The raising and lowering of pitch caused by a voicing distinction in sonorants (nasals and approximants) : an epidemic disease in SEA languages

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Introduction
Hundred of languages spoken in the mainland of Southeast Asia and Southern China can be classified according to their genetic relationship into 5 major language families: Tibeto-Burman, Tai-Kadai, Hmong-Mien (Miao-Yao), Mon-Khmer, and Austronesian. All Languages in the Tai-Kadai, Hmong-Mien language families are tonal, and some Tibeto-Burman, Mon-Khmer and Austronesian languages have tone.

Consonantal perturbation of Fo associated with obstruents have been well attested in many languages. (A brief survey can be found in Maddieson, 1984.) It has been known among SEA language specialists that voiced sonorants normally have the same effect on pitch of the vowels as do voiced obstruents, and voiceless sonorants go together with voiceless obstruents in raising pitch. Maddieson (1984) did some spectrographic measurements of the effect of voiceless and voiced nasal and lateral sonorants on Fo of the following vowel in five pairs of Burmese words spoken by three speakers. According to his findings, there was a general difference in Fo at vowel onset between pairs of words which contrast in sonorant voicing, i.e., the voiced sonorants lower the pitch and the voiceless ones raise the pitch of following vowel as expected. Finally, he concluded: "Our findings only lead us as far as the conclusion that different supra glottal configurations may have relatively little importance in explaining consonant effects on pitch...It seems probable that a better understanding of the details of laryngeal settings for voicing and voicelessness will have to precede the formulation of a new theory accounting for such effects." (Maddieson, 1984: 14).
The role of pitch raising and lowering of sonorants in SEA languages

In this section, some examples of pitch raising and lowering of nasals and approximants will be drawn from the four language families of SEA: Mon-Khmer, Tibeto-Burman, Tai-Kadai, and Hmong-Mien.

The Monic branch of the Mon-Khmer language family comprises only two languages: Mon and Nyah Kur or Chao Bon (Diffloth, 1984). Both of them are register languages (2); pitch differences in Mon and Nyar Kur can be regarded as a component of the two contrastive register complexes (L-Thongkum, 1982 and 1988). There are three types of nasals and approximants occur in normal-voice syllables and the breathy-voice ones occur only in breathy-voice syllables. Regarding pitch differences, three pitches can be heard: high, mid, and low, in syllables having voiceless sonorant+clear vowel, voiced sonorant+clear vowel, and murmured sonorant+murmured vowel, respectively (L-Thongkum, 1990). In Nyah Kur, voiceless sonorants affect pitch of the following vowel the same way as voiceless aspirated obstruents. As a result, three different pitches can be heard clearly in the Ban Tha Pong dialect of Nyah Kur; for example, high pitch: [ch'amum 342 ~ ฏum 453] 'a bear', [ch'lo:əŋ 342 ~ lo:ŋ 543] 'high, tall' [thwar 453] 'a wasp'; mid pitch: [ma: 342] 'up to (such and such point)', [lụŋ 342] 'to shrink (of cloth)', [t pérd 342] 'till, until'; and low pitch: [młam 231] 'father's younger brother', [lụ: 231] 'to howl', [țhwał 231] 'thigh', etc. (L-Thongkum, 1982 and 1984).

Although the majority of Mon-Khmer languages are non-tonal, some Waic languages, Kawa and Samtao (Plang), have two tones: high vs. low (Diffloth, 1980), and some Angkuic languages, U and Man Met, have four-tone and six-tone systems (Diffloth, 1991). In tonal Mon-Khmer languages, words having voiceless sonorant initials always have high tone; for example, Kawa: /hláʔ/ 'leaf', /hlēʔ/ 'rain', /hlát/ 'to fear', /hlάŋ/ 'high', /hmáiŋ/ 'male', /hmáŋ/ 'to ask', /hmń/ 'to hear', /hnám/ 'blood', /ńhāp/ 'difficult', /ńhőʔ/ 'to yawn', /ńhiaŋ/ 'dark', /ńhåk/ 'ear', etc; Samtao: /ńhēʔ/ 'rain', /ńháʔ/ 'leaf', /ńhőʔ/ 'tree bark', /ńhét/ 'iron', /ńńūŋ/ 'high', /ńńūŋ/ 'to hear', /ńńíŋ/ 'male', /ńńőʔ/ 'rope', /ńńhá/ 'dry field', /ńńhwy/ 'axe', /ńńhāp/ 'difficult', /ńńhám/ 'blood', /ńńhúk/ 'ear', etc. Words with voiced sonorant initials can have high or low tone, depending
upon their phonological history, i.e. *ʔmV > mV, and *mV > mV (Diffloth, 1980).

Burmese, a Tibeto-Burman language, has four contrastive tones (U Thien Tun, 1982). In the speech of my Burmese informant, Mr. Wen Go, the phonetic characteristics of these four tones are: Tone 1 = breathy tone [32’], Tone 2 = clear tone [453], Tone 3 = creaky tone [51’], and Tone 4 = glottal tone [42’] or high-falling tone with abrupt end. Each of these four tones has two allotones, i.e., high [H] vs. low [L]. The high allotones only occur in syllables begun with voiceless aspirated obstruents and voiceless sonorants; for example, /ŋa¹/[1H] ‘nose’ vs. ’/ña¹/[1L] ‘ill’, /ŋa²/[2H] ‘to borrow, to hire’ vs. /ŋa²/[2L] ‘fish, five’, /ɲi³/[3H] ‘to ignite’ vs. /ɲi³/[3L] ‘be caught as by fire’, /mɛ⁴/[4H] ‘gad fly’ vs. /mɛ⁴/[4L] ‘dream’, /lou¹/[1H] ‘to warm one’s self’ vs. /lou¹/[1L] ‘secure, safe’, /lwe²/[2H] ‘go out of way’ vs. /lwe²/[2L] ‘vary’, /la³/[3H] ‘handsome, pretty’ vs. /la³/[3L] ‘moon, lunar month’, /lai⁴/[4H] ‘seriously’ vs. /lai⁴/[4L] ‘to flow’.

In general, Tai-Kadai languages have fully-developed tone systems. Lakkja, a Tai-Kadai language spoken in Jinxiu Autonomous Yao County, Guangxi Province, China, has six tones. These six tones can be divided into two tone categories: the high series tones (Tone 1 = [453], Tone 3 = [45], Tone 5 = [33]) and the low series tones (Tone 2 = [231], Tone 4 = [214], Tone 6 = [221]). Words with voiceless sonorant initials always have one of the three high series tones or odd-numbered tones (L-Thongkum, 1990); for example, /ŋaŋ¹/ ‘outside’, /ja³/ ‘after’, /lou¹/ ‘to extinguish’, /wa:i⁵/ ‘quick, fast’, /ja:u³/ ‘dry’, etc. This type of tonal behavior is also predictable in lexical items having voiceless sibilant and voiceless aspirated obstruent initials. In Kjiang E, Shangnan Maonan, and Sui, the high series tones also occur in words with voiceless sonorant initials, whereas words with voiced sonorant initials can have tones in both categories; for instance, E: /ŋaŋ¹/ ‘bamboo shoot’, /ŋok⁷/ ‘bird’, /ŋam³/ ‘water’, /hw¹⁰/ ‘fire’, /hjæn¹/ ‘teeth’, /lek⁷/ ‘steal’; Shangnan Maonan: /ma¹/ ‘dog’, /mai⁵/ ‘new’, /mat⁷/ ‘flea’, /mu⁵/ ‘pig’, /ŋɔ³/ ‘rat’, /hja¹/ ‘two’, /lɔm¹/ ‘wind’, /læp⁷/ ‘dark’, /yan¹/ ‘day, sun’, /yin³/ ‘to fly’, and so forth (Edmondson, 1991).
In the Miao-Yao language family, the Mien dialects of the Yao branch have six tones. The dichotomy, high series (Tone1 = [33], Tone3 = [354], Tone5 = [13] and low series (Tone2 = [31], Tone4 = [231], Tone6 = [11]) tones, is also applicable to the Mien dialects. Like Lakkja, words having voiceless sonorants and voiceless aspirated obstruents as initials always carry the high series tones; for example, /nei1/ 'fat, lard', /p3i1/ 'day, sun', /jaŋ°/ 'year', /win1/ 'to turn one's head', /la5/ 'moon', etc. (L-Thongkum, 1991). This type of phenomenon also exists in Hmong Daw or White Miao; for example, /mu35/ 'spear', /nu55/ 'day, sun', /nia35/ 'tooth', /nu35 (me°33)/ 'intestines', /luw55/ 'brain', /lua33/ 'rope', etc. In Hmong Daw, eight tones occur in non-checked syllables : /55/, /33/, /35/, /51/ (the high set), /22/, /21(glottalized)/, and /31(breathy)/ (the low set). Like Mien, words having voiceless sonorant initials can carry only tones in the high set (the author's field notes).

The evidence from Mon-Khmer, Tibeto-Burman, Tai-Kadai, and Hmong-Mien languages as shown above confirms very well that the "birth" and "death" of voiceless sonorants do have effect on the pitch of the following vowel, i.e. they are pitch raisers.

Flaws in phonetic theories

The knowledge obtained from working on a large number of SEA languages of many linguists and phoneticians specializing in SEA languages and linguistics tells us that there are still flaws in phonetic theories that should be reviewed and revised.

Firstly, sonorants (nasal, lateral, and semi-vowel) in SEA languages are equal to obstruents in many phonetic and phonological aspects, such as their status and distribution in phonological inventories, effect on Fo or pitch of the following vowel, history of phonological development, and so on. In the "International Phonetic Alphabet Chart" revised in 1989, there are no separate symbols for voiceless sonorants; only a diacritic placed under a voiced sonorant symbol (e.g.ŋ) is provided, whereas there are seven separate symbols for voiceless plosives : p, t, c, k, q, and ?. This fact seems to hint that phoneticians, especially in the Western world, have viewed voiceless sonorants as "illegitimate children" of "secondary importance". In my opinion, the diacritic provided for voiceless sonorants and devoiced obstruents (e.g. güc) is not inclusive enough.
and may cause frustration to field linguists in selecting a suitable symbol for the sound they hear. Let us look closely at the following phonetic symbols representing possible sounds in human language:

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<thead>
<tr>
<th></th>
<th>Plosive</th>
<th>Nasal</th>
<th>Lateral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voiceless</td>
<td>[p]</td>
<td>[m]</td>
<td>[l]</td>
</tr>
<tr>
<td>Voiceless+Aspiration</td>
<td>[ph]</td>
<td>[mh]</td>
<td>[lh]</td>
</tr>
<tr>
<td>Voice</td>
<td>[b]</td>
<td>[m]</td>
<td>[l]</td>
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<tr>
<td>Devoiced</td>
<td>[ɗ]</td>
<td>[ɗ]</td>
<td>[ɗ]</td>
</tr>
<tr>
<td>Voice+Aspiration</td>
<td>[bh]</td>
<td>[mh]</td>
<td>[lh]</td>
</tr>
<tr>
<td>Glottalized</td>
<td>[ʔb]</td>
<td>[ʔm]</td>
<td>[ʔl]</td>
</tr>
<tr>
<td>Creak+Voice</td>
<td>[ʔɭ]</td>
<td>[ʔɭ]</td>
<td>[ɭ]</td>
</tr>
<tr>
<td>Breath+Voice</td>
<td>[ɭ]</td>
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So far, when the sounds in SEA languages have been transcribed, the symbols m, hm, mh, ʔm have been used interchangeably for the so-called "voiceless bilabial nasals" and ɭ, hl, lh, ɭl for "voiceless lateral approximants." Do these four nasals or laterals in each set have the same phonetic quality? I think that these eight consonant symbols should be used in a more careful way because they indicate different kinds of phonation types or states of the glottis. Moreover, laryngeal settings for phonation types are some what related to pitch mechanisms. To support this view, the interaction between pitch and phonation type in some register Mon-Khmer languages has been studied instrumentally by Theraphan L-Thongkum (1987, 1988, 1989, 1990, and 1991). The results obtained from this kind of investigation can (lead to a better understanding of tonogenesis and the other aspects of sound change. The confusion will continue if there are no clear concepts and adequate symbols for sonorants, and if linguistic students have never been trained to hear and produce the sounds in question. We can no longer take for granted that some types of sonorants have never been in opposition or contrast, then, there is no need to distinguish them. We might risk missing some important clues for solving the linguistic problems of SEA, an area where language resources are rich.

Secondly, there is no explicit phonetic explanation for the pitch raising effect of voiceless sonorants; and the fact that voiceless sonorants or aspirated sonorants affect the pitch of the following vowel the same way as voiceless aspirated obstruents and voiceless sibilants in many SEA languages even adds more puzzles to the problem. All of the theories we have at present, i.e.
vertical larnnx tension (laryngeal tension, supraglottal configurations) and aerodynamic theories (subglottal pressure, Bernouilli effect), seem to focus mostly on the effect of obstruents on the pitch of the following vowel. (See Bell-Berti, 1975; Gandour, 1974; Halle and Stevens, 1971; Hombert et al, 1979; Lefebvre, 1967; Painter, 1978; Ohala, 1978; Riordan, 1980; Titze and Talkin, 1979; Westbury, 1983.)

There is a need for an adequate theory of consonant effects on pitch that is able to explain the SEM phenomena -- a unified theory that can explain things in terms of the integration of articulatory settings laryngeal mechanisms for the production of phonation type and pitch, amount and velocity of air-flow, and so on. All of these features seem to have a large or small share in pitch raising and lowering.

Notes

(1) Ross (1991), cited in Edmondson (1991), has reported that Yabem, Bukawa, and Kela, the three Austronesian languages of North Huon Gulf of Papua New Guinea possess tone. Michael D. Larish also says that Moklen is becoming a tonal language through language contact with Southern Thai dialects (Larish, personal communication).

However, in this paper, the Austronesian languages will not be taken into account, since the majority of them are non-tonal and I have never had any first hand experience in working on any Austronesian languages.

(2) A register language may be viewed as a language that has contrastive phonation types.

(3) In Baise Kim Mun, a dialect of the Yao branch, voiceless sonorants have been lost (*m > m, *l > l) however, each of the high series tones has split into two tones: *T1> /T1.1/= [354], and /T1.2/= [13]; *T3//T3.1/= [45'] and /T3.2/= [35]; and *T5> /T5.1/= [354] and /T5.2/= [33]. As a result, words that used to have voiceless sonorant initials have voiced sonorants with /T1.1/, /T3.1/, or /T5.1/, at present. A case of tonal flip-flop occurs in Jinxiu Kim Mun: /T1.1/ and /T5.1/ are lower than /T1.2/ and /T5.2/. (See more details in L-Thongkum, 1991)
(4) For example, Initial consonant Tone
\[ bh > b \quad mh > m \quad lh > l \quad zh > z \]
\[ ph = ph \quad mh = mh \quad lh = lh \quad sh = sh \] /High/<
\[ p = p \quad \bar{m} = \bar{m} \quad \bar{l} = \bar{l} \quad s = s \] /High/ >
\[ ?b > b \quad ?m > m \quad ?l > l \quad ?z > z \] /Mid/<
\[ b > p/ph \quad m > \bar{m}, mh \quad l > \bar{l}, lh \quad z > s, sh \] /Low/ > /Low/<

References


Diffloth, G. 1980. The Wa Languages. (Linguistics of the Tibeto-Burman Area 5(2). Fresno, California: California State University

Diffloth, G. 1984. The Dvaravati-Old-Mon Language and Nyar-Kur (Monic Language Study 1). Bangkok: Linguistics Research Unit, Faculty of Arts, Chulalongkorn University.


1984. Tonogenesis in Mon-Khmer languages. Journal of the Faculty of Arts 16 (2) 53-72. Bangkok (In Thai.)


