋ | | aj | aw | a |
| a: | | | | | a:m | a:n | | a:ŋ | | a:j | a:w | a: |
| u | up | ut | uc | uk | um | | | uŋ | ul | | | u |
| u: | | | | | | | | | | | | u: |
| o | op | ot | | ok | om | | | oŋ | | oj | | o |
| o: | | | | | o:m | o:n | | | | o:j | | |
| ɔ | ɔp | ɔt | | ɔk | | ɔn | | | | | | ɔ |
| ia | iap | iat | | | | ian | | iaŋ | | | iaw | |
| ua | | | | | uam | uan | | uaŋ | | uaj | | ua |

5.1.3 Falling tone: Tone 3

Falling Tone 3 has modal voice and is a high falling tone. Examples (154) to (162) take this tone. This tone does not occur with stop final syllables but only on live syllables. Open syllables do not show a vowel length contrast in this tone; they are all long vowels. The final palatal nasal /ɲ/ occurs only in syllables with this tone, and only with short vowels in the data collected. The majority of words ending with the lateral approximant /l/ also occur with this tone. Table 34 shows the rhymes found in the data for Tone 3.

| | | | |
|-------|-------|------------------------------------|---------|
| (154) | 1024a | /t.wa:j ³ / | “tiger” |
| (155) | 140 | /k ^h a:j ³ / | “eat” |
| (156) | 1384 | /t.po:l ³ / | “night” |

| | | | |
|-------|------|-----------------------------------|------------------|
| (157) | 725 | /kual ³ / | “sew” |
| (158) | 1565 | /ŋa:ŋ ³ / | “sweet” |
| (159) | 134 | /ŋaŋ ³ / | “hear” |
| (160) | 1095 | /p.sɤŋ ³ / | “snake” |
| (161) | 820 | /fe: ³ / | “buy” |
| (162) | 562 | /t ^h u: ³ / | “apply, besmear” |

Table 34. Tone 3 rhymes

| | p | t | c | k | m | n | ɲ | l | j | w | (open) |
|----|---|---|---|---|-----|-----|-----|-----|-----|-----|--------|
| i | | | | | im | in | iŋ | il | | iw | |
| i: | | | | | | in | i:ŋ | il | | | i: |
| e | | | | | | | | | | ew | |
| e: | | | | | | e:n | e:ŋ | e:l | | e:w | e: |
| ɛ | | | | | | ɛn | ɛŋ | ɛl | | | |
| u | | | | | um | | uŋ | | uj | | |
| u: | | | | | u:m | u:n | u:ŋ | u:l | u:j | | u: |
| ɤ | | | | | ɤm | ɤn | ɤŋ | ɤl | | | |
| ɤ: | | | | | ɤ:m | ɤ:n | ɤ:ŋ | ɤ:l | ɤ:j | | ɤ: |
| a | | | | | am | an | aŋ | al | aj | aw | |
| a: | | | | | a:m | a:n | a:ŋ | a:l | a:j | a:w | a: |
| u | | | | | um | un | uŋ | ul | | | |
| u: | | | | | u:m | u:n | u:ŋ | u:l | u:j | | u: |
| o | | | | | | on | oŋ | | oj | | |
| o: | | | | | o:m | o:n | o:ŋ | o:l | o:j | | o: |
| ɔ | | | | | | ɔn | ɔŋ | | ɔj | | |
| ia | | | | | iam | ian | iaŋ | ial | | iaw | |
| ua | | | | | uam | uan | uaŋ | ual | uaj | | ua |

5.2 Syllable structures and tones

This section will revisit syllable structure, to examine the correlation of syllable structure with tone. There are clear restrictions on the distribution of each tone according to syllable structure.

The environments and laryngeal features of the three tones of Muak Sa-aak can be summarized as follows:

Low Tone 1: with stop finals, sonorant finals, or open syllables (dead or live syllables) but only long syllables.

Checked Tone 2: every syllable type, except that long syllables do not occur with stop finals; creaky voice. Within this tone, only the high, short allotone (with short vowels) occurs with stop final consonants.

Falling Tone 3: in long and short syllables, but only sonorant finals or open syllables (live syllables).

Syllables with nasal finals, including the palatal nasal, which does not occur in borrowed words from Tai Lue, occur primarily with Tone 3. Some of these also occur with Tone 1 or Tone 2; however, many of these are borrowed words from Tai Lue, and it is hard to find minimal pairs with native words. A possible explanation would be that the occurrence of nasal finals with low Tone 1 or checked Tone 2 is a result of borrowing. It would be expected that checked Tone 2 would occur with syllables having long vowel and stop final, but it does not. Tone in Muak Sa-aak does not seem to have a high functional load, as there are not many minimal pairs found in the data, probably because of the correlation between tone and syllable structure.

The syllable types which are found with each tone are summarized in Table 35.

Table 35. Tone and syllable type

| Syllable type | Tone 1 | Checked Tone 2 | | Tone 3 |
|-------------------------------|--------|----------------|---------|---------|
| | Low | High | Falling | Falling |
| short vowel + stop | | X | | |
| long vowel + stop | X | | | |
| short open syllable | | X | | |
| vowel + sonorant or long open | X | | X | X |

Various minimal pairs were found based on tone. Two full sets of minimal pairs, based upon tone plus vowel length, are shown in Tables 36 and 37, below. Note the asterisk * marks words that are borrowed from Tai Lue.

Table 36. Tone and vowel contrast in nasal final syllables

| | Short vowel | | Long vowel | |
|--------|---------------------|---------------------------------|----------------------|--------------------|
| Tone 1 | /raŋ ¹ / | “rich” | /ra:ŋ ¹ / | “no one there”* |
| Tone 2 | /raŋ ² / | “field with no-one working it”* | /ra:ŋ ² / | “leave/ separate”* |
| Tone 3 | /raŋ ³ / | “shining” [of the sun] | /ra:ŋ ³ / | “flower” |

Table 37. Tone and vowel contrast in open syllables

| | Short vowel | | Long vowel | |
|--------|---------------------|------------|--|----------------------------|
| Tone 1 | (not possible) | | /ci: ¹ / | “sap” |
| Tone 2 | /ci: ² / | “do, make” | /cu ¹ ci: ² / /ci: ² / | “dung beetle”* “point”* |
| Tone 3 | (not possible) | | /cu ¹ ci: ³ / | “make a hole”* |

Open syllables with short vowels can occur, but only with Tone 2; they cannot occur with Tone 1 or Tone 3.

These tone contrasts do include borrowed words from Tai Lue. It is difficult to get tone contrasts between all of the tones without involving borrowed words, since tone is linked to syllable structure, particularly final consonants. The links between tone and syllable structure may also be seen in Table 38, below, showing examples of syllable structures which can occur with each tone. Tone, vowel length, and final consonant type are all linked together.

Table 38. Correlation of Muak Sa-aak syllable structures and tones

| | Tone 1 (low) | Tone 2 (checked) | Tone 3 (falling) |
|--------------------|--|--|---------------------------------|
| CV _S S | /pɤl ¹ / “fall” | /kan ² / “be defeated”* | /kam ³ / “language”* |
| CCV _S S | /k ^h u:3 kran ¹ / “lazy” | /p ^h rɤŋ ² / “clam” | /prɤŋ ³ / “head” |
| CV _L S | /kɤ:n ¹ / “before”* | /kuan ² / “bottle” | /ka:ŋ ³ / “house” |
| CCV _L S | /krɤ:n ¹ / “lying down” | /k ^h ruan ² / “gather” | /kri:l ³ / “skinny” |
| CV _S P | -- | /kat ² / “burn” | -- |
| CCV _S P | -- | /prɛt ² / “lick” | -- |
| CV _L P | /kat ¹ / “fasten” | -- | -- |
| CCV _L P | /t.pru:t ¹ / “swallow” | -- | -- |
| CV _S | -- | /ke ² / “they (3PL)” | -- |
| CCV _S | -- | /kra ² / “stir” | -- |
| CV _L | /ke: ¹ / “pour” | /pɔ: ¹ ka: ² / “trader”* | /ka: ³ / “pack (v)” |
| CCV _L | /pra: ¹ / “split open” | --- | /kra: ³ / “mat” |

*Borrowed words from Tai Lue

S=Sonorant final P=stoP final V_S=Short vowel V_L=Long vowel

5.3 Tonogenesis

Muak Sa-aak has developed three tones. The development of tone appears to be correlated not only to vowel length, but to final consonant type. The following subsections will review the known factors that may be influencing the development of tone in Angkuic languages, and then suggest a hypothesis regarding how tone may have developed in Muak Sa-aak.

5.3.1 Impact of initial consonants

There are two groups of initial consonants that have been used to differentiate Angkuic languages from other Eastern Palaungic languages. These are the retention of a distinction between the proto *h- and *s- initials, and aspirated initial oral stop

consonants. In addition to distinguishing Angkuic languages from other Eastern Palaungic languages, the aspirated stops also play an important role in tonogenesis.

5.3.1.1 Maintenance of the initial *h-, *s- contrast

The proto *h- and *s- initial fricatives merged into one glottal initial fricative, h- in Palaungic languages today, except for the Angkuic languages and Danaw. According to Diffloth, in Angkuic languages, the distinction between the proto *h- and *s- initials is maintained as (h)s- and h-; in Danaw this is also maintained, but the *s- became θ- (1977: 42). Diffloth discusses this using Angku and Ya-Ang Lawa as examples for Angkuic languages; Svantesson also addresses these initial consonants in his discussion of Hu, but is unable to elicit any vocabulary with the *h- initial (1991: 69). Table 39, below, compares Muak Sa-aak data to the words given by Diffloth (1977: 46-47). In the Muak Sa-aak data studied here, only one item was found with the *h- initial. The *s- which is lost in most of Palaungic is maintained in Muak Sa-aak as /s-/, in contrast to /h-/.

Table 39. Development of proto *h-, *s- initials in Palaungic languages (Diffloth 1977: 46-47)³⁹

| Angku s- or hs-, Danaw θ-, other Palaungic h- | | | | |
|---|------------|-------|---------------------------|---------------------------------------|
| | Angku | Danaw | Other Palaungic (Palaung) | Muak Sa-aak |
| “hair” (body) | suk, hsuk | --- | hũ | /suk ² / |
| “thick” | hsut, asút | --- | hăt | /k.sɯt ² / |
| “to bathe” | sũm | θɔn | hũm, hõm | /sum ³ / |
| h- in all languages ⁴⁰ | | | | |
| | Angku | Danaw | Other Palaungic | Muak Sa-aak |
| “clever” | han | --- | hiang (Lawa) | /hat ² ha:n ³ / |

³⁹ The words given from languages other than Muak Sa-aak are not marked as phonemic or phonetic transcription because it is not clear from the source.

⁴⁰ Diffloth (1977: 47) does give more examples for /h-/ initial; they are not included here because the Muak Sa-aak word has been replaced by borrowed words from Tai Lue and is no longer useful for this comparison, or is not cognate.

5.3.1.2 Aspirated stops

As discussed in Section 2.2.3.2, Svantesson states that the Angkuic languages do not follow the model of registrogenesis or of tonogenesis based primarily on a devoicing of voiced initial consonants. They had already undergone a shift in their initial consonants, causing contrast between voiceless and aspirated initials, instead of a contrast between voiced and voiceless initial consonants (1991: 67-68). Angkuic languages therefore have many aspirated stops in places where other Palaungic languages (belonging to branches other than Angkuic, i.e. Waic or Lametic) have voiceless unaspirated stops. Muak Sa-aak follows this Angkuic pattern, as shown in Table 40, below.

Table 40. Germanic shift⁴¹ in initial consonants: Muak Sa-aak compared to Hu, U, Lamet, Northern Kammu, and Southern Kammu [Khmu]⁴² (adapted from Svantesson 1991: 68)⁴³

| Muak Sa-aak | Hu | U | Lamet | Northern Kammu | Southern Kammu | |
|--|----------------------|--------------------|--------|----------------|----------------|------------------|
| *voiceless | | | | | | |
| /p ^h ɤŋ ³ / | phɤŋ | phèt | pɤŋ | pɤŋ | piŋ | “to shoot” |
| /tam ¹ / | thəŋ | thán | táaŋ | táaŋ | taaŋ | “to weave” |
| /k ^h a:p ¹ / | khàp | khap | káap | káap | kaap | “jaw” |
| *voiced | | | | | | |
| /s.pua ³ / | pàŋ | pán | pàaŋ | -- | -- | “white” |
| /pri ² / | pwi? | qí | prii? | pri? | bri? | “forest” |
| /puuc ² ta:k ¹ / | phltàk ⁴⁴ | ?atǎ ⁴⁵ | pltàak | ktáak | kdaak | “palm (of hand)” |
| /ka:ŋ ³ / | kàŋ | káã | --- | kàaŋ | gaan | “house” |
| /kak ² / | kák | kàk | kàk | -- | -- | “to bite” |

Table 40 is adapted from Svantesson’s study on Hu (1991), where he compares it to U, Lamet, and two dialects of Kammu [Khmu]. Lamet is classified in the SIL Ethnologue as Eastern Palaungic. Kammu, or Khmu, is classified in the Khmuic branch of Mon-Khmer (Lewis 2009). In these examples, only Muak Sa-aak, Hu and

⁴¹ See Section 2.2.2.2 for discussion of this “Germanic” shift; in this shift, voiced initial stops become voiceless unaspirated stops, and voiceless initial stops have become aspirated voiceless stops.

⁴² Suwilai Premrirat and Jan-Olof Svantesson use different spellings for this language, “Khmu” (Suwilai) and “Kammu” (Svantesson) and slightly different terminology for the dialects. Suwilai’s work in “Khmu” is discussed in Section 2.2.2.1.

⁴³ It is not entirely clear how phonemic Svantesson’s data is from which this table is adapted. In the article on Hu where this comes from, he does state that his material was not enough for a complete analysis (1991: 67), and his article on U states that at least parts of his transcription may be subphonemic (1988: 69). Therefore the data in Table 40 is not marked with // or [].

⁴⁴ Svantesson does not appear to include either presyllable vowels or hyphens in his transcriptions in Hu, Lamet, Northern Kammu, and Southern Kammu to distinguish presyllable consonants from main syllable consonants; these apparent consonant clusters in “palm of hand” are presyllable consonants plus main syllable initials, that is, /phl-tàk/. In this case, /h/ designates aspiration.

⁴⁵ The final consonant /ʃ/ is a voiced pharyngeal approximant (Svantesson 1988: 71).

U have aspirated initial stops. Lamet, which is a Palaungic language but does not belong to the Angkuic branch, has initial voiceless unaspirated stops like Khmu, which is not Palaungic, but along with the Palaungic languages is Northern Mon-Khmer. Therefore, Muak Sa-aak appears to behave like the Angkuic languages Hu and U in this area.

Svantesson (1991: 67 and 1988: 87) and Diffloth (1991: 19) both contend that the Angkuic languages follow a different route of tonogenesis from the other Palaungic languages, where tonogenesis or registrogenesis follows the pattern of loss of initial consonant voicing distinction. They contend that Angkuic tonogenesis is primarily based on vowel length. It seems reasonable to expect that, like Hu and U, Muak Sa-aak probably does not follow the model of registrogenesis and/or tonogenesis based primarily on changes in initial consonants, as outlined in Sections 2.2.2.1 above.

5.3.2 Impact of syllable coda

Originally Angkuic languages are believed to have had an initial consonant voicing distinction (voiced/ voiceless), like other Mon-Khmer languages. They would also have been atonal and without a register distinction. Typically Mon-Khmer languages possess a short-long vowel contrast as well, or are believed to have possessed one at some point. Many of the Mon-Khmer languages have undergone changes resulting in loss of the initial voicing distinction and development of register or tonal contrast, such as Bru, Cambodian,⁴⁶ or the western dialects of Khmu.⁴⁷ Some in the Palaungic languages, such as Hu and U, have lost vowel length contrasts.⁴⁸

It is suggested that Angkuic languages underwent a Germanic shift,⁴⁹ replacing the initial consonant voicing distinction with an aspirated/ unaspirated distinction. Tonogenesis came later, and has replaced an earlier vowel length distinction. In Hu, this has resulted in a simple 2-tone system whose origins can be fully explained by the transfer of vowel length distinction to tonal distinction (Svantesson 1991: 67). Table 14 from Section 2.2.2.4 is presented again below, in Table 41. Again, Svantesson used the Lamet data for comparison, since it preserves the vowel length distinction.

⁴⁶ See Section 2.2.1 for discussion, and Huffman (1976: 587).

⁴⁷ See Section 2.2.2.1 for discussion, and Suwilai (2001: 49).

⁴⁸ See Section 2.2.2.4 for discussion of vowel length in Angkuic languages, and also Svantesson (1988: 78-79), (1991: 71-72) and Diffloth (1991: 19).

⁴⁹ See discussion in Sections 2.2.2.2.

Table 41. Development of vowel length and tones in Hu; in comparison with Lamet (Svantesson 1991: 72)⁵⁰

| | Hu ⁵¹ | Lamet ⁵² | |
|--------------|------------------|---------------------|----------|
| Short vowels | yám | yàm | “to die” |
| | paθán | phán | “five” |
| | méɲ | krmìɲ | “star” |
| | ncén | kcèn | “heavy” |
| Long vowels | yàm | yàam | “to cry” |
| | lèk | liik | “pig” |
| | ʔòm | ʔóom | “water” |
| | nasòk | yóok | “ear” |

In U, final consonants have also affected the resulting tonal system, so that as many as four tones have resulted (1988: 74, 86). Table 15 from Section 2.2.2.4, showing the development of tones in U from vowel length plus final consonants, is given here again below, as Table 42. As with Hu, Svantesson uses Lamet data for comparison because it retains the Proto-Palaungic vowel length distinctions (Svantesson 1988: 77).

⁵⁰ See Footnote 15, page 27.

⁵¹ See Footnote 16, page 27.

⁵² See Footnote 17, page 27.

Table 42. Summary of U tonal development, shown in comparison to Hu and Lamet (Svantesson 1988: 87-92)⁵³

| Syllable type ⁵⁴ | Tone ⁵⁵ | U ⁵⁶ | Hu | Lamet | |
|---|--------------------|--------------------|-----------------------|------------------------|-----------------------------------|
| 1) Originally short vowel, voiced sonorant coda. Original nasals --> stops. | Low | yàp phèt ɲàw | yám phíɲ ɲàl | yàm píɲ ɲàl | “to die” “shoot” “fire” |
| 2) Originally short vowel followed by stop or *-s | High | khát súʃ sé | khát θúk khasét | kát khúk krsás | “cold” “hair” “charcoal” |
| 3) Originally long vowel followed by stop or *-s | Rising | lăt qhǎʃ sũʃ | --- thʷák nasòk | láat tráak yóok | “to fear” “buffalo” “ear” |
| 4) Originally open syllable or long vowel followed by sonorant; all prevocalic consonants are sonorants ⁵⁷ | Falling | mâ mî yâm | mà mé? yàm | màar mii? yàam | “field” “you” “to cry” |
| 5) Originally long vowel followed by a sonorant; a voiceless obstruent is among prevocalic consonants. | High | thám pán sáw | --- pàɲ --- | ktáam pàaɲ háaw | “crab” “white” “to climb” |
| 6) Originally open syllable and a voiceless obstruent among the prevocalic consonants; high vowel. | High | ʔí nchí ɲkú | ʔí nsí? --- | ʔii? sí? ɲkúu? | “people” “louse” “skin” |
| 7) Original open syllable and a voiceless obstruent among prevocalic consonants; non-high vowel | Low | khà là salè | --- lá? salé? | káa? lá? slèe? | “fish” “leaf” “rain” |
| 8) Some words do not end in a stop or ʔ, but have a rising tone; all have or once had a palatal final. | Rising | saɲĩ ʔǎn ʔǎy | ɲí? kaʔaɲ ʔày | sɲii? kʔaaɲ ʔáay | “day” “wasp” “we (dual)” |
| 9) Most words with final *h | Falling | --- | --- | --- | --- |

⁵³ See Footnote 18, page 29.

⁵⁴ See Footnote 19, page 29.

⁵⁵ “Tone” refers to the tone in U.

⁵⁶ Svantesson uses /h/ to denote aspiration, and /y/ for the sound represented by /j/ in the IPA. As mentioned in Section 2.1.3.2, /ʃ/ denotes a voiced pharyngeal approximant (Svantesson 1988: 72).

⁵⁷ See Footnote 21, page 29.

⁵⁸ No examples given in Svantesson 1988.

Although Diffloth (1991: 19) suggests that tonogenesis in Angkuic languages comes primarily from vowel length, Muak Sa-aak appears to have developed tone while retaining features of vowel length, although the functional load of length does not seem to be high, since there are few minimal pairs based on length distinction. Instead, Muak Sa-aak has developed tone partly out of vowel length, partly out of final consonants (something described by Svantesson in U), and perhaps partly also due to borrowing.

Svantesson in his study of U compared his data to a list of Lamet data, since Lamet, unlike many other Palaungic languages, still retains the vowel length distinction (Svantesson 1988: 77). He used this to see what happened to the vowel length in U, and to show that it was one of the main factors involved in tonogenesis. Therefore, in Sections 5.3.2.1- 5.3.2.4, this data from Muak Sa-aak was compared with the Lamet data given by Svantesson in his study of U (Svantesson 1988: 107-122).

5.3.2.1 Final nasals and lateral approximants

In Muak Sa-aak, tonogenesis seemed to be only partially affected by vowel length. Most final nasals and lateral approximants seem to have retained their vowel length contrast and were the same tone, the falling Tone 3, regardless of vowel length. Within this tone, vowels that were short in Lamet, were short, and vowels that were long in Lamet were long in Muak Sa-aak, as seen in Table 43.

Table 43. Vowel length: Muak Sa-aak, Lamet, U (Lamet and U from Svantesson 1988, 107-122)⁵⁹

| | Muak Sa-aak | Lamet ⁶⁰ | U (Angkuic) |
|------------------|-----------------------|---------------------|-------------------|
| “dry field” | /ma:l ³ / | màar | mâ |
| “black” | /laŋ ³ / | lèŋ | làŋ ⁶¹ |
| “iron” | /t.ŋaŋ ³ / | ŋàŋ | ʔaŋàŋ |
| “eye” | /ŋa:j ³ / | ŋàay | ŋây |
| “arrow” | /te: ³ / | tèey | tê |
| “belly, stomach” | /k.tɿl ³ / | ktil | tû |

It can be seen that the vowel length in the Muak Sa-aak Tone 3 words here (Table 43) matches with the corresponding Lamet words, short or long. The U words, however, all have short vowels in this position; the length contrast has been lost as U developed tones.

5.3.2.2 Glottalized short open syllable

The words which took the short allotone of Tone 2, and did not end in a stop final correlate to Lamet words with final glottal stops. However, many of these Lamet words had long vowels. So if the Lamet vowel was short, the Muak Sa-aak word was the high allotone of checked Tone 2, with the short vowel. If the vowel is long in the Lamet cognate, in most cases, the Muak Sa-aak vowel here is also short, and again, it is the high allotone of checked Tone 2 as well. It appears that the length contrast here in Muak Sa-aak has been lost, but it is not reflected in a tone contrast, resulting in a neutralization of an earlier contrast. Examples are shown in Table 44, below (Section 5.3.2.3)

⁵⁹ Svantesson’s transcription of U in this article is probably not entirely phonemic (Svantesson 1988: 69); he does not discuss this for Lamet and most transcription is not marked with // or []. Therefore the items from U and from Lamet are not marked with // or [].

⁶⁰ In Svantesson’s transcription for Lamet and for U, there does not seem to be any syllable break marked between the presyllable and main syllable; he does not necessarily write any vowel in the presyllable. Thus rŋaŋ in Lamet might be written as r-ŋaŋ, or ʔaŋàŋ in U might be written ʔa-ŋàŋ.

⁶¹ Svantesson describes /ʕ/ as a voiced pharyngeal approximant (1988: 72). See Section 2.1.3.2 for discussion.

5.3.2.3 Final stops

Final non-glottal stops form a contrast to final glottal stops. If the vowel is short, final stops created the high allotone of checked Tone 2, and if long, they became low Tone 1. In terms of vowel length, short vowels in the Muak Sa-aak data (Tone 2) correspond to short vowels in the Lamet data used by Svantesson, and long vowels in the Muak Sa-aak data (Tone 1) correspond to long vowels in the Lamet data. Here, in the case of final stops, it is possible that tonogenesis may have resulted from the vowel length contrast, although the length difference has not disappeared. That is, the length distinction has not been lost, but it has been doubled in a tone contrast. Another piece of evidence in support of this conclusion is the fact that Muak Sa-aak appears to have no Tone 1 words with short vowel and stop final consonants. Likewise, Tone 2 has no words with long vowel and stop final consonants. See Table 44 below for comparison of the Muak Sa-aak to the U and Lamet data.

Table 44. Glottal stop finals, stop finals, and resulting tones in Muak Sa-aak (Lamet and U from Svantesson 1988: 107-122)⁶²

| | Muak Sa-aak | Lamet ⁶³ | U (Angkuic) |
|-----------------|-------------------------------------|---------------------|-------------------|
| “rope, string” | /p.ch ^h i ² / | plsíʔ | sí |
| “dog” | /c ^h ɔ ² / | sóʔ | sò |
| “wind” | /s.ma ² / | ʔmáaʔ | samà |
| “fish” | /k ^h a ² / | káaʔ | khà |
| “bite” | /kak ² / | kàk | káʔ ⁶⁴ |
| “hair” | /suk ² / | khúk | súʔ |
| “pig” | /le:k ¹ / | liik | líʔ |
| “bow, crossbow” | /ʔa:k ¹ / | ʔáak | ʔáʔ |

⁶² See Footnote 59, page 77.

⁶³ See Footnote 60, page 77.

⁶⁴ Svantesson describes /ʃ/ as a voiced pharyngeal approximant. It is the historical final *k (1988: 72). See Section 2.1.3.2 for discussion.

5.3.2.4 Tone 1 open syllables

There are not many Muak Sa-aak words ending in open syllables and occurring with Tone 1; when these words were compared with the Lamet data given in Svantesson's article, it was found that in Lamet, they were primarily words with final /-h/ or /-s/ (Lamet still has these finals, but Muak Sa-aak does not). The interesting question is at what point in time Muak Sa-aak lost the final /-h/ and /-s/, in relation to the development of tone. Table 45 shows some of these words in comparison with Lamet and U from Svantesson (1988). U, like Muak Sa-aak, has lost the final /-h/ and /-s/.

Table 45. Tone 1 words in Muak Sa-aak which may come from proto *-h or *-s finals (Lamet and U from Svantesson 1988: 107-122)⁶⁵

| | Muak Sa-aak | Lamet ⁶⁶ | U (Angkuic) |
|------------|------------------------------------|---------------------|-------------|
| “wide” | /wa: ¹ / | wàh | vâ |
| “charcoal” | /c ^h e: ¹ / | krsás | é |
| “bear” | /k ^h rej ¹ / | kríis | χί |
| However: | | | |
| “begin” | /kaw ² / | kóoh | kò |

In the last item, the Muak Sa-aak word has Tone 2.

For these particular final consonants to occur with a low tone is consistent with the evidence (see Section 2.2.2.3). To draw definite conclusions in this area, however, would require examining more words, and this area of final /-h/ and /-s/ would be an area for further study.

5.4 Summary

There are three tones in Muak Sa-aak, a low tone, Tone 1, a checked tone, Tone 2, and a falling tone, Tone 3. Although there are some features of voice phonation, register is not distinctive. The occurrence of the three tones is closely correlated to syllable structure, and in particular to final consonant type, but also to vowel length.

⁶⁵ See Footnote 59, page 77.

⁶⁶ See Footnote 60, page 77.

Tone is partially but not fully predictable based upon syllable structure. It is hypothesized that tones in Muak Sa-aak have come about as a result of the influence of both final consonants and vowel length. Borrowed words from Tai Lue may also have played a role, since most of the words occurring with the falling allotone of checked Tone 2 are borrowed words.

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