

Deaspiration and the Laryngeal Specification of Fricatives in Jinghpaw

KEITA KURABE

ILCAA, Tokyo University of Foreign Studies

Abstract: The aim of this paper is to argue that several distinct phonological phenomena in Jinghpaw such as phonological gaps in the phoneme inventory, morphophonological alternations of prefixes, and similarity avoidance effect in the lexicon, can be uniformly accounted for in terms of deaspiration or aspiration dissimilation. The present paper, by taking into consideration that voiceless fricatives in the language are phonologically specified for [+spread glottis] like aspirated stops based on phonological gaps in the consonant inventory, shows that the Obligatory Contour Principle (OCP) on the [spread glottis] tier accounts for several types of prefix alternations involving aspirated stops and voiceless fricatives. This paper also examines the Jinghpaw lexicon, highlighting a distributional asymmetry involving [spread glottis] in the lexicon, and shows that the asymmetry is due to the ban against multiple [+spread glottis] on the [spread glottis] tier.*

Key words: Jinghpaw, deaspiration, laryngeal dissimilation, spread glottis, OCP

1. Introduction

Deaspiration as a type of laryngeal dissimilation is a cross-linguistically common phenomenon widely attested at both the synchronic and diachronic levels. This dissimilatory process arises when more than one aspirate occurs within a certain

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The Jinghpaw data treated in this paper are, unless otherwise noted, based on primary data collected by the author in Myitkyina, Kachin State, Burma, between 2009 and 2017 as part of fieldwork on the language. The Shan data are based on Sao Tern Moeng (1995) and transcribed following the system used in SEALang Library Shan Dictionary: <http://www.sealang.net/shan/dictionary.htm> [accessed December 6, 2017]. The Burmese data are based on Myanmar Language Commission ed. (2009).

Abbreviations used in this paper are as follows: CAUS: causative; COP: copula; INTJ: interjection; OM: Old Mongolian; PIE: Proto-Indo-European; PTB: Proto-Tibeto-Burman; RED: reduplicant.

phonological domain, as a prohibition against adjacent identical elements on the same melodic tier. The goal of this paper, in terms of deaspiration, is to provide a unified account of several distinct phonological phenomena in Jinghpaw, a Tibeto-Burman language spoken in northern Burma and neighboring areas of China and India. The present paper also illustrates that a unified account is only achieved under the assumption that voiceless fricatives categorically pattern with aspirated stops in the language, phonologically specified for [+spread glottis].

The paper is organized as follows. Section 2 provides a literature review on deaspiration as a type of laryngeal dissimilation in order to locate the Jinghpaw phenomenon in a wider context. Section 3 presents descriptive accounts of five phonological phenomena in Jinghpaw that provide data for further analysis in Section 4. They are: (a) phonological gaps in the consonant inventory that provides an implication for the aspiration category in the language; (b) synchronic or diachronic morphophonological alternations of three prefixes that could be considered realizations of deaspiration; and (c) a similarity avoidance effect in the lexicon that could also be regarded as one manifestation of deaspiration. Section 4, building upon previous studies on the laryngeal specification of fricatives, presents an analysis based on the OCP effect on the [spread glottis] tier that provides a unified explanation of all the phonological phenomena observed in Section 3.

2. Deaspiration

Deaspiration often arises as a dissimilatory process. Laryngeal dissimilation is a process involving laryngeal features including well-known phonological processes such as voicing dissimilation like Dahl's Law in several Eastern Bantu languages and Lyman's Law in Japanese, and aspiration dissimilation like Grassmann's Law in Indo-European languages where aspirated stops are dissimilated to unaspirated stops when followed by other aspirates within the same phonological word. Data from Sanskrit in (1a) and Greek in (1b) illustrate Grassmann's Law, which occurred independently in the history of the two Indo-European languages.

(1) Grassmann's Law in Sanskrit and Greek (Hock 1991: 111–112)

PIE	Sanskrit/Greek	Gloss
a. *bhudhyetoy	Sk. budhyatē	'is awake'
*bhebhowdhe	Sk. bubōdha	'was awake'
b. *dhidhēmi	Gk. tithēmi	'put'
*gheghewa	Gk. kekheua	'poured'

A similar diachronic dissimilatory process is also observed in the history of genetically unrelated Mongolian languages, where a rule deaspirates initial stops and affricates of Old Mongolian when they are in adjacent syllables. Crucially for the present study, this process is also triggered by *s as illustrated in (2b). The deaspiration is observed in all dialects of Mongolian proper with the exception of Northern Halh and Eastern Mongolian (Svantesson et al. 2005: 205–208). Compare:

(2) Mongolian (Svantesson et al. 2005: 206)

	OM	Chahar	Halh	Gloss
a.	*t ^h at ^h a	tat ^h	t ^h at ^h	'to pull'
	*č ^h ik ^h in	čix	č ^h ix	'ear'
b.	*t ^h osun	tɔs	t ^h ɔs	'fat'
	*č ^h isun	čus	č ^h us	'blood'

Deaspiration is also attested in the synchronic phonology of several distinct languages. Allen (1957: 5), for example, observes, "Aspirated consonants imply unaspirated preceding and following consonants (within a word)" in Harauti, an Indo-Aryan language spoken in Rajasthan, India. de Reuse (1981: 243) also observes, "A syllable of the shape ChV loses its aspiration when it comes to occur before another syllable of the shape ChV" in Ofo, an extinct American Indian language spoken on the lower Mississippi, citing examples such as:

- (3) Ofo (de Reuse 1981: 243–244)
- | | | | |
|----------|-------------|------|--------------------------|
| oskafha | 'the white' | from | o'skha-afha ⁿ |
| tu'fafha | 'to tear' | from | tu-fha-fha |

In Meithei, a Tibeto-Burman language spoken in Manipur, India, a consonant is deaspirated and subsequently voiced when preceded by an aspirate. Again, a voiceless fricative /h/ triggers the deaspiration of the following consonant. Examples provided in (4) illustrate the deaspiration of derivational suffixes *-khət* 'V upward' and *-thok* 'V outward'.

- (4) Meithei (Chelliah 1997: 55)
- | Root | | Root + derivational suffix |
|------|----------|----------------------------|
| thin | 'pierce' | thingət 'pierce upwards' |
| hi | 'trim' | hidok 'trim outwards' |

3. Jinghpaw data

This section provides descriptive accounts of five related phonological phenomena in Jinghpaw that provide data for further analysis in Section 4: phonological gaps in the consonant inventory (3.1), synchronic alternations of the causative (3.2) and temporal prefixes (3.3), a diachronic alternation of the animal prefix (3.4), and a similarity avoidance effect in the lexicon (3.5). All the phenomena are related in terms of the interaction between aspirated stops and voiceless fricatives.

3.1. Gaps in the consonant inventory

Table 1 provides the phonemic consonant inventory of Jinghpaw based on Kurabe (2017).¹ What is relevant here is the fact that there are phonological gaps involv-

¹ The phoneme /h/ is marginal, being mostly restricted to interjections, onomatopoeia or onomatopoeic words in the native phonology, e.g., /hã/ 'INTJ' and /hám/ 'yawn'. Its marginality is also reflected in the fact that many of the /h/ in loanwords are nativized and adapted as /k^h/ in Jinghpaw, e.g., /k^hoy/ 'shellfish' from Shan /hoj¹/.

ing aspirated stops and voiceless fricatives in the inventory. This suggests that the voiceless fricatives /s/ and /ç/ are phonologically aspirated counterparts of /ʈ/ and /ç/. We will elaborate on this point later on in Section 4.2.

Table 1. Jinghpaw consonant inventory

Stops and affricates	p	t	ʈ	c	k	ʔ
	b	d	ɟ	j	g	
	p ^h	t ^h			k ^h	
Fricatives			s	ç		(h)
Nasals	m	n			ŋ	
	ʔm	ʔn			ʔŋ	
Liquids		l	r			
		ʔl	ʔr			
Semivowels	w			y		
	ʔw			ʔy		

3.2. Causative prefix

A well-known phenomenon in Jinghpaw morphophonology is the alternation of the causative prefix that exhibits two allomorphs: *ɕə-* and *jə-*. A descriptive account from previous studies is given in (5):²

- (5) Environment (Liu ed. 1984: 33, Dai and Xu 1992: 74–76, Dai 2012: 88–89)
The allomorph *jə-* occurs before aspirated stops or voiceless fricatives, while *ɕə-* occurs elsewhere.

Relevant data are provided in (6a) and (b). Compare:

- (6) a. *poy* ‘be blown’ → *ɕə-poy* ‘scatter to the wind’
ʈsan ‘be far’ → *ɕə-ʈsan* ‘cause to be remote’
caŋ ‘be black’ → *ɕə-caŋ* ‘blacken’
màt ‘be lost’ → *ɕə-màt* ‘lose’
ráy ‘COP’ → *ɕə-ráy* ‘adjust’
 b. *p^hrò* ‘be white’ → *jə-p^hrò* ‘whiten’
t^hèn ‘be broken’ → *jə-t^hèn* ‘break’
k^há ‘be bitter’ → *jə-k^há* ‘cause to be bitter’
sán ‘be clear’ → *jə-sán* ‘clean’
ɕàŋ ‘enter’ → *jə-ɕàŋ* ‘cause to enter’

Each sonorant has a corresponding preglottalized series whose phonemic status can be established by minimal pairs such as /*maŋ*/ ‘corpse’ vs. /*ʔmaŋ*/ ‘be dark’ and /*wàn*/ ‘be coiled’ vs. /*ʔwàn*/ ‘fire’. This paper treats a preglottalized consonant as a single consonant, not a consonant cluster. This interpretation has an advantage in simplifying syllable structure (Kurabe 2016). Note also that preglottalization is not uncommon in neighboring Tibeto-Burman languages (Matisoff 2003).

² The transcription is slightly modified in accordance with the phonemic representation in this paper.

The allomorph $\epsilon\partial-$, although not discussed in previous studies, can be interpreted as the underlying form based on its wider distribution. Thus:

(7) Rule of the causative alternation

$$\epsilon\partial- \rightarrow j\partial- / __ p^h, t^h, k^h, s, \epsilon$$

That is to say, the causative prefix $\epsilon\partial-$ alternates with $j\partial-$ when followed by aspirated stops or voiceless fricatives. This conditioning factor suggests that aspirated stops and voiceless fricatives form a natural class in the language. Note further that the rule also suggests that the voiceless fricative $/\epsilon/$ is dispreferred before aspirated stops or voiceless fricatives, which can be seen as a kind of dissimilation. We will revisit this issue in Section 4 after taking a look at other relevant phenomena below.

3.3. Temporal prefix

Jinghpaw, as described in previous studies (Liu ed. 1982: 20, Dai and Xu 1992: 2, Dai 2012: 34–35), has an array of prefixes that derive various cyclic time nouns.³ These prefixes are added to bound morphemes expressing cyclic time such as *ní* ‘day’ and *niŋ* ‘year’. The prefix $\epsilon\partial-$ forms generic time nouns such as $\epsilon\partial$ -*ní* ‘day’. The prefix *dày-*, which has its diachronic source in the demonstrative *nday* ‘this’, marks the ‘present’ cycle such as *dày-ní* ‘today’. The prefixes *ʔmə-* and *ma-*, whose diachronic origins are unknown, mark ‘one cycle before’ and ‘two cycles before’ respectively such as *ʔmə-ní* ‘yesterday’ and *ma-ní* ‘day before yesterday’. Table 2 is a summary of the combinations of temporal prefixes and cyclic bound nouns provided in previous studies together with the prefix *lə-* ‘one’ that is also attached to bound time nouns, e.g., *lə-ní* ‘one day’, and has its diachronic source in the numeral *ləŋáy* ‘one’.

Table 2. Temporal prefixes (previous studies)

	$\epsilon\partial-$	<i>dày-</i>	<i>ʔmə-</i>	<i>ma-</i>	<i>lə-</i>
‘day’	$\epsilon\partial$ - <i>ní</i>	<i>dày-ní</i>	<i>ʔmə-ní</i>	<i>ma-ní</i>	<i>lə-ní</i>
‘year’	$\epsilon\partial$ - <i>niŋ</i>	<i>dày-niŋ</i>	<i>ʔmə-niŋ</i>	<i>ma-niŋ</i>	<i>lə-niŋ</i>
‘night’	$\epsilon\partial$ - <i>náʔ</i>	<i>dày-náʔ</i>	<i>ʔmə-náʔ</i>	<i>ma-náʔ</i>	<i>lə-náʔ</i>

Although not listed in previous studies, bound morphemes carrying the sense of ‘month’ and ‘morning’ are also involved in the same temporal system as illustrated in Table 3.⁴

³ A similar temporal prefix is also found in Mongsen Ao, a Tibeto-Burman language spoken in Nagaland, India (Alexander Coupe, p.c., 2017).

⁴ The arbitrary gaps in Table 3 can only be filled by analytical expressions, e.g., *nday* $\epsilon\partial$ *ta* ‘this month’, etc.

Table 3. Temporal prefixes (complete version)

	ɕə-	dày-	ʔmə-	ma-	lə-
'day'	ɕə-ní	dày-ní	ʔmə-ní	ma-ní	lə-ní
'month'	ɕə-ta	—	—	—	—
'year'	ɕə-niŋ	dày-niŋ	ʔmə-niŋ	ma-niŋ	lə-niŋ
'morning'	jə-pʰòt	dày-pʰòt	—	ma-pʰòt	lə-pʰòt
'night'	ɕə-náʔ	dày-náʔ	ʔmə-náʔ	ma-náʔ	lə-náʔ

Observe in Table 3 that the temporal prefix ɕə- is turned into jə- before the aspirated stop /pʰ/, i.e., jə-pʰòt 'morning'. Again, we can observe that, although limited in scope, a voiceless fricative prefix is not preferred before an aspirated stop, as we have seen in Section 3.2.

3.4. Animal prefix

The cases we have looked at in Sections 3.2 and 3.3 are synchronic processes. A relevant phenomenon is also observed in the diachronic phonology of the language. Among various kinds of prefixes reconstructed for Proto-Tibeto-Burman (PTB), the animal prefix *s- (ultimately from *sya 'animal, flesh, body') is a well-established proto-prefix that has been retained in a number of modern Tibeto-Burman languages with various reflexes (Benedict 1972: 106–108, Matisoff 2003: 97, 102). It is usually added to nominal roots referring to animals and body parts. Examples:

- (8) Reflexes of PTB *s- (Matisoff 2003: 97, 102)
- Written Tibetan: *s-brul* 'snake', *s-bal-pa* 'frog', *s-dig-pa* 'scorpion', *stag* 'tiger'
 - Lushai: *sa-kbi* 'barking deer', *sa-hram* 'otter', *sa-hŋa* 'fish', *sa-va* 'bird'
 - Nung: *sə-wi* 'bear', *sə-ro* 'ant', *sə-ri* 'barking deer'
 - Miri: *si-tum* 'bear', *si-be* 'monkey'
 - Chokri: *tə-ki*⁴⁴ 'monkey', *tə-ɕi*⁴⁴ 'dog', *thə-ɣ*⁴⁴ 'frog', *thə-ɔ*²¹ 'pig'

The PTB animal prefix is reflected in Jinghpaw as either a fricative ɕə- or sə- (Matisoff 2003: 102), the conditioning factor of which is unknown. Examples:

- (9) Reflexes of PTB *s- in Jinghpaw
- ɕə-*ram* 'otter', ɕə-*ro(ŋ)* 'tiger', ɕə-*ru* 'mole', ɕə-*krép* 'bedbug', ɕə-*líp* 'cockroach'
 - sə-*woy* 'pangolin', sə-*naŋ* 'wild boar', sə-*gú* 'sheep'

It is important here to note that, although not mentioned in previous studies, there is a third type of reflexes of the PTB prefix *s- in Jinghpaw: ɔ- (~ jə-). This reflex is observable before aspirated stops. Examples include:⁵

⁵ Some of these items are reconstructed for PTB with a prefix *d-, e.g., *d-kəy 'barking deer'. The Jinghpaw data suggest that these items also had the animal prefix *s-, indicating variation in proto-prefixes.

(10) Reflexes of PTB *s- before aspirates

cə-kʰyon ‘wolf, wild dog’, *cə-kʰyi* ‘barking deer’, *cə-kʰən* ‘crab’, *cə-kʰraw* ‘tailor ant’, *cə-kʰây* ~ *jə-kʰây* ‘giant squirrel’

The diachronic sound change of the animal prefix, like synchronic alternations observed in causative and temporal prefixes, suggests that a voiceless fricative prefix is dispreferred before aspirates.

3.5. Asymmetry in the lexicon

This section examines the Jinghpaw lexicon, highlighting a distributional asymmetry involving aspirated stops and voiceless fricatives in the lexicon. Monomorphemic words in Jinghpaw are almost always monosyllabic or disyllabic. A large portion of disyllables exhibit the iambic prosodic pattern consisting of a heavy syllable preceded by a light syllable headed by /ə/ with reduced phonemic possibilities (e.g., no medials, no finals). Jinghpaw disyllables can thus be represented as $C_1ə.C_2(C_3)V(C_4)$, where two medials /r, y/ and nine finals /p, t, k, ʔ, m, n, ŋ, w, y/ may optionally occupy the C_3 and C_4 slots, respectively. Table 4 provides a summary of the frequency of two consecutive consonants in the $C_1ə.C_2$ sequence in lexical items listed in Hanson (1906), a copious dictionary of Jinghpaw. The column in the table indicates C_1 and the row C_2 . Labels for the main consonant groups are as follows: T (voiceless stops and affricates excluding the glottal stop), D (voiced stops and affricates), TH (aspirated stops), S (voiceless fricatives), N (nasals), L (liquids), and Y (semivowels).⁶

Table 4. Frequency of two successive consonants in $C_1ə.C_2$

	T	D	TH	S	N	L	Y
T	60	59	57	24	56	57	9
D	64	114	133	54	69	105	49
TH	16	6	2	0	12	38	9
S	119	136	16	5	99	93	41
N	106	129	53	43	55	95	33
L	95	88	93	37	61	18	21
Y	0	0	0	0	1	0	0

The statistical asymmetry in the lexicon involving aspirated stops and voiceless fricatives (TH and S) displays a similarity avoidance effect in the Jinghpaw lexicon where sequences of aspirated stops and voiceless fricatives are dispreferred. There are thus no sequences of TH and S in the lexicon. Remarks on exceptional combinations are in order. The dispreferred sequence of TH plus TH comes from the two examples given in (11). Note, however, that both have allomorphs involving

⁶ Hanson (1906), for unknown reasons, very often confuses *gə* with *kə* in his dictionary. All relevant examples are identified based on Maran (1978) and considered in Table 4. Examples involving a glottal stop, i.e., *ʔə*, are not considered in the table because it is not relevant to our discussion although they are prevalent in the Jinghpaw lexicon.

unaspirated stops, which native speakers prefer more.

(11) Exceptional TH + TH sequences

- kʰətʰəp* ~ *gətʰəp* ‘approach’
pʰəkʰəm ~ *pəkʰəm* ‘security, as for money’

Counterexamples consisting of S plus S are exemplified by five items among which three show allomorphs involving their unaspirated counterparts. Thus:

(12) Exceptional S + S sequences

- səsan* ~ *ɛəsən* ‘a branch of Kachin tribes’
səsət ~ *ɛəsət* ~ *ɛəsət* ‘measure by steps’

The exceptional combination of S plus TH comes from sixteen lexical items, among which thirteen have /s/ as their C₁. At least two of them are loanwords from neighboring languages, as given in (13a), three have their sources in compounds, as given in (13b), and three exhibit allomorphs involving unaspirates, as given in (13c).

(13) Exceptional S + TH sequences

- a. *səkʰá* ‘Epsom salts’ (< Burmese *sʰəkʰá*)
sətʰí ‘rich man’ (< Shan *sʰáʰtʰéʰ* < Burmese + Pali)
- b. *səkʰàp* ‘a batch of cotton’ < *pəsi-kʰàp* (lit. cotton-load)
səpʰò ‘a kind of cotton’ < *pəsi-pʰò* (lit. cotton-?)
səpʰra ~ *ɛəsəpʰra* ‘cotton field’ < *pəsi-pʰra* (lit. cotton-platform)
- c. *səpʰó* ~ *ɛəsəpʰó* ‘consult’
səpʰo ~ *ɛəsəpʰo* ‘flood debris’
səpʰra ~ *ɛəsəpʰra* ‘cotton field’ (see 13b)

4. Discussion

The phonological phenomena we have observed in Section 3, although they have not been discussed collectively in previous studies, are related in terms of the interaction between aspirated stops and voiceless fricatives. Our data suggest that: (a) aspirated stops and voiceless fricatives form a natural class; and (b) they are prohibited from occurring in succession. The purpose of this section is to provide a unified account of the phonological phenomena in the previous section based on recent discussions on distinctive feature theory, to which we turn first in Section 4.1.

4.1. Laryngeal specifications of fricatives

Aspirated stops (e.g., /pʰ, bʰ/) that are produced by spreading the vocal folds are represented by a distinctive feature [+spread glottis] (henceforth [+sg]). The unmarked laryngeal state of fricatives, whether voiced or voiceless, has traditionally been assumed to be unaspirated or [-sg] (Halle and Stevens 1971). Recent studies, however, indicate that the unmarked laryngeal specification of voiceless fricatives is [+sg], phonetically being produced with a spread glottis (Kingston 1990, Blevins

1993, Iverson and Salmons 1995, Vaux 1998, Vaux and Miller 2011). Vaux (1998) demonstrates that laryngeal properties, in addition to the two key invariant feature complements of fricatives [+continuant] and [-sonorant], are also significant for fricatives at least in languages where [spread glottis] is phonologically active. The unmarked laryngeal specification of fricatives, depending on voicing, has the following feature values:

- (14) Laryngeal specifications of fricatives
 voiced fricatives [-sg]
 voiceless fricatives [+sg]

Evidence in support of this position has been accumulated through data from cross-linguistically diverse languages at both the synchronic and diachronic levels. Vaux (1998), drawing on data from several languages, cites a diverse array of phonological phenomena favoring the position that [+sg] is the unmarked laryngeal specification of voiceless fricatives. A piece of evidence emanates from laryngeal assimilation in the New Julfa dialect of Armenian where the future prefix *k-* assimilates in laryngeal features (voicing and aspiration) to a consonant to its right. Crucially, voiceless fricatives cause aspiration in line with aspirated stops. Consider:

- (15) New Julfa Armenian (Vaux 1998: 498)
- | Underlying form | Surface form | Gloss |
|-----------------|--------------|-----------------------------|
| k-t-a-m | kətam | 'I will go' |
| k-bzz-a-m | gəbəzzam | 'I will buzz' |
| k-tʰoʁ-n-ie-m | kʰətʰoʁniem | 'I will allow' |
| k-savor-ie-m | kʰəsavoriem | 'I will grow accustomed to' |
| k-dʰ-n-ie-m | gʰədʰəniem | 'I will put' |

Debuccalization of a coda fricative in the Seville dialect of Spanish also provides evidence in favor of the proposed representation of voiceless fricatives where a debuccalized /s/ aspirates the following stops. For example:

- (16) Seville Spanish (Vaux 1998: 504)
- | Underlying form | Surface form | Gloss |
|-----------------|--------------|---------------|
| los padres | loh pʰaðreh | 'the parents' |

Further evidence comes from the diachronic phonology of Pali, where the original fricative + stop sequences were simplified from /sC/ to /Cʰ/ in initial position and /sC/ to /CCʰ/ in medial position. Examples:

- (17) Pali (Vaux 1998: 503)
- | Sanskrit | Pali | Gloss |
|----------|----------|------------|
| stána- | tʰana- | 'breast' |
| skandʰá- | kʰandʰa- | 'shoulder' |
| hásta- | hattʰa- | 'hand' |
| yaṣṭí- | yaṭṭʰi- | 'pole' |

Consonant classes of Thai tonogenesis also provide diachronic evidence for the laryngeal specification of voiceless fricatives, where voiceless fricatives pattern with voiceless aspirated stops and voiceless sonorants in the development of the Thai tone (Vaux 1998: 507).

4.2. Revisiting the Jinghpaw voiceless fricatives

Previous studies in Section 4.1 suggest that the two voiceless fricatives in Jinghpaw, i.e., /s/ and /ç/, are laryngeally specified for [+sg] like aspirated stops.⁷ This interpretation can also be justified in terms of Jinghpaw-internal evidence. Phonetically, the two voiceless fricatives are usually realized with the aspiration. The linguistic intuition of native speakers also reveals us that the Jinghpaw fricative /s/ is an aspirate, judging that the Jinghpaw /s/ is equivalent to /s^h/ in Burmese that has a phonemic contrast between plain /s/ and aspirated /s^h/. Note further that the affricates /tʃ/ and /dʒ/ tend to be produced as [s] and [z] by younger speakers whose phonology has a three-way contrast between voiceless, voiced, and aspirated alveolar fricatives as in Burmese.⁸

The morphophonological alternation of the causative prefix in Section 3.2 also confirms the proposed analysis when we consider that the key feature underlying the conditioning factor of the alternation rule (7), reproduced below for easy reference, is the laryngeal feature [+sg].

(7) Rule of the causative alternation

$$çə- \rightarrow jə- / _ p^h, t^h, k^h, s, ç$$

The prefix alternations and similarity avoidance effect in Section 3 also support this position when we consider that the key feature operating on the dissimilation is [+sg] which we will elaborate on in Section 4.3 below.

Recall that the close relationship between voiceless fricatives and aspirated stops is also suggested by the phonological gaps in the consonant inventory, as mentioned in Section 3.1, which suggest that the fricatives /s/ and /ç/ are phonologically aspirated counterparts of /tʃ/ and /dʒ/. This view is now more convincing given that: (a) the fricative /s/ [s^h] is contrasted with /tʃ/ [s] and /dʒ/ [z] in the phonology of younger speakers; (b) the fricative /s/ is sometimes in free variation with /dʒ/ in the similarity avoidance phenomenon (Section 3.5); and (c) the fricative /ç/ is turned into /j/ in prefix alternations (Sections 3.2 and 3.3).⁹ This interpretation leads to the more systematic consonant inventory given in Table 5.¹⁰

⁷ See Appendix for further feature specifications of Jinghpaw consonants for major class, laryngeal, manner, and place features.

⁸ Similar historical developments can also be observed in neighboring languages such as Rawang and Shan (Randy J. LaPolla, p.c., 2017).

⁹ The voicing in the latter two can be attributed to lenition in weak syllables (see Section 4.3 below).

¹⁰ In the following sections, though, we will continue to use the symbols /s/ and /ç/.

Table 5. Another interpretation of the consonant inventory

p	t	ʈ (s)	c	k	ʔ
b	d	ɖ (z)	j	g	
p ^h	t ^h	ʈ ^h (s ^h)	c ^h	k ^h	(h)
m	n			ŋ	
ʔm	ʔn			ʔŋ	
	l	r			
	ʔl	ʔr			
w			y		
ʔw			ʔy		

4.3. Deaspiration and the OCP

The laryngeal feature [+sg], as noted above, is the key factor underlying the prefix alternations and similarity avoidance effect involving aspirated stops and voiceless fricatives. Because both of them are laryngeally specified for [+sg], the prefix alternation rule can be reduced to the dissimilatory rule given in (18):

- (18) Deaspiration rule
- | | | |
|-------|---|-------|
| C | V | C |
| ‡ | | |
| [+sg] | | [+sg] |

which states that two successive [+sg] are ruled out by delinking the first. The essence of the synchronic alternations of the causative and temporal prefixes and the diachronic alternation of the animal prefix is thus aspiration dissimilation, which is a general phonological process found cross-linguistically both at the synchronic and diachronic levels (Section 2).

Note that the causative and temporal prefixes change not only in aspiration but also in voicing, i.e., *ɛə-* → *jə-*. This fact appears to be due to lenition given that it occurs in light syllables. This is supported by the fact that voiced onsets are prevalent in Jinghpaw light syllables (see Table 4). Voicing in light syllables can also be observed in other parts of Jinghpaw morphophonology. Etymologically voiceless consonants in compounds, for example, were sometimes voiced when they came to occur in light syllables. Observe this in the historical development of a compound in (19) that was derived by means of deletion of a light syllable and weakening of the first syllable due to the predominance of the iambic pattern of Jinghpaw prosody.¹¹

- (19) **ləpu-rèn* (lit. snake-long) > **pu-rèn* > *bərèn* ‘dragon’

Deaspiration in Jinghpaw can be attributed to a general constraint stated below (McCarthy 1986) that is well established based on data from a variety of languages:¹²

¹¹ See Dai and Wu (1995) for more relevant examples.

¹² A similar analysis based on [+spread glottis] and OCP is also provided by Chelliah (1997:

(20) Obligatory Contour Principle (OCP)

At the melodic level, adjacent identical elements are prohibited.

The morphophonological rule of the prefix alternation (18) and the similarity avoidance effect in the lexicon illustrated in Sections 3.2 to 3.5 can be seen as two manifestations of OCP effect given in (21): the ban against multiple [+sg] on the [spread glottis] tier.¹³

(21) OCP on [spread glottis] tier

a.	C	V	C	b.	C	V	C	c.	*C	V	C
	[+sg]				[+sg]				[+sg]		[+sg]

The constraint (21) predicts the systematic avoidance of words like (22b) in the lexicon due to the violation of OCP (spread glottis) in contrast to well-formed words like (22a).

- (22) a. *ɛəga* ‘speak’, *gəɛà* ‘child’, *kʰədon* ‘cricket’, *dəkʰəlʔ* ‘be guaranteed’
 b. **ɛəkʰa*, **kʰəɛa*, **kʰəlʔon*, **lʔəkʰon*

Note further that the OCP effect in Jinghpaw operates within monomorphemic or derived words. It does not apply to compounds as in (23a) or reduplicated words as in (23b).¹⁴

- (23) a. *ɛàn-kʰri* (meat-sour) ‘pickled meat’
 b. *kʰum-kʰum* (complete-RED) ‘total’

Although it is of great interest to know whether the constraint is unbounded or operates under syllable adjacency (Odden 1994), this cannot be demonstrated because almost all the monomorphemic words in Jinghpaw are monosyllables or disyllables, and all the prefixes discussed in Sections 3.2 to 3.4 target monosyllabic bases. Thus, the causative prefix can only be added to monosyllabic bases as in *ɛə-pyo* ‘CAUS-be.happy’ (cf. **ɛə-gəbu* ‘CAUS-be.glad’).

5. Conclusions

This paper explored deaspiration or aspiration dissimilation in Jinghpaw realized

55) for the deaspiration in Meithei (see Section 2).

¹³As suggested by a reviewer, although the OCP on the [spread glottis] tier operates on the whole phonology of Jinghpaw, the prefix alternation and the similarity avoidance effect should be kept separated in terms of their targets: the former always targets the preceding [+sg] while the latter operates irrespective of the position of [+sg], suggesting that it is specified in the lexicon.

¹⁴It is unclear whether the quality of vowels (e.g., schwas vs. full vowels) or the existence of coda consonants plays a role in deaspiration because all the relevant prefixes take the shape of light syllables, and because disyllables that do not involve light syllables are rare in the lexicon. Recall that light syllables are always headed by schwas and do not allow coda consonants (Section 3.5).

by various forms in the synchronic and diachronic phonologies of the language, and provided a unified account on several distinct phonological phenomena in terms of deaspiration. The primary findings of the present paper are as follows: (a) the voiceless fricatives in Jinghpaw are specified for [+sg] and form a natural class with aspirated stops; (b) the essence of the prefix alternations and the similarity avoidance effect observed in Sections 3.2 to 3.5 is deaspiration; (c) the deaspiration rule and the similarity avoidance effect in the lexicon are two manifestations of the OCP on the [spread glottis] tier, that is, a prohibition against multiple [+sg] on the [spread glottis] tier. Note further that the Jinghpaw data provide additional evidence for the claim that the unmarked laryngeal specification of voiceless fricatives is [+sg] (Vaux 1998, among others).

Appendix Feature matrices of Jinghpaw consonants

	p	b	p ^h	t	d	t ^h	k	g	k ^h	ʈ	dz	c	j	s	ç	m
syl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
son	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
cons	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
cont	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-
del.rel.	-	-	-	-	-	-	-	-	-	+	+	+	+	-	-	-
nas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
lat	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
voi	-	+	-	-	+	-	-	+	-	-	+	-	+	-	-	+
cg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
sg	-	-	+	-	-	+	-	-	+	-	-	-	-	+	+	-
ant	+	+	+	+	+	+	-	-	-	+	+	-	-	+	-	-
cor	-	-	-	+	+	+	-	-	-	+	+	+	+	+	+	-
distr				-	-	-				-	-	+	+	-	+	
high	-	-	-	-	-	-	+	+	+	-	-	-	-	-	-	-
back	-	-	-	-	-	-	+	+	+	-	-	-	-	-	-	-
round	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	n	ŋ	ʔm	ʔn	ʔŋ	r	l	ʔr	ʔl	w	y	ʔw	ʔy	ʔ	h	
syl	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
son	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-
cons	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-
cont	-	-	-	-	-	+	+	+	+	+	+	+	+	-	-	-
del.rel.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
nas	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-
lat	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-
voi	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-
cg	-	-	+	+	+	-	-	+	+	-	-	+	+	+	-	-
sg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
ant	+	-	-	+	-	+	+	+	+	-	-	-	-	-	-	-
cor	+	-	-	+	-	+	+	+	+	-	-	-	-	-	-	-
distr	-			-		-	-	-	-							
high	-	+	-	-	+	-	-	-	-	+	+	+	+	-	-	-
back	-	+	-	-	+	-	-	-	-	+	-	+	-	-	-	-
round	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-

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Author's contact information:

ILCAA, Tokyo University of Foreign Studies
3-11-1, Asahi-cho, Fuchu-shi, Tokyo 183-8534, Japan
kurabek0926@gmail.com

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【要 旨】

ジンポー語における無気音化と摩擦音の喉頭索性指定

倉部 慶太

東京外国語大学アジア・アフリカ言語文化研究所

本稿では、ジンポー語（北ビルマ：シナ・チベット語族）における、音素目録のギャップ、接頭辞の形態音素交替、レキシコンにおける類似回避など、複数の音韻現象を無気音化という観点から統一的に説明することを試みる。音素目録のギャップに基づき、同言語の無声摩擦音が、有気閉鎖音同様、音韻的に [+spread glottis] の指定を持つと考えることで、有気閉鎖音と無気摩擦音が関与する複数の接辞交替を [spread glottis] tier における OCP 効果の観点から説明する。同時に、本稿ではジンポー語のレキシコンにおける [spread glottis] の分布の偏りを指摘し、同現象が [spread glottis] tier における複数の [+spread glottis] に対する制約として説明可能であることを指摘する。