

Lenition alternation in West Gyalrongic and its implication for Southeast Asian panchronic phonology

Yunfan Lai

Trinity College Dublin

Abstract

Based on internal reconstruction, this paper resolves a long-standing problem observed in Khroskyabs, a West Gyalrongic language (Sino-Tibetan), that seems to sporadically have lenited voiceless stops, resulting in irregular correspondences with East Gyalrongic. Two major sound changes are involved, intervocalic lenition and post-stress intersyllabic compression. It turns out that the processes proposed here are one probable solution to monosyllabicisation in languages of South-East-Asia, explaining a pathway from polysyllables or sesquisyllables toward monosyllables. Through examining potential problems of previous reconstructions in various languages, this paper shows that the Khroskyabs case provides a plausible direction in the solution of relevant unresolved problems from a panchronic perspective.

Keywords: Sino-Tibetan, West Gyalrongic, Khroskyabs, lenition, syllable compression, monosyllabicisation, sound change

1 The problem: an irregular lenition split in Khroskyabs?

Irregularity often points to inherited features in the prehistory of the language ([Durie & Ross 1996](#): 31, [Campbell 2013](#): 198). Explaining irregular correspondences with methodological rigour is thus an invaluable undertaking. Under the neogrammarian framework, irregular correspondences can be explained via analogy, borrowing, or (internal) reconstruction. The job of the historical linguist is to first engage in reconstruction, seeking regularities within any apparent irregularities before considering other explanations.

An irregular sound correspondence patterns between Khroskyabs and East Gyalrongic languages. Voiceless stops and affricates in certain East Gyalrongic languages correspond to both voiceless stops/affricates and voiced fricatives (or sonorants) in Khroskyabs. A portion

of the Khroskyabs forms in question appear to have undergone lenition.¹

These irregular correspondences can be illustrated in Table 1 (non-lenited) and Table 2 (lenited).²

Khroskyabs	Japhug	Cogtse Situ / Others	Meaning
<i>pî</i>	<i>pa</i>	<i>pîpa</i> ‘this year’	year
<i>pôm</i>	<i>jpum</i>	<i>kə-jpâm</i>	be thick
<i>tsæy</i>		<i>rantsik</i>	chop
<i>tsôm</i>	<i>xts^hum</i>	<i>tɕ^hîm</i> (Bragbar)	be thin
<i>têv</i>	<i>arturtyβ</i>		twine
<i>kû</i>	<i>rku</i> ‘put in’		be in
<i>qæɣ</i>	<i>qax</i>	<i>kêk</i>	hoe
<i>qæɣ</i>	<i>nɣqax</i>		pull up
<i>qé</i>	<i>wciqa</i>		root, source

Table 1: Expected correspondences between Khroskyabs and East Gyalrongic (simplex initials)

¹Although some theoretical accounts of lenition, such as [Szigetvári \(2008: 110\)](#), offer broad definitions, in the present analysis I stick to Campbell’s (2013: 37) definition: ‘Lenition is a reasonably loose notion applied to a variety of kinds of changes in which the resulting sound after the change is conceived of as somehow weaker in articulation than the original sound. Lenitions thus typically include changes of stops or affricates to fricatives, of two consonants to one, of full consonants to glides (*j* or *w*), sometimes of voiceless consonants to voiced in various environments, and so on.’

²East Gyalrongic examples come from [Jacques \(2015\)](#) (Japhug), [Gong \(2018\)](#), field notes from Zhang Shuya (Bragbar Situ) and Lin You-Jing (Cogtse Situ). The abbreviations used from Table 1 through Table 4 are as follows: Njo: Njorogs; Tshob: Tshobdun. See Section 2.1 for more information.

Khroskyabs	Japhug	Cogtse Situ / Others	Meaning
ví	u-pa	wo-píé (Bragbar)	bottom
ví	pa	ka-pa	do
zî	tsa	tə-tsa	son
zóγ	amtçor	ka-mtfok	be pointy
zôγ	trtsor	ta-tsok	<i>Potentilla anserina</i>
râγ	try	kə-tek	one
râz	tuwt (Stem 2)	ka-tsə (Bragbar)	say
rûla	tr-	to-	top, upwards
γêṃ	kum	kam	door
γêr	qur	kə-kôr	help
ḅû	tuw-ku	ta-ko	head
ḅáv	taqaβ	ta-kap	needle

Table 2: Unexpected lenition in Khroskyabs (simplex initials)

In East Gyalrongic languages such as Japhug and Cogtse Situ, words with unaspirated voiceless stop initials have two reflexes in Khroskyabs, one of which is unaspirated voiceless stops, and the other an unexpected lenition to a corresponding voiced fricative. For instance, both **ví** ‘do’ and **pí** ‘year’ correspond to the Japhug form **pa**, meaning both ‘do’ and ‘year’.

Tables 1 and 2 show examples with simplex initials (initials with a single consonant), yet these irregular patterns also occur with complex initials (initials with a consonant cluster), as shown in Table 3 (non-lenited) and Table 4 (lenited).

Khroskyabs	Japhug	Cogtse Situ / others	Meaning
spæ̃		ka-spæk (Bragbar)	repeat
spi	u-spa	u-spâ	NMLZ, material
spêd	ndzurpuwt		paralysed
ftsê	mtsar	ka-mtsák (Bragbar)	jump
łtsê	tr-jtsi	tə-jntʃ^hê	pillar
xtsî	tuwt^hi		porridge
fté		mtó (Bragbar)	forehead, slope
stô	sumto	ka-st^hóʷz (Zbu)	show
xçéγ	kuwtçγγ	kə-tçok	six
fkê	murkuw	kə-mərkáʔ (Zbu)	steal
skû	çku	ʃko	scallion
sqí	tr-sq^hγj		sister
rqê	tuw-rqo	tə-ska (Somang)	throat

Table 3 – continued from previous page

Khroskyabs	Japhug	Cogtse Situ / others	Meaning
<i>pjələ́</i>	<i>pyi</i>	<i>kə-pk^hi</i>	be grey
<i>pjezə́</i>	<i>kumpɣɽtɕu</i>	<i>patsā</i>	sparrow
<i>krê</i>	<i>kro</i>	<i>ka-krô</i>	distribute
<i>skræ̃</i>	<i>ɕqrã</i>	<i>kə-ʃkrẽk</i>	be clever
<i>sqræ̃z</i>	<i>ɕkrɽz</i>	<i>ɕkrẽɕé</i> (Bragbar)	Cyclobalanopsis
<i>mqlóɣ</i>	<i>mqlã</i>	<i>kə-mɕla?</i> (Tshob)	swallow (v)

Table 3: Expected correspondences between Khroskyabs and East Gyalrongic (complex initials)

Khroskyabs	Japhug	Cogtse Situ / Others	Meaning
<i>lváy</i>	<i>tui-rpã</i>	<i>tə-rpak</i>	shoulder
<i>nvəd</i>	<i>mpu</i>	<i>kə-nə-pu</i>	be soft
<i>ɣvî</i>	<i>βya</i>	<i>xp^he</i> (Tshob)	mill
<i>yzî</i>	<i>tui-xtsa</i>	<i>tə-ktsa</i>	shoe
<i>ɣdə́</i> (Njo: <i>ɣrú</i>)	<i>χtu</i>	<i>ka-χtu</i> (Tshob)	buy
<i>vdé</i> (Njo: <i>vrô</i>)	<i>mto</i>	<i>ka-mətó</i> (Bragbar)	to see
<i>rɕə́</i>	<i>χtɕi</i>	<i>ka-rtɕi</i>	wash
<i>vɕâr</i>	<i>ftɕar</i>	<i>vtɕeʔr</i> (Tshob)	summer
<i>ryê</i>	<i>rko</i>	<i>kə-rkô</i>	be hard
<i>tyəd</i>	<i>trɣk^hut</i>	<i>ta-rkut</i>	fist
<i>nbîd</i>	<i>nqa</i>	<i>kə-nə-qe</i> (Tshob)	be tired
<i>sɕî</i>	<i>sqa</i>	<i>ka-skiê</i> (Bragbar)	cook

Table 4: Unexpected lenition in Khroskyabs (complex initials)

There is no obvious conditioning environment which can explain this lenited/non-lenited split. Attested Khroskyabs varieties show regular patterns for the initials in question, implying that the split had already taken place before Proto-Khroskyabs. Moreover, lenition affects native words exclusively and ignores Tibetan loanwords, so lenition must have occurred before the Tibetan empire conquered the Gyalrongic region roughly in the seventh century.

Newly available data of Gyalrongic languages now enable the solution of this problem, showing that lenition irregularity has actually emerged from regular sound changes. In this paper I begin with an analysis of lenition alternation in Khroskyabs proposing a reconstruction of the relevant initials, and exploring similar phenomena found in other Sino-Tibetan

languages as well as unrelated languages in Southeast Asia. I then aim at generalising the proposed sound laws to the panchronic level, thus demonstrating a possible pathway toward monosyllabification, a phenomenon widely observed in Southeast Asia, which has hitherto lacked plausible explanations.

Structure of the paper In Section 2, I present a theoretical background for the study. Section 3 proposes a reconstruction of lenition alternation in Khroskyabs, explaining why some consonants have lenited, and others have not. I postulate two major sound changes, intervocalic lenition and post-stress intersyllabic compression. Section 4 focuses on post-stress intersyllabic compression. Section 5 explores similar phenomena observed in other West Gyalrongic languages and Section 6 in Sino-Tibetan languages other than West Gyalrongic. Section 7 offers discussions on the panchronic implication of the sound changes proposed in this paper. In particular, it proposes an approach for studying monosyllabification in Southeast Asian languages under a neogrammarian framework.

2 Theoretical background

Before tackling the problem of irregular correspondences related to lenition, it is necessary to present theoretical background to highlight the research focuses of this paper. Section 2.1 offers some information about West Gyalrongic languages, which provide the foundation for the hypotheses presented here. Section 2.2 briefly discusses a general typology of lenition, serving as the theoretical basis for my reconstructions. Section 2.3 focuses on the wide-spread phenomenon of monosyllabification observed in Southeast Asian languages, and emphasises the relevance of the present paper to the study of monosyllabification from the perspective of historical linguistics and panchronic phonology.

2.1 West Gyalrongic languages

Alongside East Gyalrongic, West Gyalrongic is one of the sub-branches of Gyalrongic, which is spoken in Sichuan, China. West Gyalrongic has three subgroups, Khroskyabs, Horpa-Stau, and the now extinct Tangut language (Lai et al. 2020). East Gyalrongic has four main languages, Situ, Japhug, Tshobdun, and Zbu. See Figure 1.

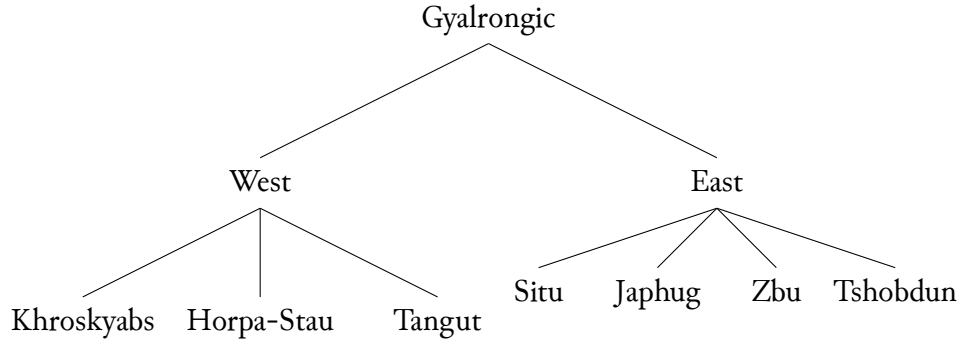


Figure 1: Gyalrongic languages

Within Sino-Tibetan, the Gyalrongic branch is among those that exhibit the most complex linguistic features, both phonologically and morphologically (Gong 2018, Jacques 2004, Lai 2017, Lin & Luoerwu 2003, Sun 2000a,b, and Zhang 2020, etc).

West Gyalrongic languages are spoken in the counties of 'Barkhams, Chuchen, and Dzamthang in Rngaba Prefecture, and Rongbrag, Rta'u, and Nyagrong in Dkarmdzes Prefecture. Tangut, an extinct language attested from the 11th and the 16th centuries, was located more than 1000 kilometres northeast to the homeland of the modern West Gyalrongic languages, see Figure 2.

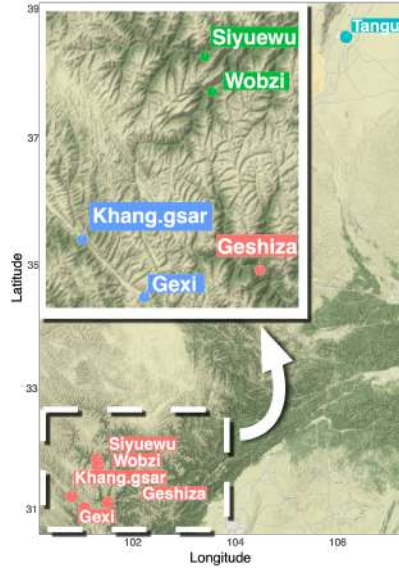


Figure 2: West Gyalrongic languages cited in this paper

The main Khroskyabs variety used in this paper is the Siyuewu dialect, with data collected from the author's first-hand field notes. Other varieties, such as Wobzi (Lai 2017), Guanyinqiao (Huang 2007) and Njorogs (Yin 2007) are also cited when relevant.³ On the

³The default variety referred to as 'Khroskyabs' here is the Siyuewu dialect. Other varieties are specifically indicated as Wobzi Khroskyabs, Guanyinqiao Khroskyabs, Njorogs Khroskyabs, and so on.

Horpa-Stau side, three modern dialects, Gexi Stau (Huang 1991, Huang & Dai 1992), Khang-gsar Stau (Jacques et al. 2014, 2017), and Geshiza (Honkasalo 2019) are selected. Data from Tangut are based on Li Fanwen’s (1997) Tangut-Chinese dictionary.⁴

The reader is invited to consult Section 2 of the supplementary material for reconstructions of Khroskyabs rhymes and prenasalised stops, as well as Tangut transphonologisation, which are not essential to the current argument, but will help with understanding the reconstructed forms.

Phonological sketch of Siyuewu Khroskyabs Familiarity with the phonological system of Siyuewu Khroskyabs will facilitate understanding of the paper. Other Gyalrongic languages cited in this paper exhibit similar systems to that of Siyuewu Khroskyabs. Table 5 shows the consonant inventory of the language, the parenthesised sounds are either non-phonemic or only attested in loanwords.

Bilabial	<i>p, p^h, b, m</i>
Labiodental	<i>(f), v</i>
Dental	<i>s, z, ts, ts^h, dz</i>
Alveolar	<i>t, t^h, d, n, l, r</i>
Aveolo-palatal	<i>ɕ, ʑ, tɕ, tɕ^h, dʑ</i>
Palatal	<i>c, c^h, ʃ, ʂ, ɲ, j</i>
Retroflex	<i>(ʂ), tʂ, tʂ^h, dʂ</i>
Velar	<i>k, k^h, g, x, ɣ, ŋ, w</i>
Uvular	<i>q, q^h, (ŋ), ɣ, ʁ</i>

Table 5: Consonant inventory of Siyuewu Khroskyabs

Siyuewu Khroskyabs has seven vowels *i, u, e, ə, o, æ* and *a*, and two tones, a high tone and a falling tone, noted respectively with the diacritics *ǎ* and *â*.

2.2 Typology of lenition

Sounds in different positions are unequally susceptible to lenition. Ségéral & Scheer (2008: 135) distinguish weak positions from strong positions. Sounds in weak positions are generally more susceptible to lenition than in strong positions. The strong and weak positions are listed below.

⁴Tangut forms are given with an original Tangut character above its number in the dictionary, and reconstruction based on the Gong Hwang-Cherng system (Gong 2003), refined by Gong Xun (2017, 2020). For instance, the notation  *swi*¹ ‘sprout’ shows a Tangut character numbered 0001 in Li Fanwen’s dictionary. Its reconstructed phonological form is given as *swi*¹, with a superscript number indicating that it bears tone 1. Its English gloss is given as ‘sprout’.

- Strong positions
 - a #_V (word-initial)
 - b VC._V (post-coda)
- Weak positions
 - c V_.CV (internal coda)
 - d V_# (final coda)
 - e V_V (intervocalic)

The most relevant lenition processes [plosive → fricative] and [plosive → approximant], are indeed more frequently found in weak positions. In their typological study of 81 languages, [Bybee & Easterday \(2019: 287\)](#) found that 21 out of 28 languages exhibit plosive-to-fricative lenition, and 8 out of 11 languages that exhibit plosive-to-approximant lenition in weak positions.

Nivkh demonstrates typical synchronic leniting and fortifying processes. Its consonants tend to lenite in weak positions and fortify in strong positions ([Shiraishi 2008: 392–393](#)). Initial stops spirantise into corresponding fricatives/sonorants when placed between vowels (intervocalic position), and initial fricatives harden into corresponding plosives when preceded by a nasal or a fricative (similar to a post-coda position).

A well known case of lenition, termed Begadkefat, is widely attested in Central Semitic. Non-emphatic stop consonants are lenited after vowels, or rather, in a weak position. In strong positions, such as word-initial and post-coda positions, the law does not apply. Begadkefat is attested in Phoenician as early as the fifth century B.C. ([Muchiki 1994](#)).⁵

Typological evidence suggests that the most natural and plausible way to trace the origin of lenition is through weak positions.

2.3 Monosyllabification in Southeast Asian languages

Monosyllabification is a widespread phenomenon in many unrelated Southeast Asian languages. The phenomenon is usually described as a reduction of the first and weaker part of a sesquisyllable,⁶ termed a presyllable or sometimes an iambic syllable,⁷ as shown in (1) ([Michaud 2012: 116](#)).

⁵In most cases, lenition only occurs in strong positions when secondary conditions are met. In West Germanic languages, initial sonorisation usually occurs with fricatives, and in Slavic varieties, initial fricativisation is far more attested in velars than in labials ([Kümmel 2007: 43, 56](#)). Initial voiceless plosives in Germanic often weaken to voiceless lenis, without full sonorisation, such as *p* > *b̥*. Full sonorisation of initial plosives often result from distant assimilation ([Kümmel 2007: 48–49](#)).

⁶The term “sesquisyllable”, first coined by [Matisoff \(1973\)](#), means “one and a half syllables”.

⁷In this paper, I distinguish the presyllable (a syllable that precedes the stem) from the preinitial (a consonant that precedes the main consonant of the stem). For the identification of preinitials in Khroskyabs, see [Lai \(2017: 25–26\)](#).

(1) Cp(V)-CiV(Cf) > CiV(Cf)

Vietnamese (Ferland 1982), Kra-Dai (Solnit 1988), Tai (Pittayaporn 2009), Cham (Thurgood 1999: 62-63), and Chinese (Baxter & Sagart 2014) have undergone similar monosyllabicisation processes. This type of syllable reduction usually results in the emergence of new phonemes, new phonotactic sequences, or new phonations of vowels that increase the complexity of the phonological system. The presyllable may cause the lenition of the following consonant, and may create new consonant clusters when it is reduced. It thus innovates consonantal or vocalic contrasts, such as geminated/non-geminated and tense/lax contrasts (Ferland 1997, Michaud 2012: 118-126).

Although descriptions of monosyllabicisation in Southeast Asian languages and discussions on the resulting phonological changes are copious, there are very few studies on the evolutionary mechanisms driving monosyllabicisation, and fewer still from a neogrammarian point of view.

At present there are two major approaches to describing the mechanisms of monosyllabicisation. The first is through prosodic structures. Brunelle & Pittayaporn (2012) find that monosyllabicisation, as a phonological process, never occurs in trochaic foot structures. It is only attested in iambic feet. They propose two main types of “driving forces”, or phonetic pressures, to account for monosyllabicisation: reduction of unstressed syllables and lengthening of stressed syllables. These phonetic pressures can be applied to “a greater or lesser extent in all languages, irrespective of their canonical word or foot type”.

The second approach is to seek solutions within the realms of sociolinguistic and language contact. In his dissertation, Brunelle (2005) studies how these factors have effected monosyllabicisation in Eastern Cham. He finds that language contact with Vietnamese is one of the major sources of monosyllabicisation in Eastern Cham.

As far as I am aware, current accounts on the mechanisms driving monosyllabicisation are mostly typological. However, no studies to date have discussed the regular sound changes that participate in monosyllabicisation. The suggestion that monosyllabicisation is associated with reduction/lengthening or language contact is correct but vague as it does little to explain the exact developmental steps. Indeed it seems that many linguists do not expect regularity in monosyllabicisation. Michaud (2012: 118), in particular, states that “monosyllabicisation is, in its first stages, a sporadic process”. Yet it is equally possible that a language like Cham or Vietnamese may have undergone sound changes under different conditions and across stages which aided in its progression towards monosyllabicity. Thus, superficial “sporadicity” may well be the result of various intervening, regular sound changes.

Therefore, although monosyllabicisation is a crucial phenomenon in the study of Southeast Asian languages, a clear model explaining this “sporadic” syllable reduction is lacking, as most of these languages are quasi-isolating. However, Gyalrongic languages, with rich morphology in addition to monosyllabicisation, shed light on the solution to this mystery.

In the present paper, I will search for the regularity behind the “irregular” correspondences in Khroskyabs described in Section 1, and propose a regular sound change, namely post-stress compression, which can be observed as leading to an early stage of monosyllabisation in Khroskyabs. I will also show that post-stress compression can be found in other Sino-Tibetan languages as well as other language families, and can thus be considered a panchronic sound law responsible for monosyllabisation.

3 Reconstructing lenition in Khroskyabs

In Section 1, I have shown that Khroskyabs lenited and non-lenited initials seem to sporadically correspond to non-lenited initials in East Gyalrongic. Within a neogrammarian framework of exceptionless sound laws, sporadic correspondences cannot be analysed as reflecting sporadic sound changes. Using this framework, I propose a reconstruction of lenition alternation in Khroskyabs.

3.1 Overview of lenition alternation

In Khroskyabs, there are a number of lexical pairs between which certain semantic or derivational relations can be observed, and for which lenited and non-lenited counterparts are present. An exhaustive list of these pairs is shown in Table 6.

Non-lenited	Meaning	Lenited	Meaning
<i>pî</i>	year	<i>pêvi</i>	this year
= <i>spi</i>	NMLZ, material	<i>vî</i>	do
<i>papâ</i>	a kind of tsampa	<i>γvâ</i>	tsampa
<i>nspê</i> (Wobzi)	suppurate	<i>svê</i> (Wobzi)	pus
<i>spêtsæγ</i>	chop	<i>rvî</i>	axe
<i>stô</i>	show	Njo. <i>vrô</i> ; Siyuewu <i>vdê</i>	see
<i>pætsî</i>	piglet	<i>zî</i>	son
<i>stây</i>	alone	<i>ræγ</i>	one
<i>skô</i>	make an effort	<i>γó</i>	be able
<i>qî</i>	shout, cry (n)	<i>svî</i>	sound, voice
<i>rqê</i>	throat	<i>rvæləm</i>	chest
<i>rmæstəγ</i>	male siblings	<i>dóγ</i>	younger brother
<i>stî</i>	put	<i>dî</i>	keep

Table 6: Lenition alternation in Khroskyabs

In this section, I propose a reconstruction of Khroskyabs lenition alternation. The reader is invited to see Section 2 and Section 3 of the supplementary material for other sound changes and detailed analyses of the word pairs given above.

3.2 Types of lenition alternation in Khroskyabs

In order to facilitate understanding the logic behind my reconstruction, I divide lenition alternation in Khroskyabs into four types according to onset complexity. The different types are listed below:

1. Type A: Simplex non-lenited $\sim$ Complex lenited
2. Type B: Complex non-lenited $\sim$ Simplex lenited
3. Type C: Complex non-lenited $\sim$ Complex lenited (equal complexity)
4. Type D: Complex non-lenited $\sim$ Complex lenited (unequal complexity)

The examples mapped into the four types are shown in Table 7.

	Non-lenited	Lenited
Type A	<i>pî</i> ‘year’ <i>papâ</i> ‘a kind of tsampa’ <i>qî</i> ‘shout (n)’	<i>pâvi</i> ‘this year’ <i>yvâ</i> ‘tsampa’ <i>svî</i> ‘sound, voice’
Type B	= <i>spi</i> ‘NMLZ’ <i>skô</i> ‘make an effort’ <i>stây</i> ‘be alone’ <i>pætsî</i> ‘piglet’	<i>vî</i> ‘do’ <i>yó</i> ‘be able’ <i>rây</i> ‘one’ <i>zî</i> ‘son’
Type C	<i>spâtsæy</i> ‘chop’ <i>stô</i> ‘show’ <i>rqê</i> ‘throat’	<i>rvî</i> ‘axe’ <i>vdê</i> ‘see’ <i>rvælóm</i> ‘chest’
Type D	<i>nspê</i> ‘suppurate’	<i>svê</i> ‘pus’

Table 7: Types of lenition alternations

In this section, I will reconstruct the first three types of lenition alternation; leaving the fourth type for Section 4.

3.3 Reconstruction of Type A

Type A examples are shown in (2).

- (2) a. *pî* ‘year’ $\sim$ *pâvi* ‘this year’
- b. *papâ* ‘a kind of tsampa’ $\sim$ *yvâ* ‘tsampa’
- c. *qî* ‘shout (n)’ $\sim$ *svî* ‘sound, voice’

The pair *pī* ‘year’ ~ *pāvi* ‘this year’ clearly shows that lenition may appear in an intervocalic position. The prefix *pə-* is also found in non-syllabic form in *f-snə* ‘today’. I reconstruct the *f-* prefix as having emerged from a short presyllable **pə-*.⁸ This reconstruction places a voiceless plosive onset in a weak position and allows for the triggering lenition. **pə-* shortened to *f-* via **p-* when the following consonant was not labial, while it is preserved preceding a labial consonant. Therefore we may propose the sound changes in (3).

- (3) a. **pə-pæ* > **pə-væ* > *pə-vi* ‘this year’
 b. **pə-sn [u]* > **p-sn [u]* > *f-snə* ‘today’

To generalise the rule, a presyllable **Cə-* caused the lenition of a following simple voiceless plosive onset, and was simplified into **C-* when no other conditions were involved, as illustrated in (4) (using *p-* and *v-* as representative consonants).

- (4) **Cə.p-* > **Cə.v-* > **C.v-*

Following this logic, the other two lenited forms in Type A are reconstructed as in (5).

- (5) a. **kə-pæ^v* > **kə-væ^v* > **k-væ^v* < *ɣvā* ‘tsampa’
 b. **sə-qæ* > **sə-ɣæ* > **s-ɣæ* > *sɪ* ‘sound, voice’

The voicing of the preinitial **k-* depends on the following consonant, hence *ɣ-*. The preinitial **s-*, however, does not voice to *z-* before sonorants (characteristic of Khroskyabs, see Lai 2017: 372-373), hence *sɪ* instead of *†zɪ*.

3.4 Reconstruction of Type B

Type B examples are shown in (6).

- (6) a. =*sɪ* ‘NMLZ’ ~ *vɪ* ‘do’
 b. *skə* ‘make an effort’ ~ *ɣə* ‘be able’
 c. *stāɣ* ‘be alone’ ~ *ræɣ* ‘one’
 d. *pætsɪ* ‘piglet’ ~ *zɪ* ‘son’

Type B alternation is exactly the reverse of Type A, a bare lenited counterpart and a complex non-lenited counterpart. To account for Type B, our reconstruction points to a dropped preinitial element. This element must be different from **Cə.p-* deriving *C.v-*. I reconstruct this element with a neutral vowel **Cə-* instead of a short **Cə-*, as shown in (8) (see further in this subsection for the reasoning of this reconstruction).

⁸Reconstructed forms in Khroskyabs and those cited from other works are preceded by an asterisk ‘*’. Other hypothetical forms proposed in this paper are preceded by a number sign ‘#’, as what DeLancey (2014) did for person markers in Tibeto-Burman. Following the convention of Baxter & Sagart (2014), uncertain existence of a reconstructed sound is noted within round brackets, as in **ɣu(ʷ)* ‘head’, and square brackets are used to indicate a reconstructed sound that may have alternative reconstructions, as in **ɣm[o]r* ‘last night’. A hyphen indicates a morpheme boundary, and a period is used when the morphological relation between two suspect morphemes is unclear.

- (7) a. ***Cə-pæ** > ***Cə-væ** > **vɪ** ‘do’
 b. ***Cə-ko**^v > ***Cə-yo**^v > **yó** ‘be able’
 c. ***Cə-tæk** > ***Cə-ræk** > **ræy** ‘one’
 d. ***Cə-tsæ** > ***Cə-zæ** > **zɪ** ‘son’

On the other hand, non-lenited counterparts are reconstructed with a preceding preinitial, instead of a presyllable, thus placing the non-lenited consonant in a strong position. See (8).

- (8) a. ***=s-pæ** > **=spi** ‘NMLZ, material’
 b. ***=s-ko**^v > **skô** ‘make an effort’
 c. ***=s-tæ**^v**k** > **stây** ‘be alone’
 d. ***pæ(k)tsæ** > **pætsɪ** ‘piglet’

As a general rule, a simple preinitial does not trigger lenition, as in (9).

- (9) ***C.p-** > **C.p-**

The simple proposal of an uncertain ***Cə-** seems groundless unless one can find possible origins for it. Verbs in West Gyalrongic languages are mostly, if not always, prefixed. In Khroskyabs, the vast majority of verbs require inflectional prefixes except in the non-past generic and the infinitive⁹ For the verbs ***Cə-pæ** ‘do’ and ***Cə-ko**^v ‘be able’, it is possible that the presyllable ***Cə-** was an inflectional prefixes in Proto-Khroskyabs.¹⁰

As verbs are, in most cases, prefixed in both finite and non-finite situations, their lenited forms are preserved. Non-lenited forms have been analogically replaced by lenited forms, which explains why we do not find any examples of lenition alternation in most synchronic inflectional paradigms. This case is parallel to that of Gothic, in which the effects of Verner’s law are eliminated by analogy (Fulk 2018: 108-109). Because I reconstruct the presyllable as an inflectional prefix, and because inflectional prefixes are mostly syllabic in the modern language, I propose ***Cə-** with a neutral, unshortened vowel. A presyllable with a neutral vowel is lenition-triggering, but unlike presyllables with short vowels, neutral vowels will drop if a specific condition is not met (see below).

In Khroskyabs, inflectional prefixes are usually syllabic, and derivational prefixes non-syllabic. Both types of prefixes correspond to East Gyalrongic syllabic prefixes, indicating that they were once both syllabic prefixes of differing qualities. Here, I assume that the

⁹Similar phenomena are found in East Gyalrongic languages. In Cogtse Situ, unless in non-past generic situations, for which bare stems are applied, the verb is always prefixed (p.c. You-Jing Lin 30/01/2021).

¹⁰This prefix could be any inflectional prefix with an open syllable in the proto-language, specifically, one can postulate an infinitive prefix *[k]ə- based on comparison with East Gyalrongic. In Modern Khroskyabs, infinitive forms usually bear an orientation prefix lexically selected for past/perfective, along with the Stem 1 of the verb (Lai 2017: 255-262, Lin 2011, 2003), such as the infinitive form **o-dzid** (INF-eat.I), in which **o-** is the orientation prefix selected by the verb **dzid** ‘eat’. These modern prefixes replaced the old infinitive prefix.

difference was in vowel length. See Section 5 of the supplementary material for a comparison of prefixes in East and West Gyalrongic.

The numeral **Cə-tæk* ‘one’ may bear a ‘numeral prefix’, *kV-*, in other Gyalrongic languages, such as *kə-tek* in Cogtse Situ, *kə-rík* in Bragbar Situ, and even in Tibetan གཅིག *g-cig* ‘one’. Miyake (2012) also reconstructs such a prefix in Pre-Tangut: **ka-tek* or **ka-tik* for Tangut 𐵓𐵙 *lew* ‘one’. I therefore reconstruct it as **[k]ə-* for Khroskyabs, see (10).

$$(10) \quad * [k]ə-tæk > * [k]ə-ræk > *ræk > ræy$$

The prefix on **Cə-tsæ* ‘son’ is more straightforward. In East Gyalrongic languages, body parts, kinship terms and other relevant nouns are usually prefixed by an inalienable possessive prefix in **tV-*, which can be exemplified by *ty-mu* ‘mother’, *ty-wa* ‘father’, and *ty-təu* ‘son’ in Japhug, and *tə-mô* ‘mother’, *ta-pâ* ‘father’, and *tə-zîê* ‘son’ in Bragdbar Situ.

I revise the reconstruction **Cə-* as an un-shortened **[t]ə-*, which was dropped after leniting the following voiceless plosive, see (11).

$$(11) \quad * [t]ə-tsæ > * [t]ə-zæ > *zæ > zî$$

In Khroskyabs, the inalienable possessive prefix is preserved in forms with a lenited velar initial, such as *tyêd* ‘fist’ (< **tə-kwt*), and *dyú* ‘year’ (< **tə-k[u]*)¹¹ (see Section 4).

3.5 Reconstruction of Type C

Type C examples are shown in (12).

- (12) a. *spætsæy* ‘chop’ ~ *rvî* ‘axe’
 b. *stô* ‘show’ ~ *vdê* ‘see’
 c. *rqê* ‘throat’ ~ *rxælóm* ‘chest’

The series of Type C lenited forms is reconstructed in (13) with intervocalic lenition.

- (13) a. **rə.pæ > *rə.væ > *r.væ > rvî* ‘axe’
 b. **pə.to > *pə.ro > *p.ro > vrô* ‘see (Njorogs)’ > *vdô* ‘see (Phosul)’ > *vdê* ‘see (Siyuewu)’
 c. **rə-qæ.C.lum > *rə-æ-lum > *r-æ-lum > rxælóm* ‘chest’

Following *v-* and *y-*, *-r-* underwent refortition into *-d-* in all Khroskyabs varieties, except Njorogs: Siyuewu *vdô* :: Njorogs *vrî* ‘taste’, Siyuewu *ydô* :: Njorogs *yrú* ‘buy’, Siyuewu *ydôm* :: Njorogs *yrám* ‘rich’.

The word *rxælóm* ‘chest’ originally meant the region between the breasts and the throat, which makes it reasonable to reconstruct a syllabic **rə-* for the modern preinitial *r-*. The *r-*

¹¹While One expects †*tyú* in this case, the prefix is voiced as a result of the fact that it is almost always preceded by a numeral, for instance, **[w]-tə-k[u] > *[w]-t-y[u] > *[w]-d-yu > ê-dyu* (one-year).

likely comes from a word that meant ‘breasts’, therefore must have previously been syllabic (see Section 3 of the supplementary material). This reconstruction further confirms that Khroskyabs lenition is related to a presyllable.¹²

The non-lenited series shown in (12) is reconstructed as in (14).

- (14) a. **s-pæCtsæk* > *spâtsæɣ* ‘chop’
 b. **s-toʷ* > *stô* ‘show’
 c. **r-qo* > *rqê* ‘throat’

It remains to be explained why the preinitials in the pairs, ‘show’ ~ ‘see’ and ‘chop’ ~ ‘axe’, exhibit differences other than lenition. This issue will be accounted for in Section 4.3.

4 Intersyllabic compression in post-stress position

4.1 Intersyllabic compression

The fourth category of lenition alternation (Type D) consists of one single pair from the Wobzi dialect: *nspô* ‘suppurate’ ~ *svô* ‘pus’.¹³ Our line of reasoning suggests **sǎ.puut* for *svô* ‘pus’ (Siyewu *svâd*), meaning we need to explain why the word ‘suppurate’ did not lenite after the addition of the denominal *n-* prefix. In this case, I propose a presyllable **nǎ-* attached directly to **sǎ.puut* ‘pus’, which compressed the medial syllable **-sǎ-* into **-s-*. As proposed in (9), a simplex preinitial does not trigger lenition. This compression process is termed ‘intersyllabic compression’. See (15).

- (15) **nǎ-sǎ.puut* > **nǎ-s.puut* (intersyllabic compression) > **n-s.puut* > *nspô* ‘suppurate’

However, *lváy* ‘shoulder’ does not follow this rule. This form is reconstructed as **[t]ǎ-lǎ.pæʷk*, with the possessive prefix **t[ǎ]-* for body parts. This reconstruction would result in intersyllabic compression, blocking the lenition of the initial **p-*, as shown in (16).

- (16) **[t]ǎ-lǎ.pæʷk* > † *[t]ǎ-l.pæʷk* (intersyllabic compression) > † *lpáy*

Yet this change did not take place, and therefore the reconstruction needs to be amended. In this section, I propose that intersyllabic compression only took place in a post-stress position. In Section 4.2, I briefly present the suprasegmental system in Modern Khroskyabs, and in Section 4.3, I discuss post-stress intersyllabic compression in detail.

¹²The preinitial *r-* in *rqê* ‘throat’ is of another origin. First of all, this *r-* should be a prefix, as a related form, *qælævlæv* ‘hyoid bone’, is preinitial-less. The *r-* prefix could be related to the dubious animal or body part prefix *r-* in Tibetan, such as in ཀྲ་ *r-kang* ‘leg’, རྩ་ *r-na* ‘nose’, and རྩ་ *r-kyang* ‘wild ass’ (Hill 2014: 630). The prefix seems to be preserved in *rrá* ‘face’, *rts’óz* ‘lung’ and *rvolé* ‘kidney’ in Khroskyabs.

¹³The form *nspô* ‘suppurate’ is only attested in the *ragû* variety of Wobzi Khroskyabs. It is in competence with the dominant, recently derived form *nsvô* ‘suppurate’. In other known Khroskyabs varieties, only the lenited version is attested. I first encountered the non-lenited *nspô* in 2011, and later recorded the verb form and an example sentence in 2014. The recordings and the transcription of the sentence can be downloaded via <https://doi.org/10.5281/zenodo.6460342>.

4.2 Suprasegmental system in modern Khroskyabs

Modern Khroskyabs dialects are generally thought to be tonal (Huang 2007, Lai 2017, Sun 2008), with a high tone ($\acute{\text{a}}$) and a falling tone ($\hat{\text{a}}$). Each phonological word only allows one tone-bearing syllable, on which the tonal realisation of the other syllables are based. Therefore, compounds only lexically preserve the tone of one of their members.

The tonal systems in Khroskyabs dialects are not inherited, as a few dialects, like Mbrongdzong, allow for a non-tonal, but purely accentual analysis (Sun 2000a). The high tone in Siyuewu roughly corresponds to a glottal stop coda in Mbrongdzong, and the falling tone to a stressed syllable without a glottal stop coda. In light of this evidence, a stress-based suprasegmental system needs to be postulated for Proto-Khroskyabs, a topic which deserves a separate paper.

4.3 Intersyllabic compression in post-stress position

With no segmental evidence available, the solution to the lenited initial in *lváy* ‘shoulder’ (see Section 4.1) is to reconstruct the prefix as unstressed: $*[t]\text{-}\acute{\text{a}}\text{-}(\text{CVC})$; a prefix which was lenition-triggering, but did not cause intersyllabic compression. See (17).

(17) First syllable unstressed (no compression)

$*[t]\text{-}\acute{\text{a}}\text{-}\text{l}\acute{\text{ǎ}}.\text{p}\acute{\text{æ}}^{\text{v}}\text{k} > *[t]\text{-}\acute{\text{a}}\text{-}\text{l}\acute{\text{ǎ}}.\text{v}\acute{\text{æ}}^{\text{v}}\text{k}$ (lenition) $> *l\text{v}\acute{\text{æ}}^{\text{v}}\text{k} > l\text{v}\acute{\text{á}}\text{y}$ ‘shoulder’

However, if the first of the three syllables is stressed, intersyllabic compression will take place. See (18).

(18) First syllable stressed (intersyllabic compression)

$*n\acute{\text{ǎ}}\text{-}\text{s}\acute{\text{ǎ}}.\text{p}\text{u}\text{ut} > *n\acute{\text{ǎ}}\text{-}\text{s}.\text{p}\text{u}\text{ut}$ (no lenition) $> *n\text{sp}\text{u}\text{ut} > n\text{sp}\acute{\text{á}}$ ‘suppurate (Wobzi)’

The reconstruction in (18) implies that Proto-Khroskyabs stress could be assigned to prefixes, instead of stems. This phenomenon is apparent in the conservative stress system of Tshobdun, in which stress can move onto derivational prefixes according to the stress pattern of the stem. Closed syllables preserve their original stress pattern, while open syllables reassign stress to the penultimate syllable, usually on the derivational prefix, such as *nǎ* ‘AUTOBEN/DENOM’ and *sǎ* ‘CAUS/DENOM’. See (19) (Sun 2008: 266, Sun 1997).

(19) a. $k\acute{\text{e}}\text{-}\text{t}\text{f}\text{et}$ ‘take out’ $\rightarrow k\acute{\text{e}}\text{-}n\acute{\text{ǎ}}\text{-}\text{t}\text{f}\text{et}$ ‘take out (of one’s accord)’¹⁴

b. $k\acute{\text{e}}\text{-}^n\text{ge}$ ‘wear’ $\rightarrow k\acute{\text{e}}\text{-}n\acute{\text{ǎ}}\text{-}^n\text{ge}$ ‘wear (of one’s accord)’

c. $k\acute{\text{e}}\text{-}\text{r}\eta\text{i}$ ‘borrow’ $\rightarrow k\acute{\text{e}}\text{-}\text{s}\acute{\text{ǎ}}\text{-}\text{r}\eta\text{i}$ ‘lend’

The cognate of *svǎ/svǎd* ‘pus’ in Tshobdun is *te-spu* ‘pus’. Although a cognate of ‘suppurate’ is not attested, $\dagger k\acute{\text{e}}\text{-}\text{r}\text{e}\text{-}\text{spu}$ would be its expected form, with a stressed derivational prefix *re-*, as in the case of *nǎ-sǎ-puut*.

¹⁴The infinitive prefix *ké-* is regularly lost in Khroskyabs.

The exact mechanisms of stress patterning in Proto-Khroskyabs and in Modern Tshobdun must be different and heavily affected by analogy. However, it is conceivable that these two patterns could be traced back to Proto-Gyalrongic – another topic requiring further future investigations.

Post-stress intersyllabic compression helps to explain issues with *=spi* ‘NMLZ, material’ and *skô* ‘make an effort’ (Section 3.4). These two words were provisionally reconstructed as **=s-pæ* and **s-ko^v*, with a non-syllabic prefix **s-* (Section 3.4). However, according to our analysis the prefix of *=spi* ‘NMLZ, material’ should have been **sə-* (cf. **sə-qæ* > *svi* ‘sound’). The same applies to the causative *s-*, which should have also been **sə-* to explain the case of *s-tô* ‘to show’ (see Section 4.4). Therefore, we must seek to explain why these *s*-prefixes are now non-syllabic.

The marker *=spi* ‘NMLZ, material’ never occurs in a stressed position, and is always preceded by a host. As a result, it is always found in structures similar to *CV(C)=spi*. Therefore, the prefix *s-* is always situated in a post-stress intersyllabic position, which is the environment for compression. It is plausible that the original **=sə-pæ*, with a syllabic prefix, was compressed to **=s-pæ* before lenition took place. This process is illustrated in (20).

$$(20) \quad *'CV(C)=sə-pæ > *'CV(C)=s-pæ > 'CV(C)=spi$$

As is mentioned in Section 3 of the supplementary material, the verb *skô* ‘make an effort’ is defective. It is never assigned an inflectional prefix, as are the vast majority of verbs. Looking at Example (21), one can immediately recognise that the structure, [Prefix-Verb₁-Suffix-Verb₂-Suffix], corresponds to what is called the ‘left-dominant bipartite construction’, a term coined by Jacques (2018) for similar constructions in Sino-Tibetan languages.

$$(21) \quad n\grave{a}-ldz\acute{e}-n \quad sk\acute{o}-n \\ \text{IMP-learn.I-2PL make.effort.I-2PL} \\ \text{‘Study hard!’ (fieldnote)}$$

It is therefore reasonable to assume that *skô* ‘make an effort’ originally only occurred in bipartite constructions, ‘suffixed’ to a main verb. Like *=spi*, it was positioned in an unstressed, intersyllabic position, resulting in compression of the original **sə-ko^v* into *skô* ‘make an effort’. The compressed form was subsequently reanalysed as a separate verb; its defectiveness a trace of its original dependency. See (22).

$$(22) \quad *'CV(C)-sə-ko^v > *'CV(C)-s-ko^v > 'CV(C)-sko$$

4.4 Transphonologisation upon illegal clusters

The lenition alternations *stô* ‘show’ ~ *vdê* ‘see’, *stây* ‘be alone’ ~ *rây* ‘one’, and *spâtsæy* ‘chop’ ~ *rvî* ‘axe’ need clarification, as the vocalisms are different in each alternation, and for *stô* ‘show’ and *spâtsæy* ‘chop’, the original preinitials *v-* and *r-* are missing. This section proposes solutions to these issues.

**s-to^y* ‘show’

There is no evidence in Gyalrongic that the preinitial of the lenited counterpart of ‘show’, **pǎ.to* (> *vdê* ‘see’), was a prefix. Rather, one may assume that the causative prefix was added directly to **pǎ.to*. By analogy with our treatment of the pair *nspǎ* ‘suppurate’ ~ *svǎ* ‘pus’, we can suppose that the non-lenition of **t-* was actually not due to the preinitial **s-*, but to a compressed **p-* from **pǎ-*. The intermediate preinitial **p-* would then be compressed into the rhyme due to a phonotactic constraint that prohibited the sequence **s.p.t-*, leaving only a labial feature, which later merged with the resultant velarisation and prevented the vowel **-o* from heightening to *-e* (See Lai 2022 and supplementary material, Section 2.1). This process is a case of transphonologisation. In this case, we need to reconstruct **sǎ-pǎ.to* for *stô* ‘show’.¹⁵ See (23).

- (23) **sǎ-pǎ.to* > **sǎ-p.to* (intersyllabic compression) > **s-p.to* (violation of phonotactic constraint) > **s-to^w* (transphonologisation) > **s-to^y* (merger of labio-velarisation and velarisation) *stô* ‘show’

**s-tæ^yk* ‘be alone’

The lenited counterpart is reconstructed as **[k]ǎ-tæk* ‘one’. The denominal **sǎ-* would cause intersyllabic compression when attached to **[k]ǎ-tæk*, creating the illegal cluster **s.[k].t-* (via **sǎ-[k]ǎ-t-*), and triggering a transphonologisation resulting in velarisation. The sound changes are illustrated in (24).

- (24) **sǎ-[k]ǎ-tæk* > **sǎ-[k]-tæk* > **s-[k]-tæk* > **s-tæ^yk* > *stây* ‘be alone’

**s-pæ.C.tsæk* ‘chop’

The lenited counterpart *rvǐ* ‘axe’ indicates a presyllable **rǎ-*, however, this presyllable is absent in the non-lenited counterpart. The denominal prefix **sǎ-* compressed **rǎ-*, creating the prohibited sequence **s-r.p-*, within which the **r-* in the middle either dropped immediately, or became further compressed into the rhyme, becoming **-C-* in the reconstructed form, blocking the lenition of **ts-*. See 25.

- (25) **sǎ-rǎ.pæ-* > **sǎ-r.pæ-* > **s-r.pæ-* (prohibited) > **spær-*

¹⁵The stress on the prefix **sǎ-*, as mentioned in Section 4.3, could be related to the Tshobdun accentual system, which involves a reassignment of stress to the prefix. In Tshobdun, stress reassignment is related to syllable structure and the accentual pattern of the base word. Of the three Khroskyabs examples in this section, two base words involve open syllables (*vdê* ‘see’ and *rvǐ* ‘axe’), which cause stress reassignment in alignment with the Tshobdun stress rule. The remaining base word, *rǎy* ‘one’ (< **[k]ǎ-tæk*), has a closed syllable which does not result in stress reassignment. One possibility is that Khroskyabs generalised the stressed **sǎ-* prefix; another possibility could be related to the fact that the numeral prefix in Tshobdun are all stressed: **kǎ-vdê* ‘four’, **kǎ-mǎo* ‘five’, **kǎ-tso* ‘six’, and so on, meaning that their accentual pattern are different from other words. It is possible that Khroskyabs had **[k]ǎ-tæk* ‘one’, in which the accentual domain was an open syllable, which caused stress to be reassigned to the prefix. Further analyses are needed to understand the accentual rules of Proto-Khroskyabs.

4.5 Interim summary

This section has proposed a series of sound changes. In terms of relative chronology, post-stress intersyllabic compression precedes transphonologisation and occurs before lenition takes place; a process eventually followed by the disappearance of presyllables.

1. **Post-stress intersyllabic compression:** A lenition-triggering syllable, if preceded by a stressed syllable and followed by an unstressed syllable, is compressed to **C-*, whereupon it loses its original vowel. The remaining consonant **C-* is not conducive to lenition, therefore a consonant which follows it will not be lenited.

**'CV(C)-Cǎ.p- > 'CV(C)-C.p- or C-C-p-*

Example: **'nǎ-sǎ.puut > *'nǎ-s.puut > *n.s.puut > nspǎ* ‘suppurate (Wobzi)’

2. **Transphonologisation:** In cases where intersyllabic compression results in phonotactically prohibited sequences, **C-* (from **Cǎ-*) is further compressed into a featural element that affects the vowel quality of the rhyme:

**'CV-Cǎ.pV > *'CV-C.pV > *C₁-C₂-pV (prohibited) > C₁-pV^{C₂}*

Example: **'sǎ-pǎ.to > *'sǎ-p.to > *s.p.to > *s.to^w > *sto^v > stô* ‘show’

3. **Lenition:** A presyllable triggers lenition before simplifying into a preinitial **C-*:

**Cǎ.p- > *Cǎ.v- > C.v-*

Example: **kǎ.pǎ^v > *kǎ.vǎ^v > *k.vǎ^v > yvǎ* ‘tsampa’

4. **Simplification or disappearance of presyllables:** A presyllable with a short vowel **Cǎ-* is preserved as a preinitial. Presyllables with a neutral vowel **Cǎ-* dropped after triggering lenition.

Examples:

**rǎ.pǎ > *rǎ.vǎ > rvǎ* ‘axe’

**[t]ǎ-tsǎ > *[t]ǎ-zǎ > zǎ* ‘son’

Concrete reconstructions are shown in Table 8.

Non-lenited	Reconstruction	Lenited	Reconstruction
<i>pî</i> ‘year’	* <i>pæ</i>	<i>pâvi</i> ‘this year’	* <i>pǎ-pæ</i>
= <i>spi</i> ‘NMLZ, material’	*(<i>CVC</i>)- <i>sǎ-pæ</i>	<i>vî</i> ‘do’	* <i>Cə-pæ</i>
<i>papâ</i> ‘a kind of tsampa’	* <i>pæ^y</i>	<i>ɣvâ</i> ‘tsampa’	* <i>kǎ-pæ^y</i>
<i>nspâ</i> (Wobzi) ‘suppurate’	* <i>nǎ-sǎ-puut</i>	<i>svâ</i> (Wobzi) ‘pus’	* <i>sǎ-puut</i>
<i>spâtsæy</i> ‘chop’	* <i>sǎ-rǎ-pæ-tsæk</i>	<i>rvî</i> ‘axe’	* <i>rǎ-pæ</i>
<i>stô</i> ‘show’	* <i>sǎ-pǎ.to</i>	<i>vdê</i>	* <i>pǎ.to</i>
<i>pætsî</i> ‘piglet’	* <i>pæ [k] tsæ</i>	<i>zî</i> ‘son’	* <i>[t] ə-tsæ</i>
<i>stây</i> ‘alone’	* <i>sǎ-kə-tæk</i>	<i>rây</i> ‘one’	* <i>kə-tæk</i>
<i>skô</i> ‘make an effort’	*(<i>CVC</i>)- <i>sǎ-ko^y</i>	<i>yó</i> ‘be able’	* <i>Cə-ko^y</i>
<i>qî</i> ‘shout (n)’	* <i>qæ</i>	<i>sɿ</i> ‘sound, voice’	* <i>sǎ-qæ</i>
<i>rqê</i> ‘throat’	* <i>r-qo</i>	<i>rvælm</i> ‘chest’	* <i>rǎ-qæ.C.lum</i>
<i>rmæstây</i> ‘male siblings’	* <i>rmæ <s> tuuk</i>	<i>dóy</i> ‘younger brother’	* <i>n tǎ^yk</i>
<i>stî</i> ‘put’	* <i>s-tæ</i>	<i>dí</i> ‘keep’	* <i>n tæ</i>

Table 8: Reconstruction of lenition alternation in Khroskyabs

Exceptions to the present reconstruction are accounted for in Section 7 of the supplementary material.

A Python code is also provided to simulate the evolutionary pathway of lenition alternations in Khroskyabs, showing the overall plausibility of the reconstructions and sound changes (see Section 8 of the supplementary material).

5 Lenition in other West Gyalrongic languages

In this section, I examine lenition in other West Gyalrongic languages, and evaluate the plausibility of proposing similar regular sound laws like those described above. Four varieties are included: Gexi Stau (Huang 1991, Huang & Dai 1992), Khang-gsar Stau (Jacques et al. 2014, 2017), Geshiza (Honkasalo 2019), and Tangut (Li 1997).

5.1 Lenition alternation in other West Gyalrongic languages

Other West Gyalrongic languages also provide examples of lenition alternation, as shown in Table 9. However, alternation is less well preserved in these other West Gyalrongic languages. Low incidences of lenition alternation may be a result of either analogy or datasets. First, analogy has had a larger impact on Horpa-Stau languages than Khroskyabs via generalisation of one of two alternate forms. Second, the size of the datasets available for these languages is smaller than that available for Khroskyabs.

Language	Non-lenited	Meaning	Lenited	Meaning
Geshiza	rqua	throat	yælo	chest
Gexi	qva	throat	ɣalo	chest
Khang.gsar	rqua	throat	ɣalɐ	chest
Tangut	 qo[#]r¹	throat	 ɣa[#]r	chest
Khroskyabs	rqê	throat	ɣælám	chest
Geshiza	-sq^ha	ten (suffix)	zyæ	ten
Gexi	-sq^ha	ten (suffix)	zba	ten
Khang.gsar	-sq^ha/-sqa	ten (suffix)	zba	ten
Geshiza	rmæsti	male siblings	ri	brother
Tangut	 tɔ[#]2	brother (of man)	 lo[#]2	brother
Khroskyabs	rmæstəy	male siblings	dóy	brother
Gexi	sti	existential verb	nə-ri	put in
Khroskyabs	stíd	existential verb	dî	keep
Gexi	spə	down	və	bottom
Gexi	nə-nq^he	become thin	ɣəbə	be thin
Khang.gsar	nq^hi	become thin	ɣəbə	thin person
Khang.gsar	qəsji	tomorrow	zəvə	in two years
Tangut	 qe[#]1	shout (v)	 ɣe[#]2	sound, voice
Khroskyabs	qî/gî	shout (n)/shout (v)	sɣí	sound, voice
Tangut	 tsew[#]r²	heavy	 zew[#]1	heavy
Tangut	 tsew[#]r¹	joint	 zew[#]2	joint, wrist
Tangut	 kur¹	fumigate	 yu¹	smoke (n)

Table 9: Lenition alternation in other West Gyalrongic languages

Four pairs of lenition alternation are shared between Khroskyabs and Horpa-Stau languages, and two pairs are shared among Horpa-Stau languages, to the exclusion of Khroskyabs, as shown in Table 10.

Labels	Languages	Count
throat/chest	All	5
brother/male sibling	Geshiza, Tangut, Khroskyabs	3
put in/keep	Gexi, Khroskyabs	2
shout/sound	Tangut, Khroskyabs	2
ten (suffix)/ten	Geshiza, Gexi, Khang.gsar	3
thin	Gexi, Khang.gsar	2

Table 10: Shared lenition alternations among WG languages

The pair *spə* ‘down’ ~ *və* ‘bottom’ is only found in Gexi and the pair *qəsji* ‘tomorrow’ ~ *zəvə* is only found in Khang.gsar. Tangut has three unique pairs of lenition alternation.

𐰇𐰺 *tsew^{r2}* ‘heavy’ ~ 𐰇𐰺 *zew^{r1}* ‘heavy’, 𐰇𐰺 *tsew^{r1}* ‘joint’ ~ 𐰇𐰺 *zew^{r2}* ‘joint, wrist’, and 𐰇𐰺 *kur¹* ‘fumigate’ ~ 𐰇𐰺 *yu¹* ‘smoke (n)’.¹⁶

The question now is whether we can explain lenition alternation in Horpa-Stau in a similar fashion as we have for Khroskyabs. In the following subsections, I will approach this question from two angles based on the Khroskyabs reconstruction:¹⁷

1. Presyllables as the origin of lenition
2. Post-stress intersyllabic compression

5.2 Presyllables as the source of lenition

The lenited counterparts of the pairs ‘ten’, ‘be(come) thin/thin person’, ‘tomorrow/in two years’, and ‘shout/sound’ provide direct evidence for lenition-triggering presyllables.

The numeral ‘ten’ is likely to originate from *#sə-q^ha*, resulting in Gexi and Khang.gsar *zba*, and Geshiza *zyæ*. The Gexi/Khang.gsar form *ɾəbə* ‘be thin/thin person’ can be reconstructed as *#rə-qə-bə*. Similarly, Khang.gsar *zəvə* ‘in two years’ can be reconstructed as *#sə-qə-və*, where *qə-* corresponds to the first syllable in *qəsji* ‘tomorrow’.

The Tangut pair 𐰇𐰺 *qe^{r1}* ‘shout (v)’ ~ 𐰇𐰺 *ke^{r2}* ‘sound, voice’ is comparable to the Khroskyabs pair *qi* ‘shout (n)’ ~ *si* ‘sound, voice’, and can be reasonably reconstructed in the same way: *#Sə-qa^r* > *#Sə-ka^r* > *#S-ka^r* > *ke^{r2}* ‘sound, voice’ (see also Supplementary Material, Section 4).

¹⁶Unlike the case of Khroskyabs, it seems that lenition in Horpa-Stau languages affects both aspirated and non-aspirated initials. Given that aspiration alternation is still productive in many Horpa-Stau languages, the aspiration here could be secondary and should be studied when the morphology of Horpa-Stau is better understood.

¹⁷There is no confirmed case of transphonologisation in modern Horpa-Stau. See Section 4 of the supplementary material for more on transphonologisation in Tangut.

Kinship terms, body parts and other nominals that take a possessive prefix in East Gyalrongic languages are lenited as expected according to our hypothesis. It is therefore possible to postulate #*Cə-ti* for Geshiza *ri* ‘brother’, #*Cə-pə* for Gexi *və* ‘bottom’ (cf. Japhug *w-pa* 3SG.POSS-bottom), #*Cə-toʷ* for Tangut 𐵓𐵔 *loʷ* ‘brother’, and #*Cə-tsewʷ* for Tangut 𐵓𐵔 *zewʷ* ‘joint, wrist’.¹⁸ Note that the non-lenited counterpart of ‘joint, wrist’ in Tangut, 𐵓𐵔 *tsewʷr¹* ‘joint’, probably takes a body part prefix #*r-* (see Section 3.5), and is thus reconstructed as #*r-tsewʷ*.

In modern Horpa-Stau languages, the forms for ‘chest’ do not have an *r-* preinitial. The preinitial either could have dropped after leniting the following consonant for morphological reasons, or may have simply not existed in the first place. In the latter case, lenition could have been triggered by a possessive prefix. The Tangut form 𐵓𐵔 *saʷr* ‘chest’ preserves the *r-* initial (transphonologised into the rhyme). The *a-* vocalism in this form, which is different from the *o-* vocalism in the non-lenited form (𐵓𐵔 *qoʷr¹* ‘throat’), is due to the fact that 𐵓𐵔 *saʷr* ‘chest’ is a bound state with *-a*, like in other West Gyalrongic languages (Lai 2017: 163-164, Honkasalo 2019: 225-227).

The Tangut noun 𐵓𐵔 *yu¹* ‘smoke (n)’ is problematic, as none of its modern West Gyalrongic cognates exhibit lenition: *mkʰəd* ‘smoke (n)’ in Khroskyabs and *mkʰə* in other languages. The *m-* preinitial is likely related to the word for ‘fire’, *vmə* ‘fire’ in Khroskyabs, *ymə* in Gexi/Khang.gsar, and *wmə* in Geshiza. It is therefore possible that the lenited form in Tangut was triggered by 𐵓𐵔 *məʷ¹* ‘fire’ after it became a presyllable. It could also have simply been triggered by a possessive prefix, which commonly exists for ‘fire’ in East Gyalrongic (cf. Japhug *ty-kʰu* and Cogtse Situ *tə-kʰə*). The non-lenited counterpart, 𐵓𐵔 *kur¹* ‘fumigate’, can be reconstructed as #*r-ku*. The prefix #*r-* is denominal and can be compared to the Japhug denominal prefix *rr-* (Jacques 2014a).

The Gexi verb *ri* ‘put in’ can be reconstructed as #*Cə-ti*, with an obsolete verbal prefix that triggered lenition in the same way it did for Khroskyabs. Its cognate in Khroskyabs, *dī* ‘keep’ (< **ntə*), had prenasalisation that blocked the lenition process (Supplementary Material, Section 2.2). The same treatment could perhaps be proposed for the Tangut stative verb 𐵓𐵔 *zewʷ¹* ‘be heavy’, reconstructed as #*Cə-tsewʷ*. However, due to the lack of textual examples, the difference between the non-lenited 𐵓𐵔 *tsewʷr²* ‘be heavy’ and 𐵓𐵔 *zewʷ¹* ‘be heavy’ remains unclear, and no morphological hypothesis can be put forward.

¹⁸It is possible to specify the reconstructed prefixes as #*[k]ə-* (infinitive) and #*[t]ə-* (inalienable possessive), but I prefer to stick with the unspecified #*Cə-* until more substantial evidence is found.

5.3 Intersyllabic compression

Intersyllabic compression can be observed in the lenition alternations attested in Horpa-Stau and Tangut with the pairs for ‘ten’ and ‘window’.

The case of ‘ten’

The clearest example is the pair for ‘ten’, with a full-fledged numeral as the lenited counterpart, and a numeral suffix as the non-lenited counterpart in modern Horpa-Stau languages: Geshiza **zyæ** ‘ten’, Gexi/Khang.gsar **zba** ‘ten’, compared to **-sq^ha** ‘ten (suffix)’ in all three languages. Similar to the treatment for Khroskyabs intersyllabic compression, the case of ‘ten’ in Horpa-Stau can be postulated as in (26).

$$(26) \quad \#CV(C)\text{-}s\check{\text{ə}}\text{-}q^ha > \#CV(C)\text{-}s\text{-}q^ha > CV(C)\text{-}sq^ha$$

The case of ‘window’

The case of ‘window’ belongs to an alternation observed between Geshiza **kærku** ‘window’ and Tangut 𐰚𐰆𐰏 **g²⁸⁸³wir¹** ‘window’ (cf. Supplementary Material, Section 6). The Tangut form can be postulated as **#rǝ-kwi**, lenited as **#rǝ-ywi**. After the simplification of the presyllable, the lenited **#-y-** is refortified into the plosive **-g-**. This regular phenomenon is also found in 𐰚𐰆𐰏 **g⁵¹⁰²ur¹** ‘testicles’, from **#rǝ-ku**, related to Guanyinqiao Khroskyabs **lǝú** ‘testicles’ (< ***lǝ-qur^v**, cf. Siyuewu Khroskyabs **lǝrǝdú** ‘testicles’). Modern Horpa-Stau languages also underwent this process, as in Geshiza **rgi** ‘be hard’, likely from **#rǝ-ki**, compare Khroskyabs **ryé** ‘be hard’. The form **kærku** ‘window’ in Geshiza is clearly a compound with two parts, **kæ-** probably related to **yæ** ‘door’ (**#Cǝ-kæ**),¹⁹ and **-rku** to Tangut 𐰚𐰆𐰏 **g²⁸⁸³wir¹** ‘window’.

If this comparison is valid, one could propose that Geshiza **kærku** ‘window’ is the result of intersyllabic compression, as shown in 27.

$$(27) \quad \#k\check{\text{æ}}\text{-}r\check{\text{ə}}\text{-}ku > \#k\check{\text{æ}}\text{-}r\text{-}ku \text{ (intersyllabic compression)} > k\check{\text{æ}}rku \text{ ‘window’}$$

5.4 Summary for lenition alternation in Horpa-Stau and Tangut

This section shows that lenition alternation exists in Horpa-Stau and Tangut, and can be explained in a way similar to lenition alternation in Khroskyabs: via presyllables and intersyllabic compression. As the morphologies of Horpa-Stau and Tangut are currently less well

¹⁹It is common for Gyalrongic languages to form the word ‘window’ with the word for ‘door’, as in Cogtse Situ **kam-tsa** ‘window’, literally meaning ‘small door’. However, a problem for this etymology is that Horpa-Stau languages usually have a uvular for the ‘door’ word, compare Khang.gsar **ɣe** ‘door’, Gexi **ɣa** ‘door’, and Tangut 𐰚𐰆𐰏 **ɣa⁵⁶⁸⁹** ‘door’. Geshiza phonology prohibits **ɣ-**, therefore the initial consonant of **yæ** ‘door’ could have originated from a uvular or a velar, but **q-** is not prohibited, therefore the non-lenited version should have been **qæ-**. However, the Khroskyabs cognate **yām** ‘door’ (< ***Cǝ-kum**) points to a velar initial, thereby aligning with Geshiza. In light of this comparison, it is possible that ‘door’ in Geshiza originally had a velar initial. Explanation of velar/uvular alternation in West Gyalrongic awaits further evidence.

studied than that of Khroskyabs, the time is not yet ripe to give precise reconstructions. However, the hypotheses formulated in this section are probably on the right track.

Jacques (2014b) and Miyake (2012) each propose a solution to lenition in Tangut. Jacques (2014b) opts for a uniform solution by reconstructing a *C- before every lenited initial consonant. After providing an overview of his Pre-Tangut, Miyake (2012) proposes three types of presyllables, among which one type is lenition triggering. However, he does not specify the exact conditions of lenition and non-lenition, nor does he seek possible sources for the reconstructed presyllables. For some lenited examples, Miyake (2012: 252) comes up with a Pre-Tangut form without a presyllable, such as reconstructing **gu* for  ²⁷⁵⁰ *ku*^{h1} ‘head’. Our approach proposes #*[t]ə-qu*^h, comparable to Japhug *tu-ku* ‘head’.

6 Lenition and compression in other Sino-Tibetan languages

In this section, cases of lenition in East Gyalrongic as well as other Sino-Tibetan languages are briefly examined. I will show that seemingly sporadic sound correspondences can be solved under the neogrammarian framework in a way analogous to the Khroskyabs solutions offered above. Section 6.1 presents the case of East Gyalrongic, Section 6.2 the case of Burmese, and Section 6.3 Old Chinese and Proto-Min.

6.1 East Gyalrongic

Gong Xun (2018: 22-23) divides Situ dialects into two groups, leniting dialects and deprenasalising dialects. Leniting dialects exhibit lenited consonants which were originally unaspirated plosives, while deprenasalising dialects preserved unaspirated plosives and removed prenasalisation from prenasalised voiced stops. In the city of Barkhams, where Situ dialects are dominant, dialect mixing is prevalent and most leniting dialects have borrowed terms from deprenasalising dialects. Even the ‘purest’ leniting dialects, such as Bragbar Situ, have not been spared (Gong Xun 2018: 22). Table 11 shows comparisons of lenited and non-lenited cognates between Khroskyabs and Bragbar Situ. While Khroskyabs is uniformly leniting, Bragbar Situ shows irregular correspondences without apparent governing conditions – a phenomenon which cannot be fully explained at present (Zhang 2020: 12). As such dialect mixing seems to be the best solution for the time being.

Khroskyabs	Bragbar Situ	Meaning
vî	ka-viê	do
ví	wo-pié	bottom
zî	tə-zîê	son
zôy	ta-tsêk	<i>Potentilla anserina</i>
rêy	kə-rík	one
réz	ka-tsô	say
yâm	kóm	door
yêr	kə-kér	help
ɣû	ta-wô	head
ɣáv	ta-wiép	needle

Table 11: Lenition comparison between Khroskyabs and Bragbar

Bragbar Situ preserves a few lenition alternations, which suggest similar underlying processes as those proposed for Khroskyabs. These are shown in (28).

- (28) Lenition alternation in Bragbar Situ
- ka-viê** ‘do’ ~ **wo-spâ** ‘material’/**ka-ɕpiê** ‘be able’
 - kə-rík** ‘one’ ~ **zja-tiók** ‘eleven’
 - tə-zîê** ‘son, man’ ~ **kam-tsiê** ‘window (small door)’

The alternation set in (28a), reconstructed throughout the previous sections, is also attested in Khroskyabs. It is reasonable to suppose a similar process for this alternation in Bragbar Situ as in Khroskyabs; one in which the preinitials **s-** and **ɕ-** blocked lenition.

The set in (28b) concerns the numerals ‘one’ and ‘eleven’. It is comparable to the case of ‘ten’ in modern Horpa-Stau languages. The form **zja-tiók** could have had a linking consonant between the two syllables, **#zja-C-tiók**, that prevented lenition from happening. A linking consonant is found in the numeral **zja-p-tšók** ‘sixteen’ in Bragbar Situ, which can be measured against **kə-tšók** ‘six’. In other numerals, this linking consonant is lost due to analogy.

Bragbar Situ has generalised the non-lenited **-tsiê** as a diminutive suffix, as shown in (28c). The full word **tə-zîê** ‘son, man’ is probably lenited for the same reason as **zî** is in Khroskyabs: the initial is lenited in an intervocalic position.

Bragbar Situ attests a lenited version for ‘snow’, **ta-jviê** (**j-** comes from a lateral) and a non-lenited **ɕerpiê** ‘axe’. Both words have a lenited cognate in Khroskyabs, **lvî** ‘snow (Guanyinqiao)’ and **rvî** ‘axe’. If the form for ‘axe’ is not borrowed from a non-leniting dialect, it could reflect a case of intersyllabic compression. See (29).

- (29) **#'ɕe-rə.piê** > **#'ɕe-r.piê** > **ɕerpiê** ‘axe’

Another related phenomenon in Bragbar concerns different inflectional and derivational patterns of the same verb. The form **wo-ktə-s** (3SG.POSS-be.big-NMLZ) ‘her size’ shows a compressed preinitial **k-**, while the vowel is preserved when a tone is assigned **re-tə-kə-ti-n** ‘you have grown up’. This alternation is probably recent, showing that intersyllabic compression can readily take place in Gyalrongic (p.c. Shuya Zhang 11/02/2021).

Beyond Situ, Zbu is also a leniting East Gyalrongic language. Zbu exhibits intersyllabic compression for the numeral ‘ten’, as in the pair with lenited **seʔeʔ** ‘ten’ and non-lenited **nə-sqé** ‘twenty’. This alternation is identical to the case of modern Horpa-Stau languages, and can be reasonably explained along the same lines.

6.2 Burmese

Burmese and Gyalrongic both belong to the Burmo-Gyalrongic sub-branch of Sino-Tibetan (Jacques & Pellard 2020, Sagart et al. 2019). Lenition in Burmese is illustrated in Table 12 with West Gyalrongic cognates.

Burmese	Khroskyabs	Khang.gsar	Meaning
<i>wak</i>	p^hâγ < *p^hæʔk	va < #Cə-paC	pig
<i>rak</i>	rák < *Cə-tæk (Njorogs)		weave
<i>mrañ</i>	vdê < *pə-to	vdə < #pə-to	see

Table 12: Burmese lenition

Hill (2019: 80) proposes a hypothetical ***C-** in order to explain Burmese lenition, as shown in (30).

- (30) a. ***C-pak** > **wak** ‘pig’
 b. ***C-tak** > **rak** ‘weave’
 c. ***mC-taŋ** > **mrañ** ‘see’

Hill’s reconstruction contains a problem similar to one found in Jacques’ (2014b) Pre-Tangut reconstruction in that it lacks thorough exploration of internal morphology. Given the presence of a preinitial **m-** in **mrañ** ‘see’, the simplest approach would be to incorporate the preinitial into the reconstruction rather than assuming an extraneous and unknown element. The form can thus be reconstructed as **#mă-taŋ**, in which **#-t-** underwent intervocalic lenition.²⁰ Following this logic, the other two forms in (30) should have also been preceded by a presyllable **#Cə-**, rather than a preinitial. See (31).

- (31) a. **#Cə-pak** > **wak** ‘pig’

²⁰An alternative etymology relates Burmese *mrañ* ‘see’ to Japhug **nympo** ‘look’, Bragbar Situ **namjō** ‘look’, and Khroskyabs **nyê** ‘look, watch’ (p.c. Guillaume Jacques 19/01/2021).

- b. #**Cə-tak** > **rak** ‘weave’
 c. #**mǎ-taŋ** > **mrañ** ‘see’

The presyllable in #**Cə-tak** ‘weave’ must have been an inflectional prefix, as proposed for Khroskyabs.

The presyllable in #**mǎ-taŋ** corresponds to Bragbar Situ **mətó**. Note that **-o** in Situ regularly corresponds to **-aŋ** in Burmese and Tibetan, and is reconstructed as ***-aŋ** in Proto-East-Gyalrongic by (Jacques 2004: 230). West Gyalrongic has a denasalised presyllable ***pǎ-** for ‘see’, which may indicate a Proto-Burmo-Qiangic ***mǎ-** presyllable with a voiceless nasal.

There is no correspondence in Gyalrongic languages for the presyllable in Burmese ‘pig’. However, in some Loloish languages, ‘pig’ does have a presyllable, as in Lisu **a⁵⁵vɛ³¹** and Weishan Yi **a⁵⁵vɪ²¹** (Huang & Dai 1992), and Akha **àɣàq** (Hansson 1989).

Our reconstruction also serves to explain the unexpected Burmese form **sa** ‘son’. The expected reconstruction is **†tsa**, which should have evolved into the unattested **†ca** (Hill 2019: 57). Our reconstruction makes it possible to postulate the pathway shown in (32).

- (32) #**Cə-tsa** > #**Cə-za** > #**za** > **sa** ‘son’

6.3 Old Chinese and Proto-Min

In order to account for Norman’s (1973, 1974) Proto-Min ‘softened’ initials, Baxter & Sagart (2014) postulate a series of presyllables, or ‘loosely attached preinitials’ in their own terms, which lenited and softened Old Chinese simple initials in Proto-Min.²¹ Middle Chinese, however, was not affected by these presyllables. See Table 13, reproduced from Baxter & Sagart (2014: 46).

Old Chinese	Proto-Min	Middle Chinese
*Cə-tʰ-	*-t-	t-
*Cə-dʰ-	*-d-	d-

Table 13: Old Chinese presyllables

The presyllables are also used to explain Vietic lenition in early loanwords. For instance, 倚 ***Cə.q <r>ajʔ** ‘lean on’ is reflected in Vietnamese **ghế** [ye B1] ‘chair’ (Baxter & Sagart 2014: 187).

Here it will be interesting to note that both Proto-Min and Vietic underwent similar leniting changes to those which happened in West Gyalrongic.

²¹The exact origin of the softened initials is still hotly debated (Baxter & Sagart 2014, Handel 2009, Norman 1986).

More interestingly, it seems that intersyllabic compression also took place in Old Chinese, as in the pair 食 **mə-lək* ‘eat’ ~ 食 **s-m-lək-s* ‘feed’. The **s-* prefix in **s-m-lək-s* ‘feed’ is clearly a causative prefix, with an indirect cognate in Khroskyabs reconstructed as **sə̌-*. The addition of this prefix caused the presyllable in **mə-lək* ‘eat’ to compress to *m-*. Although there is no evidence for the reconstruction of a syllabic causative here, one may assume that compression from *#sə̌-mə-lək-s* to **s-m-lək-s* was already complete before Old Chinese.

It is also noteworthy that except for **N-*,²² no simplex preinitial can precede a presyllable in Old Chinese. Only **Cə-C-* is attested, such as in 含 *Cə-m-kʰ[ə]m* ‘contain’ and 動 **[Cə-m-]tʰoŋʔ* ‘move’.

Baxter & Sagart (2014) reconstruct a number of presyllable/preinitial alternations for Old Chinese, which are likely to result from a certain kind of compression. However, it is impossible to recover their origins at the present stage. See (33).

- (33) a. 號 **Cə.[g]* ‘aw-s’ ‘command, call (n)’ ~ 號 **[C.g]* ‘aw’ ‘call out’
 b. 詞 **sə.lə* ‘utterance’ ~ 司 **s-lə* ‘superintend’
 c. 被 **mə-pʰ(r)aj* ‘cover oneself with’ ~ 被 **m-pʰ(r)ajʔ-s* ‘cover’
 d. 埋 **mə.rʰə* ‘bury’ ~ 埋 **m.rʰə* ‘bury’

6.4 The onset in Proto-Sino-Tibetan

The reconstructable onset structure (medials excluded) with commutable preinitials/presyllables in Proto-West Gyalrongic can be illustrated in (34), with two presyllables maximum.

- (34) Proto-West Gyalrongic
#C(ə̌).C(ə̌).C_{initial}-

The most complex onsets in Baxter and Sagart’s (2014) Old Chinese have maximally two pre-elements, usually involving a nasal, such as the aforementioned 食 **s-m-lək-s* ‘to feed’ and 含 *Cə-m-kʰ[ə]m* ‘to contain’, or 懶 **[N-kə̌].rʰanʔ* ‘be lazy’. The onset structure of Old Chinese could theoretically be shown as in (35), with one presyllable and two preinitials. Following the conjecture proposed in Section 6.3, the preinitial next to the presyllable may have been compressed from a syllabic element.

- (35) Old Chinese
*#C(ə̌).C(ə̌).C_{initial}- > *C(ə̌).C.C_{initial}-*
 Example: 食 *#sə̌-mə-lək-s* > *#sə̌-m-lək-s* > **s-m-lək-s* ‘feed’

Tibetan attests no presyllables and allows for a maximum of two preinitial consonants. Yet some scholars suspect preinitials in Tibetan came from presyllables (Jacques 2012, 2014c), as shown in (36).

²² **N-* in Old Chinese is equivalent to prenasalisation in Khroskyabs, and should be treated separately from other segments.

(36) Tibetan

$\#C(\text{ə}).C(\text{ə}).C_{\text{initial}}- > C.C.C_{\text{initial}}-$

Example: $\#b\text{ə-sə-grub-s} > \#b\text{ə-s-grub-s} > b\text{-s-grub-s}$ ‘accomplish.PST’

The attested and reconstructed syllable structures in West Gyalrongic, Old Chinese, and Tibetan are very similar, and they seem to have undergone similar changes, but at different stages. West Gyalrongic has been shown to have compressed the second presyllable before reducing the first. Old Chinese shows an intermediate stage with the second presyllable compressed and the first partly preserved, while Tibetan had already completed both processes by the Classical period. Chinese is probably the outgroup of Sino-Tibetan, with only a remote relationship with Gyalrongic and Tibetan (Sagart et al. 2019, Zhang et al. 2019). However, these languages do share a number of prefixes, whose forms can be reconstructed to the proto-language as presyllables (Jacques 2019, LaPolla 2017, Sagart 1999). It is therefore probable that the shared onset canons presented above reflect the onset canon in Proto-Sino-Tibetan, the general pathway for which can be represented as follows:

1. Stage I: Forms allowing for two presyllables: $\#C\check{\text{ə}}.C\check{\text{ə}}.C_{\text{initial}}-$
2. Stage II: The presyllable in the middle is compressed: $\#C\check{\text{ə}}.C.C_{\text{initial}}-$
3. Stage III: The outermost presyllable reduces: $\#C.C.C_{\text{initial}}-$
4. Stage IV: Loss of preinitials and other compensational changes (transphonologisation, lenition, tonogenesis, etc.)

7 Contribution to panchronic phonology and historical linguistic methodology

This paper observes lenition alternation in Khroskyabs and other Sino-Tibetan languages and proposes historical development pathways for these phenomena, which can be summarised as consisting of three main steps.

1. Post-stress compression in intersyllabic position
2. Lenition of voiceless plosives in intervocalic position
3. Reduction of the remaining presyllables

Step 1 and Step 3 are related to monosyllabification. While the reduction in Step 3 is a spontaneous process that has no proven external trigger, I showed that the compression in Step 1 is driven by a full set of morphophonological mechanisms. This proposal rejects the statement of Michaud (2012: 118) that monosyllabification is sporadic in its first stages. At least in many Sino-Tibetan languages, syllable reduction triggered by stress patterns preceded spontaneous reduction.²³ While previous studies mostly focus on describing

²³I tend to avoid the term “sporadic” here because it implies that a phenomenon is inexplicable.

monosyllabification, this paper clearly shows that monosyllabification is explainable under the neogrammarian scheme through regular sound changes. Extensionally, these findings support and advocates for making efforts to account for similar phenomena that are seemingly irregular in Sino-Tibetan and other Southeast Asian languages.

In Section 7.1, I focus on the typology of intersyllabic compression and point out that post-stress compression may be a candidate for a panchronic sound law.²⁴ In Section 7.2, I comment on some unresolved problems in reconstructions of Southeast Asian languages that could potentially be solved using the sound changes proposed in this paper. Section 7.3 concludes the paper with general methodological commentary.

7.1 Towards a panchronic account of compression

Intersyllabic compression is a common phenomenon among the languages of the world, and one that occurs under different conditions (usually in relation to stress patterns or prosody). In Old Icelandic, syncope is attested in intersyllabic positions involving at least one bimoraic syllable in Proto-Norse (Riad 1992: 95-96). See (37).

- (37) a. **her.ði.jooz* ‘shepherds’ > *her.ðar*
 b. **ka.tilooz* ‘kettles’ > *kat.lar*

The Cuna (Quechuan) verb *ukka-* ‘give’ comes from an earlier form **utka-* which was syncopated from *utaka*. The preterit form was *utkisa* in an earlier stage, with medial syncope at work again, transforming the modern form into *uksa*. Both syncope processes acted upon a syllable sandwiched between two other syllables (Holmer 1947: 36).

Latin syncope affects the vowel of medial syllables in many cases (Weiss 2009: 122-124). This particular type of syncope is related to accentual patterns, exhibiting a pattern extremely similar to that of Khroskyabs. The old Latin form *bálineum* ‘bath’ was borrowed from Greek *balaneîon* ‘bath’, with the second vowel *i* reduced from an original *a*. In Latin at the time of the Roman Empire, *bálineum* became *bálneum*, leaving no trace of the post-stress medial *-i-* (Exon 1906: 142). This change was governed by a prosodic rule prohibiting two successive unstressed syllable after a stressed syllable. As in Khroskyabs, such a sound change has created many synchronically inexplicable doublets. For example, Latin *uēlum* ‘veil’ exhibits an irregular diminutive form, *uexillum*, with an additional *-xi-*. The reconstruction **uéxūlum* must then account for the missing syllable in the diminutive form, considering the loss of the medial syllable as a result of the stress on the first syllable (Garnier 2012: 241).

Synchronic phonetic studies can shed light on the phonetic bases of intersyllabic compression and related phenomena. Intersyllabic compression involves a vowel reduction/deletion in a post-stress environment. Post-stress vowel reduction is attested in various languages. Many English varieties exhibit this type of reduction, and studies show that the

²⁴For a typology of lenition, see Section 2.2 above.

reduction is heavily influenced by post-stress environments (Hooper 1978, Patterson et al. 2003, Ryu & Hong 2013, Zwicky 1972). A similar phenomenon is found in modern Greek, where post-stress vowels are much more likely to undergo reduction than pre-stressed ones (Baltazani 2007, Dauer 1980). An experimental study by Baltazani (2007) finds that post-stress vowels in modern Greek are much shorter and more susceptible to centralisation, and generalises this rule to a wider prosodic level: either at the word or the clausal level, units occurring after the main prominence tend to be prosodically weak. Intersyllabic compression also implies that the vowel of the medial syllable, rather than that of the final syllable, is reduced. The same phenomenon is observed in English (Zwicky 1972, Dalby 1986: 34, Burzio 1994: 113), as Burzio (1994: 113) states, ‘foot-medial open syllables are affected by reduction to a greater extent than foot-final syllables’. Further afield, the Pontremolese dialect of Northern Italian is reported to delete all post-stress word-medial vowels without any exception (Cavirani 2015: 77). Fletcher (2010: 540-549) observes the universal phenomenon of duration marking of boundaries and medial shortening, stating that a syllable in final position tends to be longer than in non-final or medial position. The lengthening of final syllables allows them to resist reduction, and peripheral syllables do indeed seem to possess more prominence than internal syllables in many cases. Carter & Clopper (2002: 347) find that English speakers tend to ‘make use of similar acoustic or perceptual salience properties (stressed syllables and word edges) underlying various tasks in language processing’, meaning that the medial syllable is supposedly of the least prominence.

It is both typologically and phonetically unsurprising that many languages undergo intersyllabic compression, especially in a post-stress position, as I have hypothesised for Khroskyabs in this paper. I have also shown that the same process of compression can be observed in other Sino-Tibetan languages. That the same sound change occurred independently in different languages hints at a panchronic sound law, which may well explain a number of unresolved questions regarding the mechanisms driving monosyllabification in non-Sino-Tibetan Southeast Asian languages.

7.2 The usefulness of detailed analyses of alternating doublets

Recent decades have seen fruitful historical linguistic accounts of many Southeast Asian language families, many of which are proto-language reconstructions, to name a few, Proto-Tai (Pittayaporn 2009), Proto-Hmong-Mien (Ratliff 2010), and Proto-Hlai (Norquest 2015). While these reconstructions make important contributions to Southeast Asian linguistics, there are inevitably unresolved details left untreated. Most of these issues concern alternating doublets within one variety or across dialects that are reconstructed separately, a number of which may be associated with monosyllabification.

In her reconstruction of Proto-Ong-Be, Chen (2018: 88, 116, 186) proposes two separate reconstructions for ‘porridge’, namely $*(nam^{BC2}-)tia^{BC2}$ and $*(nam^{BC2}-)p^{h}ia^{BC2}$, based

on an eastern *t*-reflex and a western *p^h*- or *f*-reflex. However, given the identical rhyme and tone, it is reasonable to assume that **tia^{BC2}* and **-p^hia^{BC2}* are variants of the same morpheme. The labiality in **(nam^{BC2})p^hia^{BC2}* could well be the result of assimilation caused by the coda of the preceding syllable, **nam^{BC2}*- (meaning ‘water’). Similarly, Ratliff’s (2010) Proto-Hmong-Mien reconstruction reports an irregular triplet for ‘heaven/sky’: **weŋ*; **ndeun*; **ngeun*. It seems that these forms are morphologically related: **w*- in **weŋ* could have been lenited from **ng*- in **ngeun*, and **-d* in **ndeun* was likely assimilated to the preinitial **n*-. A close examination of their morphosyntactic behaviour of these forms may reveal them to be distinct but related forms.

In Proto-Vietic, voicing alternations are reconstructed to account for tonal disharmony in modern varieties: Southern **C-gu?* ~ Northern **C-ku?* ‘bear (animal)’, Southern **C-bu:l?* ~ Northern **pu:l* ‘plait’, and Southern **k-jə:p* ~ Northern *cə:p* ‘lightning’ (Ferlus 1999, 2014). Ferlus (1999: 94-97) explains this voicing alternation as a change from voiced to voiceless, due to the superposition of a local stratum, rejecting any further reconstruction involving elements such as presyllables or features such as prenasalisation. Such an explanation is weakly explanatory and prematurely abandons segmental reconstruction. One could, for instance, propose a voicing triggering element *#Cǎ₂*-, that voiced the initial in Southern Vietic, and is compressed by *#Cǎ₁* (which evolved into Ferlus’ **C*-) in Northern Vietic. The proposition of a hypothetical presyllable is used in Baxter and Sagart’s 2014 Old Chinese reconstruction to account for softened initials in Proto-Min, and can even explain the voicing contrast between Southern and Northern Proto-Vietic. See (38) for a tentative reconstruction of ‘bear’. The Thavung reflex *cǎ?ku?B* ‘bear’ shows a glottal stop in the first syllable (Peiros 2015a), while the Malieng reflex *ta:kUʔ¹* has a long vowel (Peiros 2015b), both may be trace of the hypothetical *#Cǎ₂*.

- (38) a. Southern: *#Cǎ₁-Cǎ₂-ku?* ‘bear (animal)’ > *#Cǎ₁-Cǎ₂-gu?* (voicing) > *#Cǎ₁-gu?* > **C-gu?*
 b. Northern: *#Cǎ₁-Cǎ₂-ku?* ‘bear (animal)’ > *#Cǎ₁-C-ku?* (compression) > *#Cǎ₁-ku?* > **C-ku?*

It is also important to account for non-lenited examples in leniting languages, such as Vietnamese *chết* [*cet* B1] ‘die’, from Proto-Vietic **k.cet* ‘die’ (Ferlus 2014: 6), as compared to **k.cəh* > *giẻ* [*ze* C1] ‘duster’ (Ferlus 2014: 9). A unified reconstruction of the preinitial **k*- is insufficient to explain the different reflexes in Vietnamese. One could, for example, postulate *#kǎ*- for lenited reflexes, and *#k*- for non-lenited reflexes. Here again, the alternation between *#kǎ*- and *#k*- may be attributed to some sort of compressions.

7.3 The necessity of explaining internal variations

Reconstructions of Southeast Asian languages are normally based on direct comparison of different modern varieties which take internal variations for granted, inevitably leading to

separate reconstructed forms that are clearly related, or one reconstructed form that has several different unexplained reflexes. This methodological imperfection may be due to the preconceived view that many Southeast Asian languages are isolating, and therefore lack reconstructible morphology. However, it must be clarified that internal variations, and especially synchronically irregular alternations, if not due to borrowing within close varieties, are often indicative of fossilised morphology. The historical linguist must seek to explain these variations by revealing underlying regularity. The solution proposed here for tracing lenition alternation in West Gyalrongic languages thus serves as an appropriate model for this purpose. Instead of reconstructing lenited and non-lenited counterparts as proto-variations, this paper proposes a unified reconstruction that specifies conditions under which lenition occurs, and extrapolates proposed sound changes to tackle further questions, such as those of monosyllabification in Southeast Asian languages. Monosyllabification is accepted as a prominent feature in languages of the area, however, the regular mechanisms behind it have never been discussed. The present paper offers a possible and falsifiable pathway towards monosyllabification which may be applied to Southeast Asian languages, namely post-stress compression. While post-stress compression may not be the only way to achieve monosyllabicity, it will be beneficial for historical linguists to examine internal variations with greater care, and to keep in mind that syllable reduction may have a regular trigger. In doing so, we will be able to propose hypotheses with greater explanatory power to deal with unresolved problems related to onset behaviour and monosyllabification.

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A Information about appendices

The reader is invited to download the supplementary material via the following link:
<https://doi.org/10.5281/zenodo.5751801>.

For any additional information and data, please directly contact the author.

Résumé

Sur la base d'une reconstruction interne, cet article résout un problème de longue date observé en khroskyabs, une langue gyalrongique occidentale (sino-tibétaine), qui semble avoir sporadiquement des occlusives lénifiées, entraînant des correspondances irrégulières avec le gyalrongic oriental. Deux changements phonétiques majeurs sont impliqués, la lénition intervocalique et la compression intersyllabique post-tonique. Il s'avère que les processus proposés ici sont une solution probable à la monosyllabisation dans les langues d'Asie du Sud-Est, expliquant un chemin des polysyllabes ou sesquisyllabes vers les monosyllabes. En examinant les problèmes potentiels des reconstructions précédentes dans diverses langues, cet article montre que le cas du khroskyabs fournit une direction plausible dans la résolution de problèmes pertinents non-résolus d'un point de vue panchronique.

Zusammenfassung

Auf der Grundlage einer internen Rekonstruktion löst dieser Artikel ein seit langem bestehendes Problem im Khroskyabs, einer westgyalrongischen (sinotibetischen) Sprache, die stimmlose Plosive sporadisch lenisiert zu haben scheint, was zu unregelmäßigen Lautentsprechungen mit Ostgyalrongisch führt. Zwei große Lautwandel sind beteiligt, die intervokalische Lenisierung und die intersyllabische Kompression in Postakzentposition. Es

stellt sich heraus, dass die hier vorgeschlagenen Prozesse eine wahrscheinliche Lösung für die Monosyllabisierung in südostasiatischen Sprachen darstellen, indem sie einen Weg von mehrsilbigen oder sesquisilbigen zu einsilbigen Wörtern beschreiben. Durch die Untersuchung möglicher Probleme früherer Rekonstruktionen in verschiedenen Sprachen zeigt dieser Beitrag, dass der Fall Khroskyabs eine plausible Richtung bei der Lösung relevanter ungelöster Probleme aus einer panchronischen Perspektive bietet.

Author's address

Yunfan Lai
Trinity Centre for Asian Studies
Trinity College Dublin
College Green
DUBLIN 2

`yunfan.lai@tcd.ie`