ASPECTS OF TONE AND VOICE IN PHUTHI

BY

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Chapter 7

Tone, Breathiness and Depression

This is the final chapter containing analysis of Phuthi phonological prosody, in which we examine the interaction of H tone with tonal depression (triggered by breathy phonation, and sometimes triggered independently—definitions of these terms follow).

After a brief literature review, I present the full set of Phuthi phonological tone and voice interactions in eight sections of data and analysis (each section has its own brief conclusion), and a final conclusion. I review a fragment of the tone/voice literature in Section §7.1, focusing on works that consider tone voice interactions in Nguni. In Section §7.2, I examine the basic phonology of local tonal depression in Phuthi. Five aspects of the primary depression patterns are presented, together articulating the failure of breathy syllables (C\text{CV}) to display a H tone even when in the scope of a H domain (where the H domain is articulated by the domain principles in Chapters 4-6). Tone/voice antagonism is initially accounted for with a local CLASH constraint, identifying ungroundedness. I reflect on the nature of tone domain locality: because the H/L interaction happens at two levels (domain structure vs. domain expression), locality can remain unviolated. In Section §7.3, an extended pattern is examined: depression anticipation, where all syllables from stem left-edge to breathy voiced trigger syllable lower H to low (L). I argue that the segmental phonation (here: tonal depression) feature parses a Low Domain (LD), whose left edge realigns to the stem edge; I propose that CLASH can only be cast as a competition for simultaneous HD and LD (tone depression) expression, not as a local effect only on a breathy syllable. A salient analytic advantage of ODT over theories with an impoverished notion of featural domain, or with no feature domain edges at all, is demonstrated in the ability of ODT to parse a LD nested inside a HD, without violating locality (locality is defined crucially at the level of domain structure, not of domain expression). In Section §7.4, I observe that depressed syllables at the right edge of a HD cause tone shift rightwards by one mora off the antepenult/penult/ultima and that they block shift from that position when immediately preceding a second depressed syllable. I reject the analytic notion of parasitic—that is, derived—breathy voiced HDs
in favour of a single tier analysis that hinges on obligatory expression of the HD right-edge and on obligatory expression of the head of a HD (which head position is identified by the paradigm-specific ranking of the complete set of right-edge realign constraints. I argue that the apparent violation of locality at the surface in the parsing of H in fact falls out of competing LD and HD construction (where LD is always fully nested in HD), and out of competing L and H expression (where L always wins). In Section §7.5, I examine grammatically invoked depression phenomena from the noun system (formation of the morphological copula). In addition to the expected shift and block phenomena, I find that the depressed copula prefix provides evidence that L-domains also display minimality effects: there is right-edge realignment of L; and there is also left-edge realignment of L (but always respecting crispness). In Section §7.6, I focus on the only SP/OP candidate for being a permanently depressed prefix: -gi- ‘I / me’ which triggers the anticipated depressor shift and depressor blocking. I also examine masked depression in the form of non-third person SPs which only rarely receive the opportunity to reveal their depressed status, and this only under conditions of cross-paradigm comparison (e.g. with the past subjunctive). Finally, I present paradigm-specific data from the past subjunctive, where SPs are always depressed, and OPs display partial depression properties, that is, quasi-depression (but where these OPs also fail to convince us that they are lexically depressed in general). In Section §7.7, I consider a phenomenon highly marked in any phonological grammar: apparently overlapping feature domains of the same feature type, which are argued to reflect unincorporated sponsors; and a disjoint (discontinuous) reflex of a single tonal sponsor feature. Both phenomena are tolerated only under a specific L/H clash configuration at the prefix/stem boundary. Section §7.8 considers the evidence for the non-conflatability of L and breathy voice in the form of non-shifting L domains, that is, L domains not parsed by a segmentally triggered L but rather where L is grammatically triggered, and where depression without breathiness is the result. I examine the present indicative negative, where a grammatical L (distinct from lexical L) is motivated for insertion in the penult position of toneless stems only. This grammatical LD is OCP-sensitive, and fails where another (segmentally triggered) lexical LD is already present in the same macrostem HD. Although grammatical L aligns differently than lexical L, it does display fusion properties akin to lexical H fusion. Finally, we will see that lexical depression can be inserted even where not required by onset voicing properties (inherent breathiness); such
insertion is sensitive to the sonority hierarchy: optimal depressor-inducing segments are sonorants (vowels, followed by glides, liquids and nasals). In Section §7.9, I wrap up the construction of pitch anchors in the form of register domains (begun in Chapter 5 §5.5), in the light of the additional patterns we have now seen from the depressor data. A conclusion to the examination of tone/voice interaction is provided in Section §7.10.
7.1. Review: Tone and Voice

‘Breathy voicing’ is considered here to be audible perturbation in phonation quality during vowel (and possibly consonant) production: breathy segments have a heavy, slightly gravelly quality to them. Breathy voicing is also considered here to be terminologically coextensive with murmur (Ladefoged (1971a:3), Pandit (1957)) and with the more extreme form of ‘whispery voice phonation’ that Laver (1980; 1994:198-200, 418) equates with breathy voice. Physiologically, breathy voice entails greater glottal aperture, reduced subglottal pressure, a significantly higher volume of transglottal flow resulting in a (remarkably) inefficient use of air: vocal folds ‘flap in the breeze’, as it were (Laver 1994:418). Acoustically, spectrograms (generated under X-Waves™, for this dissertation) reveal that breathy syllables in Phuthi are characterised by the typical cluster of breathy voice acoustic cues found in the literature (Ladefoged & Maddieson 1996:317): a comparatively large amount of energy in the fundamental frequency for F1 and F2; more random energy (higher noise component) in the higher frequencies; delayed voice onset time and delayed onset of F2, approximately as in Hindi (Davis 1994).

Phonologically, breathy phonation (or at least a contrast which is a function of breathy-like voice quality) is used by a set of languages in parts of Africa and Asia (Ladefoged 1971a) to characterise a contrastive (non-modal) subset of the voiced consonant inventory; these languages include Shona, Tsonga, Ndebele, Zulu (Niger-Congo, specifically south-eastern Bantu; discussion follows in §7.1); !Xóõ (San) and !Xu or Zhu‘hoásí (Khoe), presented in Traill (1973, 1985), Miller-Ockhuizen (2001); Hindi, Sindhi, Marathi, Bengali, Assamese, Gujarati, Bihari (or Bhojpuri)—all Indo-European, specifically Indo-Aryan; also a variety of Dravidian, Tibeto-Burman and Afro-Asiatic languages (Ladefoged & Maddieson 1996:58). Breathy voicing has also played a significant role in historical hypotheses concerning the emergence of the Proto-Indo-European consonant system, cf. Stuart-Smith (1995), Fallon (2001), for broad coverage of the issues.

Tone ‘depression’ has sometimes been used interchangeably with ‘breathy voice’ nomenclature in the southeastern Bantu linguistics literature, that is, with reference to a set of tone/voice phenomena primarily typifying Nguni languages. ‘Depression’, however, strictly indicates a pitch lowering effect alone, and has nothing necessarily to say about phonation type.
In this chapter, I will only rarely\(^1\) need to distinguish between breathy phonation and tone depression; although tone depression is considered to be the phonetic lowering of pitch register, or phonological lowering of tone category often (but not necessarily) triggered by breathy voice, I will simply classify the set of ‘breathy’ consonants (§7.2) as depressor consonants. What the precise nature of the phonetic depression might be is of secondary interest, and must be pursued further in work elsewhere.

There is a sizeable body of research into the phonetic properties of non-modal—including breathy—phonation. Much of this laryngeal research examines data from non-Bantu (and often non-African) languages such as Bickley (1982), Gujarati (Fischer-Jørgensen 1970), Hindi (Davis 1994), Jalapa Mazatec (Kirk, Ladefoged & Ladefoged (1993); Blankenship, Kirk, Ladefoged and Silverman (1995), and Otomanguean (Silverman 1997). General phonetic studies of voice and tone include Hombert (1978).


These phonetic tone/voice studies repeatedly make a by now well-known point (which, in turn, is used by the phonological works as the point of departure for establishing the nature of the phonological features involved in phonologised tone/voice processes): ‘voicedness causes lowering of \(F_0\) whereas voicelessness induces increased \(F_0\)’ (Peng 1992: 244).

Peng (1992) is to be noted as a significant theoretical work which examines the phonologised interaction of tone and voice in a variety of languages, focusing on African languages: Ewe, Nupe, Yoruba and Ngizim. Peng attempts to pin down a universal typology of onset-voice and tone effects, within a Grounded Phonology model (Archangeli & Pulleyblank 1986, 1994). Peng’s central questions concern the universal vs. language-particular aspects to the tone-voice interface. He lays out a Prosodic Hypothesis of Tone-Voice (1992:19) that states:

\(^1\) Section §7.3 considers non-local tone lowering (H > L) depression effects triggered by breathy voicing; Section §7.8.1 considers tone depression triggered grammatically (in the case of the present negative paradigm), not by breathy voice. The distinction is clear between the breathy conjunctive ‘and’-prefix in Chapter 2 §2.2.5, and the froze ‘and’-prefix in lexicalised conjunctives in §2.2.5 (32), footnote 298.
(a) ‘tone and voice must be represented on separate autosegmental planes’; and (b) ‘tone-voice correlations must be determined by conditions on tone and voice operations’. Whereas ODT is not a theory that takes an explicit stance on the geometric association of feature planes, it does make explicit claims about features and feature domains. The approach in this chapter thus assumes Peng’s first claim, that tone and voice (here: breathy voice, and its tonal manifestation: breathy voice) are distinct features, parsed by distinct (but interacting) feature domains. While this dissertation does not assess data from more than one language, I also assume, with Peng’s part (b) above, that there are conditions on the parsing of tone and voice features, and that the expression of these features is governed by conditions on tone/voice, namely, grounding conditions (Peng: ‘path conditions’).

Bradshaw (1999) surveys a wide range of tone languages—African and Asian—where a particular voice setting either triggers, or is triggered by, a particular tone configuration. She articulates the tone/voice typology within an autosegmental framework, proposing—contra Peng and contra the findings in this dissertation—the conflation of the features [voice] and [Low(tone)] (cf. the discussion in §7.2.3, and footnote 22; Chapter 8 §8.3.8). Downing & Gick (2001), based on depressor evidence in Ikalanga and Nambya, likewise dispute the conflation of [voice] and [low] features.

A sizeable literature has emerged on the phonology of Bantu tone per se (largely over the thirty years since Goldsmith 1976), most of which by far handles tone phenomena that are demonstrably independent of voice quality. There is, however, only an incipient literature on the intersection of phonological tone and (breathy) voice (henceforth: ‘tone/voice’) phenomena in Bantu languages where non-modal phonation occurs (or, at least, where segmental modal voicing has prosodic phonological effects). A variety of authors have written on tone/voice interactions in Southeastern Bantu—identified as Zone S in Guthrie (1967-1971)—which is the linguistic area and subfamily in which most documented African tone/voice interactions have been found, most commonly in the Nguni languages (Xhosa, Zulu, Ndebele, Swati).

Some early work (Beach 1924, Doke 1926) begins to attempt to tease apart the phonetic and phonological properties of tone and voice in Nguni, while most phonetic and phonological studies on this language grouping have emerged in the four decades since Lanham (1960). Beach (1924:80) divides Xhosa ‘consonant initials’ into a high and a low class ‘according to their
tonetic affinities’, where depressors fall into the low class; Doke (1926:224). Neither Beach nor Doke correctly identify that voice and tone do not cross-classify: they observe merely that a subset of the consonants (here: ‘depressors’) in Zulu and Xhosa has a marked (local) pitch-lowering effect. Neither identifies the phonologised tone shift (depressor shift) and tone block phenomena so salient in Nguni, and so robustly attested in Phuthi (examined here in §7.4).


Most of the Bantu work just cited has not involved instrumental acoustic assessment of tone/voice patterns, but rather has relied on the notes (usually detailed notes) taken by scholars working with native speakers of these languages. Notable exceptions to this are Traill, Khumalo and Fridjhon (1987), Traill (1990), Silverman (2000), Downing & Gick (2001). Traill et al. (1987) and Traill (1990) provide detailed instrumental phonetic examination of voice properties in Zulu and tone properties in Swati (but not voice and tone in either). In the 1987 paper, the authors show that while there may be a separate class of consonants in Zulu that have a depressing effect (both on the analyst and the $F_0$ pitch of the following vowels), these consonants do not, in fact, condition breathy voicing. Rather, the consonants are voiceless, and are followed by ‘extreme lowering of $F_0$’ as the ‘primary and only reliable manifestation of depression in Zulu’ (1987:271).

Nevertheless, Zulu has maintained the three categories of consonant as distinct (traditionally termed: voiceless ejected, voiceless aspirated, and breathy voiced). One can infer
from Traill et al. that there may have been transfer of the phonological voice contrast between two subsystems: broadly, voiceless aspirated consonants have remained as they are, but what are typically considered to be ‘breathy voiced’ consonants are now voiceless, and voiceless ejectives with much shorter voice onset time may yet be reinterpreted as voiced. The phonology of Zulu retains the three-way release contrast, but crucially requires the pitch quality at consonant release to implement this contrast. Specifically, pitch depression (and not voice quality) distinguishes ‘breathy voiced’ consonants from the other two series.

Traill (1990) also lies firmly in the small but meticulous tradition of instrumental phonetic work on southern African languages; he examines tonal depression effects in Swati (the Nguni language most closely related to Phuthi), where the phonation quality is not always triggered by the consonantal onset, but also by a phonological property of certain morphological paradigms (e.g. the copulative) and of particular vowels in certain (relatively rare) lexical items in that language. This unusual separation of voice quality from consonant onset—termed ‘depression without depressor consonants’ in Rycroft (1980:10)—will be seen to occur in Phuthi as well (§7.3, §7.8), as it also occurs in Ikalanga and Nambya (Downing & Gick). While Traill shows that the degree of tonal depression in Swati varies phonetically according to the source of depression (inherent to phonological consonant type vs. morphologically imposed vs. lexically imposed), there is no evidence to claim that the phonology treats these Swati depression types distinctly2.

Arising from the works cited, and from the present study, a general, phonological tone/voice interaction in Nguni can be stated as follows: in every Nguni language, a subset of the consonant inventory, the so called ‘depressor consonants’, interferes with the implementation of not only phonetically high pitch targets but also phonological high tone targets. Specifically, it has been observed that vowels almost always fail to display H tones when they are depressed (perhaps: when they are breathy voiced, but cf the claim in Traill et al. (1987) that Zulu depressors are not breathy voiced). If this was the full extent of tone/voice interactions, the phenomenon could be said to be entirely phonetic. But quite independent of the phonetics of breathy voicing, scholars have identified a set of analytic phonological problems which emerge

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2 We will see in §7.8.1 that Phuthi, however, reveals patterns that distinguish phonologically between lexical and grammatical depression, that is, that two distinct L features are motivated in the grammar.
from the Nguni tone/voice interactions, commonest of which has been called ‘tonal
displacement’ (Cope (1966), Khumalo (1981, 1982)), ‘tone shift’, or ‘spillover’ (Lieber 1987), or
‘depressor induced H tone shift’ (Cassimjee (1998), C&K (1998)). Together with tone block, this
tone/voice mismatch phenomenon will form the focus of §7.3-§7.4, and is the backdrop to the
analytic sections that follow.

The present dissertation does not, however, provide an exhaustive examination of the
phonetics of tone in Phuthi. Rather, I focus the discussion on the widest possible set of
phonological tone/voice interactions displayed in the language. Bradshaw (1999) has aptly
pointed to the phonetics/phonology mismatch for tone/voice phenomena, that is, that the
phonetics of voice and (low) tone may ‘contribute to our understanding of phonological
phenomena, but it does not drive them’ (Bradshaw 1999:3). Accordingly, the focus in this
chapter is on the phonological interaction of voice and tone in Phuthi. The discussion would not
necessarily be clarified or enhanced, at this point, by a fuller phonetic examination.

Phuthi fulfills all empirical expectations of tone/voice phenomena that would be
anticipated in any Nguni language, based on comparable data from related Nguni languages (e.g.
Cassimjee (1998) for Xhosa, Rycroft (1980b) for Swati); more than that, Phuthi goes on to
display what is surely the widest range of tone/voice interactions documented for any Bantu
language, in terms of the triggering properties underlying tone movement (and non-movement),
and the non-local effects of tone/voice interaction.
7.2. Phonology of Tonal Depression

From here on, ‘depressor’ and ‘breathy voicing’ are considered to be coterminous and to refer to a coextensive class of sounds, unless otherwise indicated (the usage here defaults to ‘depressor’ or ‘depressed’).

Below, in §7.2.1, I provide the inventory of contrastively depressed consonants in Phuthi, and then proceed in §7.3 to examine and analyse the general effects these consonants have on the tonal contours we have already established in Chapters 4 to 6.

7.2.1. Inventory

Phuthi is characterised by the presence of depressor phonation, as a basic parameter in its consonant system. The most linguistically fundamental property we can identify is that depressor phonation is a basic parameter in its consonant system. The most linguistically fundamental property we can identify is that depressor phonation is a basic parameter in its consonant system.

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3 In this chapter, I will use the IPA convention of subscript diaresis [ ] to indicate breathy voiced consonants (that is, lexically depressed, but not grammatically depressed consonants, cf. §7.8-7.9, for the distinction). Some diaresis sequences overlap, due to varying letter width but fixed width diaresis [ ]: simply, wherever there are diacreses, this reflects (lexical) depression. After the IPA-rendered inventory given in (1), all data will be given in near-orthography, including digraphs for certain depressor consonants (cf. Chapter 2 §2.1.1 (4-5)). As hybrid as this may seem, the digraph <Ch> symbols serve as useful reminders that depression is sponsored at these positions (that is, does not arise from some sort of extended harmony domain). Data will be line-spaced wider apart in this chapter than previously, for ease of reading, since there are often two or more diacritics attendant to one basic character.

4 There is a small set of consonants that participate in the grammatical assignment of lexical depression (that is, in the obligatory tonal reflex of breathiness), in the copulative paradigm alone (§7.5), and which are not contrastively breathy (they do not occur anywhere other than this paradigm). These consonants cannot deploy breathiness themselves because they are not sonorant (as most lexical, salience-driven depressor syllables are, cf. §7.9), nor are they even voiced (as all lexical, onset-triggered depressor syllables are, cf. §7.2.1.1 immediately below). These consonants are: [s] for Class 7, [t] for Class 8/10. Contra Ní Chiosáin & Padgett (1997, 2001), I maintain in §7.2.6 below that not all segments in a harmony domain need bear the harmonic feature; here, in the syllable domain [sV], [s] does not necessarily need to bear the breathy voice feature. In addition, [b 3] are not productively depressor-triggering or -bearing, even though voiced, because they occur in only a tiny set of morphologically fused Class 14 nouns (cf. Chapter 2 §2.1.5 (19), §2.2.1.2).

5 It is uncontroversially claimed that Xhosa and Zulu depressor consonants are not historically cognate (as isolation forms vs. in cognate [NC] clusters) with any Proto-Bantu consonants; rather, the hypothesis is that they were loaned from neighbouring Khoi or San languages: ‘Quite apart from the clicks, Xhosa S.41 has more extraneous consonants than any other Bantu language, these numbering at least fourteen, a fact which presumably correlates with

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consonants are separated out by some phonological principle as a subset of the consonantal segments (in the manner of Homer 1999), which subset is saliently voiced with an auditorily ‘heavy’ voice quality, and which will also be seen below to behave in a phonologically unified fashion. Vowels can display depression (breathiness) too, but they never contrast underlyingly in this respect, in Phuthi (nor in any Bantu language). Importantly, depression is also a prosodic feature separable from the segmental configuration which behaves morphemically; for example, as the copula morpheme (see §7.5).

7.2.1.1 Consonants

Among Phuthi consonants, there is a (limited) four-way type distinction, but the parameters cross-classify release type (aspirated egressive, unaspirated egressive, ingressive), and voice type (voiceless, voiced, breathy voiced/depressed). The depressor consonants in the inventory are given in boldface in (1).

<table>
<thead>
<tr>
<th>Phuthi consonant inventory</th>
<th>i</th>
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<th>iii</th>
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the known heavy influence of Bushmen languages on this language’ (Guthrie (1967-71:106)); also cf. Herbert (1987), Louw (1986)). Implicitly, this hypothesis extends to the set of depressed (breathy) consonants in Phuthi too, as a Nguni cousin of Xhosa and Zulu.

6 The consonant inventory is exemplified in Chapter 2 §2.1.1 (4).
• columns are: (i) bilabial; (ii) alveolar; (iii) alveolar affricated; (iv) alveolar+labial; (v) palatal; (vi) alveolar lateral; (vii) velar; (viii) velar affricated; (ix) glottal; (x) dental click; (xi) alveopalatal click; (xii) alveolar lateral click;
• rows are: (1) voiceless ejective stops, and clicks; (2) voiceless aspirated stops, and clicks; (3) voiced implosive; (4) breathy voiced stops, and clicks; (5) voiceless fricatives; (6) breathy voiced fricatives (though ʒ is modal voiced)\(^7\); (7) liquids (trill; lateral approximant); (8) breathy voiced liquids; (9) nasals, and prenasalised clicks; (10) breathy voiced nasals; (11) glides; (12) breathy voiced glides.

Depressor (breathy) consonants are found in row 4 (stops, affricates and clicks); row 6 (fricatives, excluding ʒ); row 8 (liquids); row 10 (nasals); row 12 (glides).

The most straightforward correlation of voice and depression in Nguni is usually that voiced fricatives are depressors; in Phuthi, the voiced fricative set is somewhat impoverished, lacking canonical ʒ and ɬ\(^8\). Instead, the most robust correlation appears to be with stops: voiced stops are redundantly depressors. Yet two place series—labial and coronal—manifest a three-way voice contrast (and four-way release type contrast), as repeated in (2a-b). There is also a modal / depression contrast among some sonorants and laterals (2c-e)—although the depressor in each case is relatively rare, distributionally\(^9\).

7 Non-depressing /ʒ/ is transparently a loan phoneme from neighbouring Sotho in almost all words in which it occurs. Possible exceptions, that is, words that are not transparently from Sotho, include kú-jéntíša ‘to show’ (⟨j⟩ = [ʒ], or dialectally [dʒ]). Sotho has no depressor consonants, not even depressed fricatives (Sotho really has no phonologically active voice contrast at all). /ʒ/ thus violates the voiced fricative/depression correlation in Phuthi, signalling itself as a loan sound.

8 The absence of /ɬ/ is expected, given the Tekela status of the language (cf. Chapter 1 §1.1.7.3); in fact, there is a small class of /ɬ/-bearing items (Chapter 2 §2.1.1). But the lack of /ɬ/ is surprising on comparative Nguni grounds. Pan-Nguni /ɬ/ corresponds to Phuthi affricate /d̥ɬ/.\(^9\)

9 The breathy instance of each nasal, lateral and glide is relatively rare in an underived lexical item; but each is fairly common in paradigms where breathy voicing is productively used with a grammatical function, e.g. copula [mú-. lí- yí-], cf. Chapter 2 §2.2.1.7, and §7.8.2.3 below; associative prefixes [wá-, yá-];
(2) **Voice contrasts**

<table>
<thead>
<tr>
<th>voiceless</th>
<th>voiced</th>
<th>depressor</th>
<th>orthography</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. p' pʰ  ...</td>
<td>b̥</td>
<td>b̥</td>
<td>&lt; p, ph, b, bh &gt;</td>
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<tr>
<td>b. tʰ tʰ ...</td>
<td>d̥, d̥</td>
<td>l</td>
<td>&lt; t, th, l, d, dl &gt;</td>
</tr>
<tr>
<td>c. —</td>
<td>l</td>
<td>l</td>
<td>&lt; l, lh &gt;</td>
</tr>
<tr>
<td>d. —</td>
<td>m, n, ŋ</td>
<td>m̥, ŋ̥, ŋ̥</td>
<td>&lt; m, n, ny, mh, nh, nyh &gt;</td>
</tr>
<tr>
<td>e. —</td>
<td>w, j</td>
<td>w̥, j̥</td>
<td>&lt; w, y, wh, yh &gt;</td>
</tr>
</tbody>
</table>

- (2a) reflects the pan-Nguni presence of a single (lightly) voiced implosive /ɓ/;
- (2b) is a limited set that has arisen ‘by chance’: the voiced—but not breathy, not depressing—[d] occurs as an allophone of /l/ immediately preceding the superclose vowels [i ʊ]. This precisely the Sotho distribution (Doke & Mofokeng 1957), which Phuthi has incorporated\(^{10}\).
- Besides /ɓ/ and allophonic /d/, all voiced stops are redundantly depressors (and breathy). Besides /d/, all voiced fricatives are redundantly depressors. Sonorants (liquids, nasals, glides) are not inherently depressors, but can be, under certain morphological and lexical conditions.

The contrasts in (2) are exemplified in (3).

(3) **Examples of Phuthi voicing contrasts**\(^{11}\)

(i) **Labial contrasts**

<p>| | | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>a. kú-pátaala</td>
<td>to pay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. kú-phabbaána</td>
<td>to become confused, crazy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. kú-baasa</td>
<td>to light a fire</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. kú-bhaatsha</td>
<td>to put on a blanket (in order to wear)</td>
<td></td>
<td></td>
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</tbody>
</table>

(ii) **Coronal contrasts**

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</thead>
<tbody>
<tr>
<td>e. kú-táála</td>
<td>to become full</td>
<td></td>
</tr>
<tr>
<td>f. bú-tháátá</td>
<td>problem, difficulty</td>
<td></td>
</tr>
</tbody>
</table>

\(^{10}\) Nguni (including Phuthi) /ɓ/ is the regular reflex of Proto-Bantu \(*b\). Non-depressing Phuthi /l/ > [d~l] is the reflex of Proto-Bantu \(*d\). All other voiced stops are depressors, and are ‘extraneous’ to material inherited from Proto-Bantu, as pointed out above in footnote 5.

\(^{11}\) I exemplify these voice contrasts stem-initially in most cases, in a \(Ca\) form; all can also occur root/stem-internally, but the initial position is where there are no positional restrictions on consonants in Phuthi. \(C_2\) positions are often in a weak voice-harmonic and aspiration-harmonic relationship with \(C_1\) (cf. Khumalo (1987:22-62) for extensive discussion of a very similar set of stem-internal harmonic consonant relationships in Zulu).
g. mú-tád-aana  small parent
h. i-əaawú  lion

(iii) Lateral contrasts
i. kú-laadza  to fetch
j. lháákha  here

(iv) Labial nasal contrasts
k. émaatí  water
l. -mhaáti  wet

(v) Labial glide contrasts
m. báa-wá  they fell
n. líi-whá  cave

7. 2. 1. 2. Vowels

All nine vowel phonemes (cf. Chapter 2 §2.1.1) can occur in both modal and depressor (breathy) states. There is, however, no phonemic contrast between vowel phonation types outside of morphologically induced phonation change (e.g. in the copulative, see §7.5 below). Phuthi vowels are all underlyingly modal (that is, non-contrastive for voice in any way). Depression is sponsored on a vowel only when a morphological condition intrinsic to that paradigm requires a certain syllable (usually the prominent penult position) to be breathy, e.g. the copulative prefix š- (unrelated to syllable position, cf. §7.5), quantitative -ọhle (§7.8.2), present negative penult -σ/word (§7.8.1)—though penult depression in the negative is not clearly breathy. I return to examine such grammatical and nonconsonantal lexical depression in §7.5, §7.8.

7. 2. 1. 3. Depression binding in a syllabic domain

It is noted from this point on, through the remainder of this chapter, that depression sponsored on a consonant onset (as we have seen in §7.2.1.1) extends off the consonant release burst (for oral or nasal stops), or off the phonological node to which depression is attached during the production of a continuant (fricative, liquid, glide), into the vowel (or other syllabic
nucleus) body within a tautosyllabic domain, as in (4a,d) below. I term this articulatory process of automatic depression extension ‘depression binding’\textsuperscript{12}, since the depression feature—however it is computed, as some combination of slack voice / aperture / glottal air flow / subglottal air pressure—binds to the vowel (or other syllabic sonorant) occupying the nucleus following the consonant onset where it is underlyingly sponsored. The fact that such binding occurs is unsurprising, given the insight that breathy voicing is most readily audible as a distinguishing characteristic of a stop only during the release of the closure (Ladefoged & Maddieson 1996:57).

Depression binding can be insightfully schematised using the aperture representation innovated in Steriade (1993a-b, 1994): oral stops are bipositional (4b); fricatives and all other continuants are monopositional, as are vowels (but with distinct apertures: narrowed A\textsubscript{f} for fricatives; wider A\textsubscript{max} aperture for the sonorants). We can construe depression/breathy voicing as [dep], without committing to the physiological specifics of the depression gesture(s).\textsuperscript{13}

It becomes clear from such representation that Phuthi depression attaches to the release portion of a stop (A\textsubscript{max}), and to the only portion of a continuant (A\textsubscript{max}). Since the A\textsubscript{max} release portion of a stop is absorbed by the following vowel nucleus when segments are parsed in a continuous string, the depression must (re)attach to the nuclear A\textsubscript{max} position. This is a response to a constraint preventing the surface parsing of depression on a non-release portion of a consonant, that is, preventing Phuthi from parsing [dep] on A\textsubscript{0}: *(A\textsubscript{0}, [dep])\textsuperscript{14}.

\textsuperscript{12} Kingston (1990) has used ‘articulatory binding’ in a distinct way: he proposes ‘a phonetic principle of coordination, which constrains when glottal articulations in consonants occur relevant to oral ones’ (1990:407). The constraints governing such glottal/oral coordination constitute ‘binding’. This relates to a notion of phasing (Silverman 1995), and the possible sequence of the tone/voice features (L, H), to be discussed in §7.2.5.1.

\textsuperscript{13} Steriade’s (1993a,b, 1994) mono- and bipositional aperture representation is an attempt to significantly constrain the possibilities for nasal and affricate contour segments, which are not of relevance in this tone/voice examination. Suffice to say, Steriade regards a mono- or bipositional configuration as being able to be associated with just one place feature (e.g. [LAB]), thus precluding non-homorganic affricates and non-homorganic pre-nasalised stops/affricates. Laryngeal features such as aspiration and glottalisation attach only to the A\textsubscript{max} release portion of a stop/affricate.

\textsuperscript{14} There is a second alternative: the requisite phonological constraint might only weakly ban [dep] from parsing exclusively on closure A\textsubscript{0} (that is, [dep] must at least parse on A\textsubscript{max} or A\textsubscript{0}). Davis (1994) has shown how Hindi anticipates the increased glottal aperture required for breathy voicing before the oral closure is released. I cannot comment further, because I have no articulatory data on the mechanics of glottal aperture in Phuthi. Further, the exact status of the positional notation as phonetic or phonological is not clear.
(4) **Depressor binding**

a. $CV > CV$  
   breathy depression extends off the onset through the (usually vocalic) nucleus

b. **depression sponsored by a stop, fricative, sonorant**

```
C   C   C
A_0 A_max A_f A_max
|   |   |   |
[dep] [dep] [dep]
```

c. **examples of consonantal depressor sponsors**

```
[b]  [y]  [w]
A_0 A_max A_f A_max
| / | / \ / | / \ |
[LAB][dep] [LAB][dep] [LAB][dep]
```

d. **grammatically sponsored depression inserted on a consonant, vowel**

```
C   V
A_0 A_max A_max
|   |
[dep] [dep]
```

e. **depression binding**

```
C + V   ⇒   C V  or  C V
A_0 A_max A_max
|   |   |
[dep] [dep] [dep]
```

f. **grammatical depression binding**

```
C + V
A_0 A_max A_max
|   |
[dep]
```

(4d) demonstrates that any consonant parsed in sequence with a following (usually vocalic) nucleus either extends its depression property ([dep]) to all adjacent $A_{max}$ sequences, that is, into the nucleus; or, alternatively, if the parsed CV sequence is considered to conflate adjacent $A_{max}$ nodes (4e), then *any* contrastive glottal articulation attached to the onset release portion is automatically associated with the nucleus (vowel or other sonorant). Additionally, (lexical)
depression can be grammatically assigned (cf. §7.5), in which case depression is arguably sponsored on the vowel nucleus alone, since the depressability of the consonant onset is not relevant. (4f) indicates that such nucleus depression percolates leftwards to the consonant onset, where such an onset is depressable.

An alternative conceptualisation might posit the percolating up of depression to the syllable level in the prosodic hierarchy, and then being a property of all temporal sequenced material in the scope of the syllable domain. This preparatory step of depression distributing to the smallest surface depression domain (maximally, CV) may be referred to as depression binding.

Such binding happens automatically, with no phonological process that interferes with the distribution, hence, there is the temptation to assume that depression is a segmental property invoked only in the postlexical phonological grammar; evidence in sections §7.4-§7.8 will contraindicate such postlexicality. I will show in §7.3-§7.8 that depression is active in the lexical grammar of Phuthi, hence, that binding must be a highly ranked (in fact, undominated) process in the constraint grammar.

In keeping with the tradition in recent Nguni tone/voice analyses (e.g. Cassimjee 1998), I reflect the tone sponsor only on the sponsoring vowel (e.g. CV), but the depression feature on both consonant sponsor and the (depressor-bound) tautosyllabic vowel carrier (C\textsuperscript{V} /\textsuperscript{ch}45:0130+6604 V\textsuperscript{ch}45:0130+6604); sometimes C cannot be breathy when depression is grammatically sponsored at the syllable level and the C is inherently voiceless (e.g. in the copulative, cf. §7.5; some items in §7.8.2).

There will be no further consideration in this dissertation of the mechanics of local, intrasyllabic depression binding.

7.2.2 Typical patterns

The most general statement about the interaction of depression and tone in Phuthi is articulated in (5), then exemplified in (6) from verb paradigms already seen.

(5) **Depression Pattern 1a: no simultaneous H and depression**
A depressed syllable fails to surface as H when it should be H (either because it is sponsored lexically, or because it is required by the constraint grammar to be H).
The H domain implied in (5) is any HD constructed according to the domain parameters established in Chapters 4, 5 and 6. First, I use the infinitive pattern to exemplify the depressor facts. All items in (6) are intentionally $4\sigma$ (that is, longer than $3\sigma$); short $1\sigma$ and $2\sigma$ stems will be examined in (39-40) below; $3\sigma$ stems will be seen to display the characteristic of depressor shift, dealt with only in §7.4.

(6) Depressed syllables fail to express as H
Toneless stems: 1 H sponsor

- In these and most following examples in this chapter, the relevant Phuthi items are given twice: without domain structure (on the left), and with domain structure (in the centre). It seems wise to offer the data both in less cluttered (minimally analysed) and in fully analysed forms.

a. kú-vulélaana [kú-vulé]laana to open for each other
b. kú-dzakáliisa [kú-dzaká]liisa to injure
c. kú-bhacámiisa [kú-bhacá]miisa to help lie on the stomach
d. kú-dl álú]:la [kú-dl álú]:la to fold up (unmake) a bed

- It is assumed, for now, that adjacent HDs fuse by default (in 6e-h), as motivated in Chapter 5 §5.2. Only in §7.8.1.7-§7.8.1.9 (especially in the fusion typology (292)) does it become clear that (6e-h) here would not fuse, because the lexical L would be shared across both tokens of the now fused HD$_{xy}$, diminishing expressability of H in both HDs.

High stems: 2 H sponsors
d. kú-vi sísiisa [kú-vi sí]siisa to understand
e. kú-vunísaana [kú-vuní]saana to help each other harvest
f. kú-yhålísaana [kú-yhålí]saana to refuse each other
g. kú-vusé]:la [kú-vusé]:la to refresh, renew

It will be seen in the course of this chapter that depressed syllables which arise from contrastive consonantal depressors in the underlying representation (as do all examples in §7.2-§7.7) are entirely oblivious to lexical and morphological boundaries or categories in their
domain of application. Sample data from the present indicative long form (7) and the perfective indicative (9) confirms that Depression Pattern 1a is consistent across varying paradigms: the H sponsor in (7) lies further to the left than the examples above in (6); this has no effect on the non-expression of H on depressor syllables. In addition, nothing differs tonally from the lexical H behaviour motivated in Chapter 5 §5.1: the OCP instantiation—*ADJACENT EDGES (*AE)—continues to prevent the HD from extending off a H prefix to -ya- in (7e-h), as opposed to the widescope aligning single-sponsor (7a-d) examples.

Present indicative long form

(7)  **H SP + toneless** stem (4σ): depressed σ = toneless/low

a. bá-yá-vulélaana [bá-yá-vulé]laana they open for each other
b. bá-yá-dzakáliisa [bá-yá-dzakál]iisa they injure
c. bá-yá-bhacámiisa [bá-yá-bhacá]miisa they help lie on the stomach
d. bá-yá-dlulú:la [bá-yá-dlulú]:la they fold up (unmake) a bed

**H SP + High** stem (4σ): depressed σ = toneless/low

e. bá-ya-visísiiisa [bá]-ya-[visí]siisa they understand
f. bá-ya-vunísaana [bá]-ya-[vuní]saana they help one another harvest
g. bá-ya-yhalísaana [bá]-ya-[yhalí]saana they refuse one another
h. bá-ya-vusél:la [bá]-ya-[vusé]:la they refresh, renew

This data in (7e-h) is crucial for demonstrating that the surface lowness of depressor syllables is not a function of their being outside a HD, but rather of their inability to express H tone properly. HD-MIN (that is, tone domain minimality) would (surprisingly) fail to operate in (7e-h) above for the leftmost HD, if the Lf edge of stem σ1 were indeed not the Lf edge of the HD, and if the second HD rather began on σ2 of the stem. On the surface, without considering underlying sponsor position and depression effects, (7e-h) appear to be violating HD-MIN, as in (8a); but with appropriate domain structure added in (8b), it is clear that there is no HD-MIN (nor
OCP, that is, *AE) violation; (8c) offers a suboptimal candidate that appears to satisfy both HD-M\textsubscript{IN} (the first instance) and *AE, where the tone/depression conflict has caused the HD left-edge to be reparsed from stem \(\sigma_1\) to \(\sigma_2\); (8d) is identical to (8c), except that it appears more optimal, since both instantiations of HD-M\textsubscript{IN} are satisfied. But (8c-d) violate highly ranked BA-L\textsubscript{F} and INCORPORATE constraints.

(8) **Depression does not shift H domain left-edge**

a. bá-ya-ví sííísa  
   HD-M\textsubscript{IN} appears to be violated by the first H.

b. [bá]-ya-[ví sííísa  
   *AE (instantiating the OCP) prevents HD-M\textsubscript{IN} satisfaction.

c. *[bá-yá]-ví[sííísa  
   depression causes failure of H expression and reparse of HD left-edge; *AE is satisfied; HD-M\textsubscript{IN} can be satisfied, but only once; configuration violates INCORPORATE.

d. *[bá-yá]-ví[sísíísa  
   depression causes failure of H expression and reparse of HD left-edge; *AE is satisfied; HD-M\textsubscript{IN} can be satisfied for both HDs; configuration violates INCORPORATE.

The perfective indicative data in (9a-d) (toneless stems) and (9e-h) (H stems) confirms the infinitive and present indicative patterns just seen.

(9) **Perfective indicative**

H SP + **toneless** stem

a. bá-vulíííiye  
   [bá-vulfíííiye  they have helped open

b. bá-getíííiye  
   [bá-getfíííiye  they have helped add

c. bá-bhekíííiye  
   [bá-bhekfíííiye  they have caused to look

d. bá-dlalíííiye  
   [bá-dlalfíííiye  they have helped unroll (a bed)

H SP + **High** stem

e. bá-dlalíííiye  
   [bá-dlalíííiye  they have helped play

f. bá-vuníííiye  
   [bá-vuníííiye  they have helped harvest
7.2.2.1. Locality violated? ‘No gapping’ is not an issue

In the data (6-7, 9), we have seen that every depressor syllable is surface-low; in each case, there has been one depressed syllable per word. The lexical category of the stem is irrelevant. In (10a-b, 11a-b), there are two depressors; in (10c-d; 11c-d), there are three depressors; in every case, all the depressor syllables are low, even if there are multiple adjacent depressor syllables.

(10) H prefix + toneless stem: 2 depressors

a. kú-gudzi sèlaana [kú-gudzi sè]laana to help shear for each other
b. kú-bhebhi sèlaana [kú-bhebhi sè]laana to help carry on the back for each other

3 depressors

c. kú-gudzagéliísa [kú-gudzagélíísa] to cause to shear indiscriminately for e.o.
d. kú-bhebhagí sèlaana [kú-bhebhagí sè]laana to help carry on the back indiscriminately for e.o.

H stems (11) equally fail to express H on all depressed syllables.

---

15 These examples with the verb extension, -ag-, named the ‘extensive’ (Guma 1971:150) in its Sotho incarnation, or ‘dispersive’, are difficult to elicit, and occur only under somewhat strained pragmatic assumptions (most of the stems exemplified here are not typically associated with indiscriminate or violent modes of action, which modes typically correspond to the extensive). But these examples are all grammatically and phonologically well-formed, despite the slightly (or even significantly) unusual semantic end product.
(11) **H prefix + H stem**

2 depressors

a. kú-gadzísélaana [kú-gadzisé]laana to help stamp for e.o.

b. kú-gadzeláana [kú-gadzel]áana to stamp together with e.o.

3 depressors

c. kú-gadzagíśelaana [kú-gadzagísé]laana to help stamp indiscriminately for e.o.

d. kú-gadzageílaana [kú-gadzageí]áana to stamp together with e.o. indiscriminately\(^\text{16}\)

(12) below confirms the observation emerging from (6-7; 9-11), that any number of syllables may be depressed within a HD, given the right configuration of adjacent depressed syllables. It turns out that very few non-stem morphemes contain depressors. The preceding data sets contain two and three depressors, always strictly syllable-adjacent, always stem-internal, always surface-low syllables.

(12) **Depression Pattern 1b**: serial depression has no upper limit

All\(^\text{17}\) depressor-bearing syllables inside a single H span are low toned on the surface.

In all the depressor data thus far, whether there is one H-sponsor, or two or three, the surface-H syllables surface in two disjoint phonetic spans: preceding (but excluding) the depressed syllable, and following the depressor syllable. These disjoint spans appear to indicate gapped configurations, which are explicitly identified as banned phonological structures because they are unparsable. Archangeli & Pulleyblank (1994:38) have pointed out that gapped configurations violate a principle of precedence, as schematised in (13): a single entity, \(\alpha\), cannot

\[\alpha\]

\(^{16}\) The same stem, -\(\text{gadza}\), is used twice in these examples, as I recorded only two H stems with depressors in \(\sigma_1\) and \(\sigma_2\); the other, -\(\text{bhubhyd}l\)\(\text{a}\), ‘blow (of the wind)’, is not easy to use in a semantically productive fashion.

\(^{17}\) Although this aspect of the primary observation about tone/voice clash is descriptively adequate at this point, it will become clear in §7.2.6 that very short (monosyllabic) HDs containing depression have to resolve the clash in a ‘compacted’ way, apparently violating (12) since the ultima is domained as \([/\text{êf}]\).
both precede and follow another entity, $\mu_i$, which is what the diagram implies by the linking to both $\mu_i$ and $\mu_k$.

\[(13) \quad \textbf{No gapped configurations} \]

\[* \mu_i \mu_j \mu_k \alpha \]

The ban on gapping is simply one instantiation of a general ban in phonology (and in all language structure, more broadly) on non-local relations, that is, on configurations or processes that are required to ‘see’ between elements that are not immediately adjacent. Such non-locality would necessitate that the grammar can count, which property grammars are typically strongly argued not to possess.

Yet the data in this chapter thus far suggests just such a locality-violating configuration: a depressed syllable (or series of syllables) inside a HD fails to express H, yet the H span continues (where possible) on both sides of that depressed syllable, apparently violating locality. The Phuthi data will be shown in §7.2.3 to be fully respectful of locality, via the distinction that ODT draws between parsed domain structure and surface expression of that structure.

I now provide examples where there are non-depressor syllables inside the HD (here: the antepenult and preceding) which follow the depression locus, irrespective of the number of depressors inside the HD—one (14), two (15), or more—and irrespective of the number of post-depressor syllables: the HD resumes its H-ness on all post-depressor syllables inside the HD.

\[(14) \quad \textbf{Infinitives: post-depressor HD-internal syllables are H} \]

\[H \text{ prefix + toneless (low) stem: 1 depressor (+ 2 post-depressor syllables)} \]

a. kú-ýuléílaana [kú-ýuléí]laana to open for each other

b. kú-getfsísaana [kú-getfsí]saana to add together intensively

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H prefix + H stem: 1 depressor (+ 2 post-depressor syllables)

c. kú-vusé]laana [kú-vusé]laana to refresh e.o.
d. kú-yhalísísaana [kú-yhalísí]saana to refuse e.o. intensively

(15) Infinitives: post-depressor HD-internal syllables are H
H prefix + toneless (low) stem: 2 depressors (+ 2 post-depressor syllables)

a. kú-gudzi sísélaana [kú-gudzi sísé]laana to shear carefully for e.o.
b. kú-bhebhi sísélaana [kú-bhebhi sísé]laana to carry carefully on the back for e.o.

H prefix + H stem: 2 depressors (+ 2 post-depressor syllables)

c. kú-gadzisíslaana [kú-gadzi sísé]laana to stamp thoroughly for e.o.
d. kú-gadzisílaana [kú-gadzi sísé]laana to help stamp together with e.o.

(16) Infinitives: post-depressor HD-internal syllables are H
H prefix + toneless (low) stem: 1 depressor (+ 3 post-depressor syllables)

a. kú-yulé[jí]saana [kú-yulé]jaana to help open for one another
b. kú-getisísaana [kú-getisí]saana to help add together intensively

H prefix + H stem: 1 depressor (+ 3 post-depressor syllables)

d. kú-yhalísísísaana [kú-yhalísí]saana to help refuse e.o. intensively

(17) Infinitives: post-depressor HD-internal syllables are H
H prefix + toneless (low) stem: 2 depressors (+ 3 post-depressor syllables)

a. kú-gudzi sísílaana [kú-gudzi sísí]laana to help shear carefully for e.o.
b. kú-bhebhi síslániisa [kú-bhebhi síslá]niisa to help carry carefully on the back for e.o.
H prefix + H stem: 2 depressors (+ 3 post-depressor syllables)

c. kú-gadzi sísélâniisa [kú-gadzi sísélá]niisa to help stamp thoroughly for e.o.
d. kú-gadzi sé]lániisa [kú-gadzi sé]lániisa to cause to help stamp together with e.o.

The aspect of the primary tone/voice pattern captured in (14-17) is described by (18).

(18) Depression Pattern 1c: post-depressor HD syllables return to H
Syllables following a depressor syllable, but still internal to a H domain, surface as H.

A fourth aspect of the basic depression pattern can be observed from the data in (19-20), where the single H stem-sponsor is not realised until the right edge of the HD: there is nothing so crucial about the left edge of a HD that it needs surface expression at the cost of violating the tone/voice antagonism. In other words, Phuthi tolerates significant unfaithfulness to where the left edge of a H feature would otherwise be parsed by basic alignment\(^{18}\), due to the highly valued underexpression of H in order to satisfy the parsing / expression\(^{19}\) requirements on depression.

(19) Present indicative long form
Toneless prefix + H stem: 2 depressors

a. si-ya-gadzi sêlaana si-ya-[gadzi sé]laana we help stamp for e.o.
b. si-ya-gadze]laana si-ya-[gadze]laana we stamp together with e.o.

\(^{18}\) In fact, one may argue that the left edge of the HD is still marked by the left edge of the depression feature (below: the Low Domain), since the pitch on -ga- in (19-20) is lowered a little at that point below the non-High pitch of the previous two syllables.

\(^{19}\) Parsing vs. expression of tone depression is not yet clearly distinguished. See §7.3 for a proposal that these two aspects of the tone domain feature implementation are certainly distinct from each other.
Toneless prefix + H stem: 3 depressors

c. si-ya-gadzagi sélaana  si-ya-[gadzagi sé]laana  we help stamp indiscriminately for e.o.
d. si-ya-gadzageílaana  si-ya-[gadzageí]laana  we stamp together with e.o.

(20)  **Perfective indicative long form**

Toneless prefixes + H stem: 2 depressors

a. si-gadzi séleene  si-[gadzi sé]leene  we helped stamp for e.o.
b. si-gadzelísiiye  si-[gadzelí]siiye  we caused to stamp for

c. si-gadzagi séleene  si-[gadzagi sé]leene  we helped stamp indiscriminately for e.o.
d. si-gadzageílsiiye  si-[gadzageí]siiye  we caused to stamp indiscriminately for

A HD left-edge, then, can be phonologically opaque at the surface (despite possible lowlevel phonetic pitch cues), but continues to coherently mark the left edge of the HD, as the *AE (or OCP) effect in (21a-c) demonstrates\(^{20}\): the data in column \(i\) appears to be in violation of HD-MIN, and also to violate WSA-R\(_T\) more than even in (8) above; it becomes clear in column \(ii\), however, that the proposed abstract domain structure accurately reflects the inability of the H on \(bá-\) to realign rightwards (thus, both *AE and WSA-R\(_T\) are satisfied), *contra* the HD-built-around-depressors configuration in column \(iii\) (where the surface-H locus is incorrectly predicted).

(21)  **HD left-edge is opaque**

<table>
<thead>
<tr>
<th>Column</th>
<th>(i)</th>
<th>(ii)</th>
<th>(iii)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>bá-ya-gadzi sélaana</td>
<td>[bá]-ya-[gadzi sé]laana</td>
<td>*[bá-yá]-gadzi [sé]laana</td>
</tr>
<tr>
<td>b.</td>
<td>bá-ya-gadzagi sélaana</td>
<td>[bá]-ya-[gadzagi sé]laana</td>
<td>*[bá-yá]-gadzagi [sé]laana</td>
</tr>
<tr>
<td>c.</td>
<td>bá-ya-gadzi sísélaana</td>
<td>[bá]-ya-[gadzi sísé]laana</td>
<td>*[bá-yá]-gadzi [sísé]laana</td>
</tr>
</tbody>
</table>

\(^{20}\) Glosses for this data are: (21a) ‘they help stamp for each other’; (21b) ‘they help stamp indiscriminately for each other’; (21c) ‘they stamp intensively for each other’.

500
This aspect of potential left-edge opacity of a depressed HD is captured in (22).

(22) **Depression Pattern 1d: HD Lf-edge not necessarily expressed H**
The left edge of a HD is not obligatorily surface expressed as H.

A final aspect to the general observation concerning unexpressability of depressor syllables inside a HD concerns the status of depressors *outside* a HD, which simply do not affect the phonological parsing of a H tone at all (23).

(23) **Depression Pattern 1e: extra-HD depressors irrelevant**
Only HD-*internal* depressors interfere with the surface expression of H.

So, for example, in a word which does have HDs and depressors, but where the depressors precede the left edge of the HD (vacuously, in 24a-b, actually, in 24c-d), or lie beyond the right edge of the HD (25a-f), their presence does not affect the expressing of a HD as H.

(24) **Pre-HD depressors are irrelevant**

Short present indicative, toneless (low) stem: depressed SP\(^{21}\)

a. gi'-lima... I cultivate...
b. gi'-limisa... I help cultivate...

Short present indicative, H stem: depressed SP

c. gi'-[bó]na... I see...
d. gi'-[bóní]sa... I show...

---

\(^{21}\) A depressor consonant resets the pitch register for all successive toneless syllables. Effectively, all successive toneless syllables are tonally depressed too (though not breathy). LD (L domain) structure could be amended to reflect such effective LD-extension, but nothing follows from this analytically.
Even though (25c-d) have two H-sponsors each, neither sponsor coincides with the depressed ultima. (25e-f) are toneless stems; given the HD-MIN effect demonstrated in Chapter 4 §4.2, I omit examples of $3\sigma$ H stems with depressed penults (since the second syllable of the minimal HD coincides with the depressor syllable), such as $[\text{kû}-\text{tshegi}i\text{í}]sa$. This is treated separately in §7.2.5 and §7.4.

I discuss the behaviour of pre-depressor HD stem syllables in §7.3 below.

### 7.2.3 Clash Analysis

The evidence produced so far indicates a single constraint articulating the antagonism between H tone and depression (breathy voice) phonation, which accounts for all the patterns and data presented in (5-25) above. I observe, as have others, that tone depression (thus far, coextensive with segmental breathiness) and H tone typically invoke intrinsically antagonistic configurations of the larynx, and of the articulatory system that implements tone. This is played out in the phonology of Phuthi as an (amply demonstrated) local anti-express condition, formalised below. I now briefly consider the motivation in the literature for considering the antagonism of these tone/voice settings in languages generally.

There is a substantial literature on the mechanics of high tone vs. low tone, and the connection to breathy voicing (for example, in Ladefoged (1971a-b), Halle and Stevens (1971),
summarised in Laver (1994); also Silverman (1995:133-149), and references therein). There is a
general inclination to try to identify a single salient articulatory setting as the central correlation
for tone height, the ‘Single Source Hypothesis’ (Peng 1992: 262). But the literature cannot
resolve what such a source is. On the contrary, it has become clear from the literature cited above
that, generally, high pitch involves some combination of (a) greater horizontal tension of the
vocal folds; (b) greater vertical tension of the vocal folds (and greater elasticity); (c) higher
subglottal pressure; (d) higher airflow across the glottis; (e) greater glottal aperture. Silverman
(1995:139-140) suggests that implementation of high pitch/tone primarily involves properties
(a-b): vocal fold tension; for him, the other settings are merely enhancements of that fold tension.

Breathy voicing can be considered a likely cluster of extensions of the physiological
settings for voicedness, that is, entailing the laryngeal settings required for voicing, and then
exaggerating them: the volume of air (Catford 1977:99), and the diameter of the glottal aperture
(Davis 1994; Ladefoged & Maddieson 1996:317) both increase significantly over voicelessness
and even over modal voicing. Voice onset timing (VOT) is not only shorter than for regular
voicing (vs. the delay in VOT if a consonant preceding a vowel is voiceless), but may have
negative settings (Davis 1994, Ladefoged & Maddieson 1996). Thus, breathiness as a
linguistic laryngeal setting (or cluster of settings) subsumes at least the settings for regular
voicing. And if consonant voicing triggers pitch lowering (pitch depression) on an adjacent
vowel, as the literature frequently demonstrates, then we can expect at the very least an equal
pitch-depressing effect—if not a more systematically marked pitch-depression—resulting from
breathy voicing.

For voicing, Peng eloquently examines a wide range of sources for factors that affect the
implementation of F_0, either raising or lowering the pitch (see also Silverman (1995) for
wide-ranging data and discussion from American and Asian languages). Peng correctly reveals
that phoneticians cannot agree on whether any one of the multiple factors is indispensable, nor
what the directionality of the tone-voice relationship is: does tone predominantly influence voice,
or does voice predominantly influence tone? In addition, although there is a tendency for voicing
(here: breathy) and high pitch to involve conflicting articulatory settings, the relationship is not a
straightforwardly automatic phonetic (let alone phonological) one. Important data from Tamil
(Kingston 1986), for example, shows that there are no significant differences in \( F_0 \) for vowels that follow voiceless vs. voiced consonants in that language.

The phonetic correlation between breathy voicing and pitch depression has to be established, both universally and language-particularly. If it can been shown that breathy voicing is an extension of the settings for voicing, and if voicing inherently means lowness of pitch, then the correlation ‘breathy voice implies depressed pitch’ is uncontroversial phonetically, and (possibly) by extension, phonologically. Peng observes that low \( F_0 \) entails, generally, less vertical and horizontal tension of the folds (and lower elasticity), lower subglottal pressure, lower volume of air passing through the folds, reduced glottal aperture. While some of these settings (primarily lower tension of the folds) accord with settings for breathiness, seeming to support the ‘breathy-implies-depression’ correlation, others do not (lower subglottal pressure, lower volume of airflow).

Thus, while one may rightly anticipate a potential pitch/voice relationship, in general, and may anticipate that this pitch/voice relationship be phonologised, such a relationship is not automatically guaranteed in any sense. The phonology does not emerge from the phonetics in a straightforwardly predictable fashion.

Phuthi is a language which has phonologised the relationship, and where, as has been shown in the data thus far in this chapter, the predictive direction is from voice setting to tone setting: breathy voice phonation causes tonal depression, interpreted here as an extra-Low tone setting. What remains to be seen is whether tonal depression can exist without breathiness (I will argue from data in §7.8 that under certain circumstances tonal depression can be triggered independently of breathy voicing, cf. present negatives §7.8.1; and other assorted items §7.8.2).

The antagonism between high pitch and consonant voicing is thus clear, likewise between high pitch and consonant-triggered breathy voicing, likewise between high and low

\[22\] Clearly, [voice] for consonants and [voice] for vowels does not behave in the same way; high pitch, and H tone, is always manifested contrastively on syllable nuclei—almost always vowels, except for much rarer sonorant nuclei, in Phuthi: [m n \( \eta \) l], and even more rarely on non-sonorant nuclei, in Phuthi: [\( \mathfrak{m} \mathfrak{n} \mathfrak{n} \mathfrak{l} \)], cf. Chapter 2 §2.1.5—which are invariably voiced (barring the very small set of cases where languages employ contextually voiceless vowels). But all things being equal, [voice] on vowels does not deter pitch, or tone, from being High in any way. There is a strong case for permanent underspecification of vowels with respect to [voice] (assuming feature privativity), that emerges from this non-constraint on vowel voice/pitch distribution. I do not pursue the case for or against underspecification here, but the detailed unpacking of
(depressed) pitch; in the phonologised form of this relationship, we can expect H and L tone—in the present case of depressed, that is, extra-low/lowered tone—to conflict. In grounding terms (Archangeli & Pulleyblank 1994), this antagonism reflects an ungrounded feature configuration.

Peng (1992:202) considers just such grounding conditions (‘path conditions’) on tone and voice. Using the feature set {±hi, ±lo, ±voiced}, he proposes a set of 16 logically possible grounding conditions and 16 corollaries. Peng (1992:239) considers 16 of the 32 to be phonetically motivated (the other 16 are not phonetically grounded). Of these 16, four are relevant for Phuthi, as (26).

(26) Peng’s (1992:239) grounded TONE/VOICE paths
   a. VOICED/HI condition: if +voiced, then -H [tone];
   b. VOICED/HI corollary: if +voiced, then not +H [tone];
   c. VOICED/LO condition: if +voiced, then +L [tone];
   d. VOICED/LO condition: if +voiced, then not -L [tone].

If Phuthi reflected the conditions in (26a-b), then we would expect voiced consonants (perhaps breathy or modal) simply to ‘remove’ (or unparse) H tone settings from syllables inside a H domain. Phuthi enforces only a subset of these conditions (26c-d), however, which need modifying only in respect of depression (that is, typically, breathy voicing): depressed onsets trigger the explicit presence of Low-ness; and they actively contraindicate the presence of a H tone (in fact, of anything non-L).

In addition, if tonal lowness / depression is to be represented by a Low (L) feature, as I will suggest in the following section, then the Phuthi feature grammar also needs to contain the Peng-esque tone path condition—quite independent of voicing—in (27)\textsuperscript{23}.

\textsuperscript{23} I am recasting the Peng-esque condition as involving only privative features. It is my view that non-monovalent features are deeply problematic (cf. previous footnote, and Steriade 1995), even though the antagonism of H and L is less transparent than it might be if the features were +H and −H. In fact, the present analysis could be recast as a ±H or ±L contrast, if the grammar supported the permanent phonological underspecification of toneless syllables.
(27) **Ungrounded L/H path**
If [L], then not [H]

This implicational condition is analogous to [+high] => *+[low] with respect to vowel height. There is a basic logical requirement that the system not (try to) perform two conflicting gestures simultaneously\(^{24}\), if we believe that the tone/voice grounding configuration translates readily into a phonological feature cooccurrence condition.

We can conclude from (26-27) that any syllable with a breathy/depressed onset not expressed as surface-Low (even inside a H domain) is unexpected and undesirable, because it is necessarily ungrounded: it is L by nature (even in the nested context of a HD). In Optimal Domains Theory, an ungrounded configuration fails to properly express some aspect of the ill-formed configuration, whatever the status of the domain in which that configuration finds itself. Domain-parsing (that is, featural faithfulness) itself may, or may not, be affected by the grounding conditions, but the unfaithfulness is expected at least to be manifest through partial expression failure of the relevant domain-parsing features.

In ODT, ungroundedness is articulated by CLASH constraints, which prevent the proper expression of a feature, for a phonetically grounded reason\(^{25}\). A first pass at this for breathy/depressed syllables is (28), though it is not immediately clear from such a configuration (without the kind of would-be explanation supplied above) why H and breathiness per se would be antagonistic.

(28) **CLASH H/L**

\[
\begin{align*}
\text{H tone and breathy phonation (interpreted as ‘voiced spread glottis’) cannot coincide.}
\end{align*}
\]

\(^{24}\) We will see in §7.2.6 below that, under exceptional circumstances, H and L can be phonologically parsed and even expressed over the same syllable (even though phonetically the tone features are always sequenced to some extent).

\(^{25}\) CLASH has already been seen in the form of *EXPRESS_OP and *EXPRESS_UlTIMA, but the precise nature of the groundedness of these particular CLASH instantiations is not yet fully clear: the potential cross-paradigm Low requirements on OPs (see discussion in §7.6), and intonation-motivated final lowering in the form of Register Domains for ultima anti-expression suggest that L-ness is much more phonetically finessed than merely the presence of a phonological L domain.
We will see in §7.3 under ‘anticipated depression’ that stating this constraint at the phonation level is unnecessarily (and ultimately erroneously) overprecise; the anti-expression of H will refer more broadly to a set of depressed syllables larger than just those containing breathy onset syllables. I propose (29) as a more satisfactory, more transparently functional account of the unexpressability of H on breathy/depressed syllables. Clearly, the constraint in this format presupposes that breathy/depressed syllables redundantly deploy the feature Low (L).

(29) \[ \text{CLASH H/L} \quad \text{\#(H_x, L_x)} \quad \text{\#H_x} \quad \text{X} \quad \text{L_x} \]

A phonological segment X cannot be both H and L simultaneously.

The constraint in (29) must be accompanied by the ranking \text{CLASH-H/L} \gg \text{EXPRESS}_H, in order to allow H not to be expressed where there is a clash with a breathy/depressed (Low) syllable (but in §7.2.4 below, I will argue that \text{CLASH-H/L} must be replaced by an express ranking).

There is a small step translating from the grounding conditions in (26b) to what I am proposing for Phuthi in (29). If indeed breathy voiced consonants trigger an abstract state we have been calling tonal depression, or (targeted) Lowness—as opposed to non-H-ness, or tonelessness—then there must be a step where a Low feature is inserted via the grounding requirement in (26c).

The nature of this Low feature is in question: can it simply be a phonetic instruction to express breathy/depressed syllables inside a HD as low, once the clash has been identified, or need it be the insertion of a distinct phonological feature, L, which will be parsed with its own set of domain alignment constraints, as the representation in (29) suggests? Economy of representation suggests the former, inasmuch as economy remains a principle of representations or processes in phonology at all (in light of Optimality Theory and the general retreat from underspecification, despite Archangeli 1988). I argue here, however, that the second strategy is
the only analytic route we can insightfully pursue\footnote{\textit{I admit gladly to the influence of Mary Bradshaw’s (1999) analysis of Swati tone/voice. After attending several of Bradshaw’s conference presentations and having several arguments with her, I reluctantly conceded that H and toneless alone were insufficient to capture the full range of tone/voice interactions as manifest in Phuthi, and as they appear in this chapter. I now find Bradshaw’s tone-insertion solution to be insightful and analytically crucial, even though typologically troubling (no southern Bantu language has been argued to possess three active tones: H, L, toneless). Chapter 8 §8.3.8 will consider the implications of the tone inventory here.}}: depressor-induced lowness in Phuthi is constituted by a L domain. The reasons for this will become clearer in §7.3-7.5, where realignment requirements on both edges of this L domain will truly confirm the need for a separately alignable feature domain independent of H.

Meantime, we can consider the evidence for analysing depression as being represented by a ‘real’ L tone feature, as opposed to a diacritic that exists simply to parse (contrastive) non-H-ness: (30a-b) provide phonetic motivation; (30c-e) provide phonological motivation.

(30) Motivation for positing distinct Low Domains
a. depressed syllables are always expressed phonetically lower than comparable non-H, toneless syllables;
b. depressed L syllables appear to have an active low target: intonation patterns sharply register the lowering of $F_0$ at any point where a depression (L) domain begins.
c. all breathy syllables are tonally low in most cases (or try to be low), i.e. depressed;
d. some tonally depressed (low) syllables are not triggered by breathy consonants, but are anticipated (§7.3), included into a low (but not breathy voiced) sequence by extension (§7.4), or are assigned Low status in a particular paradigm (§7.6, §7.8);
e. both the left and right edges of a LD will be seen to be extendable beyond the sponsor location, in certain morphological and grammatical configurations (§7.3, §7.4, §7.5).

For these reasons, I consider active L to be a well-motivated feature. This choice of feature—L, not breathiness—reflects that Phuthi must have reanalysed its breathy syllables as possessing the \textit{primary} auditory / acoustic cue of low (or: lowered) pitch. Since this tone feature can sometimes occur on its own \textit{without} laryngeal breathiness (§7.8), it seems clear that the implicational grounding constraint in (31a) holds—in both forms—while the converse (31b) is not true (in either form), although one could imagine such a constraint holding in a language where tone quality (or depression) influences phonation type\footnote{\textit{There is data laid out in §7.6 and §7.8 of the present chapter that may be relevant to this tone-implies-voice relationship: toneless/low stems invoke depression (and possibly breathiness) in the present negative (§7.8.1), remote past (§7.6.2) and past subjunctive paradigms (§7.6.3).}}.
(31)  **Implicational redundancy constraints**

a.  [breathy voice] \(\Rightarrow\) {Low} obtains in Phuthi  
    [depressor consonant] \(\Rightarrow\) {Low} obtains in Phuthi

b.  {Low} \(\Rightarrow\) [breathy voice] not in Phuthi  
    {Low} \(\Rightarrow\) [depressor consonant] not in Phuthi

Peng (1992)'s grounding conditions (26c = 32a; 26d=32c) require at least the modification in (32b,d), as suggested by the Phuthi patterns already seen; these, in turn, are rewritten in bold under (32b,d), to reflect the depression patterns (some of which will be seen in §7.8 to be potentially independent of breathiness per se) and to reflect the identity of the privative features, L (Low), and H (High), to replace [+lo] and [-lo], respectively.

(32)  **Grounded tone / voice configurations**

a.  If [+voice], then [+lo]  
    LO/VOICING condition (Peng 1992:202)

b.  If [+breathy voice], then [+lo]  
    Phuthi Low/voicing

If [+depression], then L  
**Phuthi Low/voicing** [final version]

c.  If [+voice], then not [-lo]  
    LO/VOICING condition: corollary (Peng 1992:202)

d.  If [+breathy voice], then not H  
    Phuthi Low/voicing condition: corollary

If [+depression], then not H  
**Phuthi Low/voicing condition: corollary**

From here on, the contents of the breathy/depressed—that is, actively *not* H—syllables, will be referred to as ‘L(ow)’.

7. 2. 4. **Parsing and Expressing Low**

As a feature, L can be expected to adhere to narrow scope alignment unless otherwise demonstrated. The basic alignment constraints relevant to the LD parsed *in situ* by a L feature are given in (33).

(33)  **Basic Alignment (Low)**\(^{28}\)

a.  Align (L, Lf, \(\sigma\), Lf) = BA-Lf (L)

b.  Align (L, Rt, \(\sigma\), Rt) = BA-Rt (L)

\(^{28}\) Here, and in all constraints that follow where L is proposed to be treated by a set of
As a well-formed feature domain, LD requires faithful expression (via \textit{Express}\_L). But \textit{CLASH} H/L can and \textit{must} now be recast as the competition between L expression (34) and H expression: L expression must dominate H expression (35), as reflected in the feature cooccurrence constraint in (23) above, banning H and L from simultaneous expression, since H/L always resolves in favor of L.

(34) \textit{Express}\_L
\begin{itemize}
  \item Express LD, L
  \item Express all the tone-bearing units (here: moras) in a L domain as surface-L.
\end{itemize}

(35) \textit{Phuthi CLASH ranking}
\begin{itemize}
  \item \textit{Express}\_L >> \textit{Express}\_H
\end{itemize}

(35) opens the door to an important theoretical idea that OT and ODT allow, and even encourage: surface phonological ‘facts’ are not necessarily the work of a single constraint, but may fall out of a set of ranked constraints. Thus, \textit{CLASH}-H/L, motivated in (27) as a grounding statement, then in (29) as a path condition, has now been recast in (35) as an expression constraint interaction. The L/H antagonism in Phuthi is straightforwardly expressable through \textit{Express} competition. This recasting will prove critical to the analysis of depressor shift in §7.4, where the abstract notion, \textit{HEAD}, will be constructed from a set of ranked constraints (§7.4.3.2).

A sample of the data set from Depression Pattern 1a-e is provided in (36) with both L domain ‘\{\ldots\}’ and H domain ‘\[\ldots\]’ structure indicated, respecting basic alignment for L (33), and both BA-L\_F for H and WSA-RT for H (with the standard antialign effects on HDs of \textit{AVOIDPROM} and \textit{NONFIN}, as argued and demonstrated in Chapters 4 §4.1-§4.5).

(36) \textit{Primary depression pattern, including ‘aspects’ a to e: HD and (nested) LD structure}
\begin{itemize}
  \item a. \textit{[kú-[yú]lé]laana} to open for e.o. = 6a
  \item b. \textit{[bá-yá-[yú]lé]laana} they open for e.o. = 7a
  \item c. \textit{[kú-[bhe] [bhi]sé]laana} to help carry on the back for each other = 10b
\end{itemize}

constraints parallel to H, the presence of a constraint such as BA-L\_F (L) implies renaming the earlier constraint from BA-L\_F (Chapter 4 §4.1.3) to BA-L\_F (H).
The L feature will receive even stronger support as an active feature in its own right, after the shift and block data in §7.4 has been considered.

7.2.5. (H, L) TOLERATED EXCEPTIONALLY

The ungrounded, ill-formed path in (27), formalised as CLASH H/L in (29), is constrained in ODT by (37), a particular instantiation\(^{29}\) of the more general CONTRAST (repeated as (38)), introduced in Chapter 5 §5.4 as a general principle constraining feature parsing.

\[
\text{(37) } \text{\texttt{*Masking}} (\text{=} \text{\texttt{Contrast\textunderscore L}}) \\
\text{\texttt{*|LD|=|HD|}} \\
\text{The Lf and Rt edges of a LowDomain and of a HighDomain cannot both coincide. That is, the length in prosodic timing units of LD and HD cannot be phonologically identical.}
\]

\[
\text{(38) } \text{\texttt{Contrast\_F}} \\
\text{Contrast (F, -F) or Contrast (F, \emptyset)} \\
\text{Keep F and -F (or F and \emptyset F) distinct throughout the grammar.}
\]

In §5.4, CONTRAST was invoked as the underlying principled that prevented the HD on an object prefix with 1σ stem from being completely masked by the anti-expression requirement on the OP prefix domain; the potentially neutralised feature, H, then surfaced exceptionally as H in the OP, in order to avoid masking (and, thus, loss of contrast). The present instantiation of contrast (38) can be simply termed CONTRAST\_L: that is, the L contrast cannot be completely obscured.

\(^{29}\) Other instantiations of CONTRAST are imaginable (though non-default), such as discontinuous parsing of a feature in distinct expression spans (but necessarily violating the fundamental domain construction constraints, INCORPORATE and UNIQUE—cf. earlier discussion of these principles in Chapter §5.2.2).
Thus, Depressor Pattern 1a-1e, interacting with the general Max-H and Express_H constraints, must allow Clash-H/L to be overridden in cases where a depressed H syllable is not able to resolve a Clash configuration by (fully) expressing as L, for reasons of violating Contrast_L (*Masking). If a H sponsor is in penult or ultima position, and the same penult or ultima position is sponsored as L (depressed) by virtue of being lexically depressed, then the expected HD is one mora long, as is the LD, both parsed on their sponsor syllable, but sequenced, in different ways. There is a crucial difference between the two edge positions, however. In the case of the phrasal penult in (39) below, because it is the head of the WAP foot, it is prominent, that is, it consists of two moras. Hence, the LD and HD can be and are sequenced across the two available tone-bearing units (39). This depression-tone sequencing pays no attention to word category: (39a-b) are verbs; (39c) is a non-focus (post-negative) noun; (39d) is an adverb (= Class 17 demonstrative pronoun); (39e) is a relative (adjectival stem, built off a noun).

I return to the discussion of depression-tone phasing and L-H phasing in §7.2.5.1 below.

(39) **L and H are sequenced across a penult sponsor**

a. si-ya-\text{vuú}na  
   \text{si-ya-}\{\text{vuú}\}\text{û}na  
   we harvest

b. si-ya-\text{dlaá}la  
   \text{si-ya-}\{\text{dlaá}\}\text{á}la  
   we play

c. ...\text{mu-bhií}ni  
   ...\text{mu-}\{\text{bhií}\}\text{i}ni  
   singer

d. \text{lhaá}kha  
   \text{lha}\{\text{á}\}\text{kha}  
   here

e. -mhaá\text{tí}  
   -mh\{\text{á}\}\text{tí}  
   wet

In monosyllabic (phrase-final) stems, however, the two feature domains (H, L) are perfectly phonologically aligned (40), since the non-prominence of the ultima syllable means that

---

\[30\] I take a certain liberty in representing the rising H across a depressed penult syllable as breathiness/depression on only the first mora of the penult, and H only on the second. The duration of the breathiness/tonal depression is not entirely clear: impressionistically, it lasts throughout the penult syllable, perhaps more weakly towards the end of the long nucleus, as it reaches the maximum excursion of (depressed) high. But the observation that a depressed H penult or ultima is perceived as rising H is widely reported for Nguni languages, cf. Lanham (1960), Rycroft (1980b), Claughton (1992), Cassimjee (1998).
it is never more than one mora long. Hence, if either the H or L feature should fully express across the syllable, the other feature would be fully masked, and either H or L feature identity would be phonologically lost at the surface. But since Phuthi does not typically tolerate underparsing (or completely underexpressing) either the H or the L tone feature, both H and L must be parsed and expressed on the short depressed ultima sponsor syllable in situ (40). What appears to be the ill-formed simultaneity ruled out in the *MASKING (36) or CONTRAST _L (37) constraints above is allowable in this single instance because it is phonetically finessed: the ultima mora is implemented as a rapidly rising tone.

Again, word class is irrelevant: in (40), the examples are verb (a-b), a non-focus noun (c), a conjunction (d), and a demonstrative pronoun (e)—all have been introduced in Chapter 2.

(40)  L and H are both parsed on an ultima sponsor

a. si-yaa-[-dl̃]  si-yaa-[{dl̃}]  we eat
b. si-yaa-[-ṽ]  si-yaa-[{ṽ}]  we hear
c. ...tii-jh̃a  ...tii-[[jh̃a]]  ...dogs
d. l̃  [{l̃}]  when
e. l̃  [{l̃}]  this (Class 1 / 1a / 3)

Importantly, the H depressed penult and the H depressed ultima in Phuthi behave in the same way, differing only according to timing patterns: the L-H voice/tone sequence across the penult has an opportunity to spread itself out over two moras; the same voice/tone conflict is also sequenced across the ultima, but within the confines of a single mora. (A gestural approach to phonology might unify these two prosodic landing sites).

7. 2. 5. 1. Phasing of depression (breathiness) and voice: L-H

We can assume that L and H domains are sequenced across the long penult in (39), but we need to assume that the two sets of domain edges coincide in monosyllabic stems (40), as indicated by the accompanying domain structure in the central columns above (39-40), reproduced schematically in (41), if the smallest parsable prosodic tone-bearing unit is the mora.
(41) Schematic depression/H phasing in Phuthi penult and ultima syllables

\[
\begin{array}{c}
\text{L} \\
\text{H} \\
\hline
\text{L} \\
\text{H}
\end{array}
\]

a. penult: \ldots[\{\ µ\} \ [\ µ\}] \sigma \text{#}_{P\text{w}d}

b. ultima \ldots[\{\ µ\}] \text{#}_{P\text{w}d}

What the monosyllable domain representation in (41b) fails to adequately capture is that, even here, L and H tones are phased at the surface, that is, are not truly coextensive. The surface tone shape is sharply rising, not level H and breathy (or level H and merely downstepped). This makes significant sense, both phonetically and phonologically, in terms of production and perception: Silverman (1995:45) has argued compellingly that languages seek to avoid truly parallel production of competing contrastive features, since this leads to phonetic and phonological unrecoverability if one or the other feature is completely masked (absolute neutralisation). Rather, languages satisfy the competing demands on the production and perception system of phonological simultaneity by providing phased cues, so that laryngeal features such as breathy voicing (or depression) are recoverable despite partial masking by the competing high pitch gesture(s).

Silverman (1995) goes on to argue convincingly that where breathy voicing and H tone compete, the cross-linguistically optimal sequence of (high) tone and nonmodal phonation is a sequence of low/breathy followed by high/non-breathy. Silverman makes use of a threshold of ‘sufficient acoustic discriminability’ that leads languages not to excessively mask non-modal phonation (breathiness, creak) and high pitch. This is supported by experimental evidence showing that ‘listeners are less adept at discriminating pitch values during Jalapa Mazatec breathy phonation than during Jalapa Mazatec modal phonation’ (1995:137).

Silverman (1995:195) does point out, however, that there is an apparently inverse relation between strength of non-modal phonation and the tendency to be sequenced: non-modal (e.g. breathy) phonation, which is weaker, may extend its duration throughout the nucleus (vowel), without making concomitant tone unrecoverable, because of the weakness of the non-modal phonation.
By extension, in the absence of further detailed phonetic examination of Phuthi, it seems likely that here, too, the language phases breathiness and high pitch to satisfy ‘sufficient acoustic discriminability’. The phonological sequencing of L-H across two adjacent tautosyllabic moras in (39) and the phonetic sequencing of low and high in the rising tone on the ultima in (40) suggest that this principle of discriminability underpins these tone/voice phenomena too. It may yet turn out that Phuthi breathiness endures weakly through out a penult or ultima vowel, if the phonation cues are weak enough not to interfere with recoverability of H tone.

Phonologically, in the depressed ultimas in (40) above, we have to assume that HD and LD are coextensive, because ODT requires that domain edges be parsed around identified tone-bearing units; in this case, the smallest available entity is the mora (coextensive with the syllable in almost all cases but on the phrasal penult) 31.

For Phuthi, then, we need to assume that the phasing between H and depressed L gestures in the case of monosyllables—that is, where the two gestures must be executed on the same mora—is not articulated by the domain structure, nor (straightforwardly) by the EXPRESS implementation of the parsing feature, but rather by some form of phonetic spellout that appeals to universal articulatory and perceptual constraints as (partially) articulated in Silverman (1995).

Now, we can distinguish the onset of the H depressor penult in (39a,b) and the H depressor ultima in (40a,b) from a level H penult or ultima in the following ways: for the depressed syllables, (a) onset pitch is substantially lower than that of a non-breathy H penult/ultima; (b) the H tone rises across the full length of the penult, or across the short ultima; (c) the H never reaches the same height (pitch frequency) as a non-breathy H penult / ultima would. If we accept that the rising tones in (39) and (40) are both phased as L-H, then we accept that this rising tone is the prosodic resolution of parsing H and L across a coextensive domain (penult or ultima), confirming the observation in Depression Pattern 1f (42).

(42) **Depression Pattern 1f: (depression + H) is parsable**
Depressed H syllables at the right edge of a HD are parsed *in situ* as rising tones.

---

31 We can note that under a pre-ODT autosegmental approach, both L and H could simply link to the ultima TBU; even three tones might link to one prosodic unit, if necessary (e.g. rising-falling, modelled as LHL), as argued by Leben (1973) for tone data from Mende, where many-to-one relations between tones and tone-bearing units are sometimes invoked (in both directions).
The observation in (42) will be seen to be true for a (lexically) depressed H syllable at any right-edge position (*after* the effects of depressor shift have been factored in, cf. §7.4.1). Commonly, this will be at the penult or ultima position. But it will also be seen that a depressed H syllable can occur earlier a word, as a result of depression block (§7.4.2), for example, on a depressed 1ps SP or OP (§7.6.1). It will be seen in §7.8.1 that grammatically depressed H syllables do not reflect these rising properties.

The pattern in (42) characterises depressed (breathy) H syllables in other southern Bantu languages, too, leading other researchers also to propose that a rising H (breathy) syllable is parsing both L and H tone on the same syllable, but sequenced\(^{32}\). It is a striking fact of Phuthi that depression pattern 1f is never violated for lexical depression (ct. grammatical depression, cf. §7.8.1), under any conditions.

Silverman (1995) has provided a global conceptualisation for the phasing of these supposed-to-be-simultaneous tone/laryngeal features: phasing allows for recoverability of the underlying phonation *and* tone contrast, that is, both laryngeal gestures—tone, and non-modal (breathy/depressed) phonation—can achieve salience (Silverman 1995:111)\(^{33}\). Silverman argues that in a vowel which also has distinctive tone the non-modal phonatory gestures are phased early, based on data from Jalapa Mazatec, Comaltepec Chinantec, and Copala Trique (1995:152). Similarly, in Phuthi, the two tones are phased as L-H across the penult or ultima (when those are the prosodic HD right edges), despite their apparent ill-formed simultaneity ruled out in the *Masking (32)* or *Contrast* constraint. That is, the non-modal (breathy) gesture occurs early in the vowel. Assuming, as I have, that breathiness is reinterpreted as depression (that is, tonal lowness), there must be some functional principal being satisfied by the L-H sequence *in that particular order*, even on the short ultima; further research on ease of articulation or ease of

---

\(^{32}\) Hyman and Mathangwane (1998) for Ikalanga; Cope (1966, 1970), Lieber (1987), Khumalo (1981, 1987) for Zulu. Cassimjee (1998:52-53) is not explicit about how depression and H are parsed in Xhosa. Since the analysis is not autosegmental, and since she does not make use of L tone domains in ODT, Cassimjee indicates merely that H and depression are both tolerated on penult and ultima. She indicates that both moras of the long penult are H in Xhosa, though I would differ by analysing the first mora as low, since the Xhosa depressor phonetics is very similar (if not essentially identical) to Phuthi.

\(^{33}\) We have to assume that further acoustic or articulatory instrumental work universally, and specifically in Phuthi, would reveal why the laryngeal sequence is L-H and not H-L: the set of breathy (depressor) properties seems to be favoured to be expressed first in the sequence.
perception may reveal such a principle, such that implementing lowness before highness has
cognitive appeal. However, Phuthi provides a more transparent reason to invoke L before H in
the data seen so far\textsuperscript{34}: the trigger for depression is the consonant onset; depression binding is a
local operation on adjacent constituents. Parsing the sequence as HL would violate adjacency and
locality, given that the depressor trigger lies at the left edge of the CV sequence, that is (L)LH, not *(L)HL.

Now, for all of the data in the first part of this chapter illustrating Depression Pattern 1
(1a-1e) where the depressed syllables do not surface as H at all\textsuperscript{35}, the only gesture that expresses
for each depressed syllable where there is a L/H clash is the L (non-modal) portion. In
Silverman’s sense of optimal recovery, all the (non-penult, non-ultima) depressed syllables are
suboptimal, in that they do not express both the competing tone gestures (*L-H, rather only L),
because there is insufficient acoustic discriminability: the hearer cannot recover both gestures on
any pre-antepenult syllable in a domain where the antepenult is the rightmost HD syllable (that
is, the head). Instead, the phasing is stretched out as far as possible, completed only when the
rightmost edge of the HD recovers its H-ness, after the L feature has been properly expressed.
Although the completion of phasing is delayed (seemingly suboptimal), the phasing allows for
‘cleaner’ expression of the two gestures: L stretches out faithfully for as far as it sponsored, H
then recovers on the non-L mora or syllable (or syllables). (43a-c) shows the optimal and
suboptimal phasing across short and long domains. (43d) offers a pattern unattested in Phuthi,
where the L/H clash would be resolved by a process of tone fission, splitting up a single H
domain into multiple sequences of LH. Although unavailable as a solution in Phuthi, this strategy
is selected in the tonology of the Mijikenda language, Digo (Kisseberth & Wood (1980),
Kisseberth (1981, 1984)). Ikalanga, too, splits up an expanded (‘spread’) H domain into two or

The fission resolution of phasing would be strongly dispreferred by any form of tonal
paradigm uniformity constraint (compared to other tone paradigms where there is no interruption
of the expressed feature). Such multiple fission could be construed as massively violating

\textsuperscript{34} When we see depression without depressor consonants in §7.5, §7.8, this adjacency (or
locality) argument would need recasting (as being suggested here), with some of kind of appeal
to cognitive/articulatory/perceptual salience.

\textsuperscript{35} This excludes exceptional Depression Pattern 1f above, where H and L do both express.
locality. I do not explore fission problems further here (but cf. §7.7.2 for an instance of apparent H tone fission; and cf. the discussion of strict vs. relativised locality in §7.2.6 below).

(43) **Phasing in short and long domains**

\[
\begin{align*}
\text{L} & \quad \text{H} \\
\text{L} & \quad \text{H}
\end{align*}
\]

a. short domains I: \(\ldots[[\mu]\mu]\sigma\#_{\text{PWD}}\) phasing satisfied across *penult*

b. short domains II: \(\ldots[[\sigma]]\#_{\text{PWD}}\) phasing satisfied (through phonetic spellout) across *ultima*

c. long domains I: \(\ldots[[\sigma][\sigma]\sigma]\sigma\sigma\#_{\text{PWD}}\) delayed phasing: resolved on *antepenult*

d. long domains II: \(\ldots[[\sigma][\sigma][\sigma]\sigma]\sigma\sigma\#_{\text{PWD}}\) fission: phasing optimised on every syllable, but uniformity violated

The minimal HD/LD union on the ultima in (41b=43b) or the HD/LD sequence across the two penult moras (41a=43a) comes at a typological price: Phuthi must now tolerate rising tones, as the Depression Pattern 1f has expressed (42). Yet (non-depressed) rising tones were explicitly argued *against* in Chapter 5 § 5.3.1.2, with a constraint \*RISE, repeated here as (44), which would avoid rising tones (and unsurprisingly so, since they are typologically highly marked).

(44) \*RISE

A sequence of toneless and H—i.e. low and high—cannot occur within a single syllable.

Clearly, the need to parse and express both H and L must override this anti-contour constraint (44). Technically, only the rising penult violates (44); even though the short rising

---

\[36\] (43c) is equivalent to a single L autosegment linked to a sequence of three fused LDs.
ultima actually violates *Rise, we have no straightforward domain-based way of evaluating such
violation (given the coextensiveness of LD and HD in such forms), unless parsing *Rise operates
at the level of phonological gestures. Nevertheless, tone parsing always outweighs generating
marked postlexical tone shapes (45).

(45)  Obligatory tone parsing
  a. Max-H, Max-L >> *Rise
  b. Express_H, Express_L >> *Rise

Express_H has already been argued to involve two distinct constraints (Chapter 5
§5.3.1.2): Express_H(σ) and Express_H(µ). Express_L must address every mora inside a LD.

An additional observation we need to make is that the domain construction principle of
Incorporation applies also to the L feature: the sponsor feature must be incorporated inside its
own LD. Considering that a depressor consonant onset is the trigger for L-ness, and then extends
to the syllabic nucleus by means of depressor binding, the LD must begin at the left edge of the
onset or nucleus. Failure to incorporate in this fashion would mean a violation of locality if the L
domain began only after the implementation of the H feature, e.g. *C{HL}.

The interplay of the constraints and rankings in this section (45, with earlier 35, 37) give
rise to an adequate accounting for the depressor tone conflict (Tableau 1), as it has been revealed
to this point, for both longer (46a-d) and shorter (46e-j, k-o) forms.

[turn to the next page for (46) ‘Tableau 1: Local expression failure’]
(46) Tableau 1: Local expression failure

\textit{kúbhebhi sísélëana} ‘to carry intensively (on the back) for each other’

<table>
<thead>
<tr>
<th>/ ku- + -bhebhi-sis-élaana /</th>
<th>Incorp L</th>
<th>Incorp H</th>
<th>Max-H</th>
<th>Max-L</th>
<th>Express L</th>
<th>Express H (σ)</th>
<th>*Rise</th>
<th>Non Fin</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) [kú-{bhë}{bhë}sisë}laana</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) [kú-{bhë}{bhë}sisë}laana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) [kú-{bhë}{bhë}sisë}laana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) [kú-bhébihísë}laana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) ku-{bhë}{bhë}{sisë}laana</td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) ku-{bhë}{bhë}{sisë}laana</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(g) [kú-bhébihísë}{laana}</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- In all optimal candidates \textit{Express H(σ)} must be violated only sufficiently to allow \textit{Express L} never to be violated: (a) is sufficient, (b) is excessive, (c) is insufficient, (d) vacuously fails to violate \textit{Express L}, because the LD structure is not parsed at all; (e) is where a lexical H tone is underparsed—never tenable; (f) and (g) offer candidates that would side-step the express clashes by misaligning the surface domain with the sponsor position.

\textit{si-ya-vuina} ‘we harvest’

<table>
<thead>
<tr>
<th>/ si- + -ya- + vuna /</th>
<th>Incorp L</th>
<th>Incorp H</th>
<th>Max-H</th>
<th>Max-L</th>
<th>Express L</th>
<th>Express H (σ)</th>
<th>*Rise</th>
<th>Non Fin</th>
</tr>
</thead>
<tbody>
<tr>
<td>(h) si-ya-{vu}ú}na</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) si-ya-{vu}ú}na</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>(j) si-ya-{vú}ú}na</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(k) si-ya-{vú}ú}na</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(l) si-ya-{vu}ú}na</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(m) si-ya-{vú}ú}na</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- (h) violates \textit{*Rise}, but expresses at least one mora of the penult as H; (i) realigns the HD to the ultima to satisfy phasing, without violating \textit{*Rise}; but the penult now fails to express even one mora as H; (j) and (k) are notational variants, failing to properly express the LD, or even to parse L; (l) fails to parse H; (m) gets around violating \textit{*Rise} by creating a falling 520
tone in the output, but the misphasing of L and H violates the basic ODT domain construction principle, INCORPORATE.

\[si-yaa-dlā́ [siyaadlā́] ‘we eat’\]

<table>
<thead>
<tr>
<th>/ si- + -ya- + -dlā́ /</th>
<th>Incorp L</th>
<th>Incorp H</th>
<th>Max-H</th>
<th>Max-L</th>
<th>Express L</th>
<th>Express H (σ)</th>
<th>*Rise</th>
<th>Non Fin</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n) si-yaa-[{dlā́}]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>⨿(*)</td>
<td>⨿*</td>
</tr>
<tr>
<td>(o) si-yaa-[{dlą́}]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>⨿*</td>
<td>*</td>
</tr>
<tr>
<td>(p) si-yaa-[{dlá́}]</td>
<td></td>
<td></td>
<td>⨿*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(q) si-yaa-[dlá́]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>⨿*</td>
<td>*</td>
</tr>
<tr>
<td>(r) si-yaa-{dlą́}</td>
<td></td>
<td></td>
<td></td>
<td>⨿*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- (n) does not technically violate *Rise if *Rise is defined across a sequence of tone-bearing units; but it does violate this principle phonetically on the ultima (hence the parenthetical asterisk); (o) and (p) each fail because they underexpress either of the tone features; likewise, neither (q) nor (r) are well-formed because both underparse one of the tones.

One could imagine yet another output form for the monosyllable stem candidates (46n-r), such as \[si-\{yáá\}-dlą́\], where the Clash-H/L problem would be removed by realigning the HD leftwards. But Phuthi never realigns HDs leftwards—contra Bantu languages such as Rwanda (field notes, 1993; Adisasmito & Donnelly 1993a,b), which do misalign leftwards for short stems whose HD otherwise conflicts with word-(right)edge anti-align constraints.\(^{37}\)

### 7.2.6. Locality and Transparency: Strictness is Untenable

The insight from words such as \[kú-bhebhísélaana\] in (46) is that Phuthi tolerates configurations which on the surface appear to contain unconstrained gaps; the single underlying H tone in this word shows up in two disconnected portions: \[kú-\] and -sísé-. Such configurations appear to dramatically violate locality (as construed in Kiparsky (1981), Levergood (1984),

\(^{37}\) We will see in §7.3, however, that Phuthi does tolerate leftwards realignment of the typically phonationally triggered L tone.
Steriade (1987), Archangeli & Pulleyblank (1994)). The position in this dissertation is that (relativised) locality is maintained through undominated domain alignment constraints.

Locality, as it emerges from the authors above, is a key principle driving the construction and elaboration of metrical and autosegmental representations. While the theory of representations has, for many researchers, become much less constrained in the post-generative theories of phonology, locality is still assumed crucially to obtain. This notion of locality crucially depends on a (sub)theory of legitimate targets (Ní Chiosáin & Padgett 2001:118). Legitimate targets constitute all and only the harmonic feature-bearing units inside a harmony domain; typically, vowels in vowel harmony; consonants in consonant harmony; tone-bearing units (mora or syllable) in a tone domain.

I argue from the Phuthi tone/voice data presented in this chapter that locality is not violated at the level of domain structure: the H tone domain, for example, is properly formed as a single, continuous span of potentially H-expressing syllables. Similarly, the L domain parsing a single L feature is never interrupted; INCORPORATION is unviolated. Rather, the Phuthi facts fall out of the failure of the ‘surfacy’ feature realisation apparatus in ODT: expression. Specifically, in the data presented in this chapter, the surface tone expression is negotiated through the interaction of the two competing feature expression constraints that vie for optimal faithfulness to their parsing domains.

The Phuthi H domain is never structurally discontinuous; indeed, it is internally transparent to the antagonistic L feature domain (47), never fissioned into distinct domains parsing the same tone feature (e.g. Hα) more than once.

(47) Phuthi tone domains are continuous
   a. \[Hασ\ldots{Lβσ\ldots}\ldots{σ\ldots}_α\]
   b. \[^{Hασ\ldots}_α\ldots{Lβ\ldots}_β\ldots{σ\ldots}_α\]

As schematised in Chapter 3 §3.3.2, transparency in ODT is achieved through a ranking where domain faithfulness—reflecting faithfulness to underlying features, and the basic alignment domains which parse these features—outranks conflicting domain expression (effectively, CLASH-H/L). This is the case with the H/L competition in Phuthi. Opacity would be achieved by the reverse ranking, where conflicting domain expression (CLASH) outranks domain
construction, resulting in (47b) if the H trigger feature is at the left edge (that is, H cannot reach rightwards past the intervening L domain). Phuthi does not display tonal opacity, in that the domain construction parameters are not dependent on the location of depression, that is, on the location of L domains.

Phuthi does not violate what I have called general locality (cf. §3.3.2.1), that is, locality as generally construed, here as read off optimal domain edges. This is despite the fact that one or more ‘legitimate targets’ (Ní Chiosáin & Padgett (1997, 2001)) can surface while not bearing the harmonic feature (H) of the larger domain (HD) they occur in; such targets are, of course, inside a L domain that is nested inside the larger HD. That is because the notion of legitimate targets must be redefined in Phuthi as the smallest F-domain in which the feature-bearing units can display F. In the case of Phuthi, the LD is always the smaller of the two tone domains. Thus, the LD legitimate targets are legitimate only for L, not for H.

‘Strict locality’ is a second line of analytic attack that needs addressing. Ní Chiosáin & Padgett (1997, 2001) claim that locality can be coherent only in its strict sense: locality is respected in a harmony domain only when all segments in that domain (consonants or vowels) bear the harmonic feature(s). Other works pursuing this alternative view of locality include Ní Chiosáin & Padgett (1993), Itô, Mester & Padgett (1995), Gafos (1996). The earlier, standard reading of locality, according to this view, is rather of ‘relativised locality’, that is, where only a subset of the segments in a domain can bear the harmonic feature (e.g. the vowels, but not the consonants).

In strict locality, consonants in a vowel harmony domain bear the harmonic gesture too, leading to a much larger set of non-contrastive, but harmonic consonant segments. Ní Chiosáin & Padgett support this view with articulatory evidence that C gestures are superimposed on adjacent (and simultaneous) V gestures in CV sequences (Browman & Goldstein (1986, 1989, 1990)); in fact, V gestures are literally adjacent in harmony domains. Consonant (place) harmony is explained away: if there is C harmony, it is only tongue tip, in which case the intervening vowels bear it too, in a non-contrastive micro-adjusted fashion; place harmony involving consonantal major place gestures does not exist, in this view.

Ní Chiosáin & Padgett (1997, 2001) pay little attention to tone. They do suggest there is no reason that obstruents, too, cannot bear intrinsic tone or harmonic tone, e.g. $k_H$ where $k$ is
intrinsically H (which tone setting voiceless consonants often correlate with), or where \( k \) is inside a H tone domain, even though the closure phase of obstruents inhibits realising tone features. Ní Chiosáin & Padgett invoke Nupe tone/voice data, where tone on vowels is triggered by or blocked by tone on consonants. What these researchers fail\(^{38}\) to consider is segmental data (such as found in Phuthi) where two distinct, conflicting pitch gestures are attempting implementation at the same time, on the same prosodic tone-bearing unit. Ní Chiosáin & Padgett conclude that consonants are in the worst case only mildly antagonistic to tonal specifications (1997:48).

It should be clear from the Phuthi data already seen that strict locality with respect to H tone is analytically incoherent at the level of feature expression (which is implicitly where Ní Chiosáin & Padgett are measuring locality). If H and L articulations conflict in every way—physiologically, phonetically (in both production and perception), phonologically—then every syllable which has membership in both HD and LD should, by the Ní Chiosáin & Padgett account, execute both L and H; that is, \( X_{L,H} \) should be a meaningful (albeit non-contrastive) surface consonant or vowel segment, as schematised below (48). Whereas the syllables inside a LD in Phuthi do have dual class membership (as both L and H), it is difficult to imagine a situation under which such a syllable could surface with both features realised: this appears to be incoherent under any linguistic construal.

\[
(48) \quad \text{Incoherent strictly local tone domains}
\]
\[
\ast \quad [\sigma_H \sigma_H \ldots (\sigma_{L,H} \ldots \sigma_{L,H})_{LD} \ldots]_{HD}
\]

While the work of Ní Chiosáin & Padgett is important in establishing how vowel gestures may be strictly adjacent in harmony systems, and how vowel harmony is asymmetrical to so-called consonant harmony, the Phuthi data here demonstrates that such a narrow reading of locality is untenable in the tonal phonology more broadly. Strict locality with respect to tone cannot obtain for Phuthi, and must be rejected as theoretically coherent.

Chapter 8 will review theoretical issues arising from the Phuthi tone/voice data (§8.2.3), including locality (§8.3.5).

\(^{38}\) To be fair to the researchers whose analysis I am rejecting here, I am not aware of any comparable tone data in any language other than Phuthi, where an \( \alpha \)Tone domain (here: L) is saliently nested inside a \(-\alpha\)Tone domain (here: H).
7.2.7. Single-Constraint Analysis Fails

Instead of unpacking Clash-H/L as the ‘derived’ underexpression of a depressed (penult or ultima) syllable through the constraint interaction Express_L >> Express_H, an alternative pursued elsewhere has been simply to use Clash-H/L to force the rejection of simultaneous H and L, but without indicating the direction of the resolution in favour of H or L. That is, a ban on simultaneous H and L is declared; the resolution must fall out of other, existing constraints. I note simply that this approach is untenable (even for the data already presented, let alone for the shift and block data to come); the uncontroversial rankings (49a-c) lead transitively to an ordering paradox (49d), for ultima parsing of a H/L syllable, e.g. *si-yaa-dlā* ‘we eat’; similarly, the parse and express rankings in (50a-b) lead to the paradox in (50c), for depressed penults, e.g. *si-ya-yyāna* ‘we harvest’.

(49) **Clash and NonFin paradox rankings**

a. Max-H >> Clash-H/L H cannot be deleted to prevent a H/L Clash configuration

b. NonFin >> Clash-H/L a H can still parse on a depressed (L) ultima

c. Max-H >> NonFin from Chapter 4 §4.1: ultima H always parses

d. NonFin >> Max-H >> Clash-H/L >> NonFin ??

(50) **Clash and Express_H paradox rankings**

a. Clash-H/L >> Express_H better to fail to express H if it coincides with L

b. NonFin >> Clash-H/L Clash cannot be resolved on the penult by extending a HD to the ultima

c. Express_H >> NonFin an H is still expressable even when on the ultima

d. NonFin >> Clash-H/L >> Express_H >> NonFin ??

These two paradoxes provide compelling evidence that the H/L clash in Phuthi is not resolvable with a single constraint pointing only to the structural conflict without also indicating the direction of resolution. Rather, the approach I have pursued here which crucially invokes an express ranking (L >> H) appears to be correct.
7.2.8. CONCLUSION

After considering the breathy voiced consonant subset of the full consonant inventory (§7.2.1), and the way in which depressed consonants and vowels are ‘bound’ together (§7.2.1.3), we saw the basic depression pattern in §7.2.2 (then decomposed into five related aspects of depression: 1a-1e): fundamentally, a syllable cannot simultaneously be both depressed—theorised as tonally low (L)—and high (H). This clashed (ungrounded) configuration (§7.2.3) must be resolved, in the direction of successful L expression (at the expense of H), except in the case of short (2-σ, 1-σ) stems (§7.2.5), which exceptionally allow phased realisation of L and H on a single syllable.

Importantly, this section demonstrates that strict locality is untenable as a general theoretical construct in phonology for harmony systems (§7.2.6), and further that a single-constraint ‘clash’ analysis of the H/L conflict is inadequate for explaining the range of surface tone/voice patterns (§7.2.7).

7.2.9. CONSTRAINT SUMMARY

I summarise the tone/voice constraint set up to this point (51), and I sketch the tone/voice rankings in (52).

(51) Constraint set (tone/voice), version 1: new rankings
  • Resolving Clash
    a. Clash H/L >> Express_H(σ) (from 29) [replaced by 51d here]
    b. *Masking (=Contrast_L) >> Express_L [replaced by 51d here]
    c. BA-Lf (L), BA-Rt (L) (from 33)
    d. Express_L >> Express_H (from 35)
    e. Max-H, Max-L >> *Rise (from 45)
    f. Express_H, Express_L >> *Rise (from 45)

(52) Constraint rankings (tone/voice), version 1: dominance orderings

*Masking (Contrast_L)
  |  Express_L
  |  Express_H Max-H, Max-L
  |   *Rise

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7. 3. Depression Anticipation: Extended L Domains

In §7.2, the depressor facts involved local antagonism between a depressor syllable (breathy) and H tone, resolved by failing to express the H on the surface. In this section, I present a range of data containing depressed syllables not triggered locally by consonant breathy voicing.

7. 3. 1. Depression Anticipation

In the data presented thus far, no examples contained non-depressor (modal) syllables inside a stem H domain but preceding the depressor syllable(s). Whenever pre-depressor stem H syllables do occur, they are realised on the surface as L, despite their membership of the HD, and even though they are not breathy voiced (that is, they do not intrinsically trigger depression themselves). This occurs on all stem syllables preceding the depressor site. In (53) the depressor site is $\sigma_2$; in (54), $\sigma_3$; in (55), $\sigma_4$; in (56), $\sigma_5$. I exemplify here with data from the infinitive, but the patterns hold equally of the present indicative long form, present indicative long form reduplicative, long perfective, and so on (all represented in Appendix A). Depressor syllables are $[,]$; non-depressor L syllables are not marked as $[,]$, but simply have no H tone marking $['].$

(53) stem $\sigma_2 =$ depressor

Toneless (low) stems

a. [kú-ladzelí]saana to cause to follow each other
b. [kú-mabeté]laana to delay each other
c. [kú-hlaganí]saana to cause each other to meet
d. [kú-lugišé]la to prepare

High stems
e. [kú-khabhe]laana to visit each other
f. [kú-lagaté]la to wish for
g. [kú-rudšiš]seela to teach intensively for
h. [kú-fubhatshí]siisa to hold tightly in the fist

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There are very few lexical items with a depressor as deep into the stem as σ3, though (54c-d) is one. But the productive (though semantically awkward) extensive verb extension, -ag-, can be suffixed to almost any root, as in (54a-b, 55a-d), in order to introduce a depressor deeper in the stem (as noted and commented on in §7.2.2.1, footnote 15).

(54)  stem σ3 = depressor

Toneless (low) stems

a. [kú-limagelá]niisa to help cultivate indiscriminately for each other
b. [kú-hlabagelá]niisa to help stab indiscriminately for each other

High stems

c. [kú-bulugelá]niisa to cause to keep for each other
d. [kú-butaganí]siisa to ask each other thoroughly and indiscriminately

(55)  stem σ4 = depressor

Toneless (low) stems

a. [kú-patalagelá]niisa to help pay indiscriminately for each other
b. [kú-libalagelá]niisa to cause to forget indiscriminately for each other

High stems

c. [kú-bulalagelá]niisa to cause to kill indiscriminately for each other
d. [kú-sebetagelá]niisa to cause to work indiscriminately for each other

Usefully, a verb with a depressor in σ3 can be reduplicated (adding the meaning ‘now and then’), to produce a depressor in σ5. Reduplicated forms of (54) are given in (56), to confirm that the anticipation pattern is consistent independent of the depression site.
(56)  $\sigma 5 = \text{depressor}$

Toneless (low) stems

a. [kú-limalimagelá]niisa to help cultivate indiscriminately now and then for e.o.
b. [kú-hlabahlabagalá]niisa to help to stab indiscriminately now and then for e.o.

High stems

c. [kú-bulubulugelá]niisa to cause to keep for each other now and then
d. [kú-butabutaganí]siisa to ask e.o. thoroughly and indiscriminately now and then

Though it is theoretically possible to produce stems with depressed (breathy) syllables in any position, it becomes operationally very difficult beyond the depth of $\sigma 5$.

These syllables (pre-depressor, HD-internal, in the stem) which fail to express H are tonally depressed but not perceptibly breathy at all; yet they are intonationally as low as the truly breathy syllable in each stem. Thus, the low pitch of the breathy syllable is being anticipated at the prefix+stem boundary, indicated, as usual, by `-' in (53-56). Depression Pattern 2 (57) formalises this observation.

(57)  **Depression Pattern 2: pre-depressors are L**

Pre-depressor stem syllables inside a HD also fail to express H, and are tonally depressed, even though these syllables are *not* breathy.

7.3.2. **Low Tone Realignment**

Up to this point, intonational lowering on depressed syllables has been a by-product of being breathy. Now, for the first time, Phuthi displays evidence of L tone (lower than toneless) extended leftwards from a breathy depressor trigger, but not phonationally breathy. What appeared to be marginally more insightful in §7.2 is now indispensable: non-H-ness cannot be

---

39 The difficulty of providing items with a depressor consonant further into the stem than $\sigma 5$ is because Phuthi verb stems—as in most Bantu languages—are canonically two or three syllables long (only occasionally four syllables or longer). Anything longer is usually a reduplicate, as in (54).

40 There is a little variation here: the pitch of pre-depressor lowered syllables may drift down over one or two syllables before reaching the lowness of the truly breathy syllable.
merely (a) tonelessness, or (b) breathiness. The L tone has a fully active role to play, given the widescope realignment leftwards in the data above. Contrary to section §7.2 where a single constraint, clash-H/L, might have been able to cope for the full range of clash effects revealed thus far (were it not for two constraint ranking paradoxes in (49-50)), in the present section there is no single constraint that could achieve the depressedness of the relevant pre-depressor stem syllables, without being very heavily specified, such as *Express_Hx (σ_HDX, \(\sigma\) stem, _/\(\sigma\)_), where the constraint algebra translates into ‘do not express a syllable as H if (i) it is in a H domain, and (ii) it is inside a stem domain, and (iii) it precedes a depressed (breathy) syllable’. Such a heavily specified constraint would obscure several significant generalisations.

Depression anticipation (Depression Pattern 2) can now be incorporated into the analysis with a widescope alignment constraint operative on L tones (58). WSA-Lf (L) targets the prosodic word (PWord) left edge. It seeks to realign L as far leftwards as possible\(^{41}\), and to be blocked from doing so plausibly by Crisp(L) (59), which prevents a stem boundary from occurring in the middle of a LD. Just as CrispEdges (Itô, Mester & Padgett 1995, 1999) and CrispSTEM (from Chapter 4 §4.3.2.2) prevent a prosodic constituent from straddling two morphological domains with a morphological boundary anywhere inside the prosodic constituent, so too Crisp(L) forbids interrupting a L domain with a morphological stem\(^{42}\) edge.

\[
\text{(58) Widescope Alignment (Low) (WSA-Lf (L))}\\
\quad \text{Align (L, Lf, PWord, Lf)}
\]

\(^{41}\) The Phuthi left-realignment of L constrasts nicely with the related Nguni language, Zimbabwean Ndebele (Rycroft 1983), where all HD syllables are expressed as H up to the depressor trigger; however, post-depressor syllables are Low, save the rightmost edge of the HD, which is H as expected, e.g. ūkúbálándélíisa ‘to send after them’ (1983:94), ēzi khwamanyáneeni ‘in tiny bags’ vs. ēsíkhwámányáneeni, ‘in a tiny bag’ (1983:132). In other words, it appears that Zimbabwean Ndebele realigns a L domain rightwards towards the right word-edge, using the mirror image widescope constraint to Phuthi: WSA-Rt, e.g. ūkúbálán{de} líísá, ēzí khwama}nyá}neeni vs. ēsíkhwámányá}neeni. (The OP -ba- is lexically H, but the fusion properties of SP and OP HDs in Swati are distinct from Phuthi).

\(^{42}\) I specify stem edge, because we will see in §7.5.1 that a LD can minimally extend rightwards across a non-stem edge morpheme boundary, e.g. {gu-mu}-tfwáana ‘it is a child’, in order to fulfill minimality requirements.
(59) **CrispStem (Low)** (Crisp(L))

\[
*[[...+...]]_{\text{LowDomain}}
\]

A morphological stem boundary cannot occur within a Low Domain.

**Crisp(L)** applies to the long present indicative (as introduced above), repeated here with domain structure (60).

(60) **Long present indicative: effect of Crisp(L)**

a. \([b\-\-y\-\-\{-\text{limage}\}\-\-\text{niisa}\) they help cultivate indiscriminately for e.o

b. \([b\-\-y\-\-\{-\text{limalimage}\}\-\-\text{niisa}\) they help cultivate indiscriminately now and then for e.o.

Unlike **CrispStem** (Chapter 4 §4.3), which operates conjointly with **AvoidProm** at the antepenult-penult boundary to prevent implementation of HD-Min (but where **CrispStem** is otherwise widely violated by WSA-Rt (H)), **Crisp(L)** is (generally) inviolable; it is ranked in (61a), preventing expansion leftwards beyond the stem Lf-edge. Lf-edge widescope of LD is indicated in (61b), clearly overriding basic left alignment of the L domain. At the Rt-edge, no widescope realignment of L is possible; hence the optimal **narrowscope** of the L feature in (61c). Interestingly, the **narrowscope** and widescope parameters of a LD are the opposite of a HD.

(61) **L domain rankings**

a. Crisp(L) >> WSA-Lf (L)
b. WSA-Lf (L) >> BA-Lf (L)
c. BA-Rt (L) >> WSA-Rt (L)

The left edge of a LD could realign directly with the left edge of the morphological stem, instead of with the left edge of the word, and then could be brought up short by the crisp effect. However, there is at least one paradigm (present potential, cf. Appendix A, paradigm Q) where the (fused) LD Lf edge does reach leftwards of the stem boundary. In addition, OP data from the present relative appears to require left-alignment of the LD to the OP left-edge (cf. Appendix A, paradigm H, footnotes 55, 56). Given these facts, if WSA-Lf (L) did not target the PWord left-
edge, an additional widescope constraint would have to be added to the inventory, to reach even further leftwards. I assume that word edge-alignment (58) is the least specified widescope target\(^{43}\).

As in §7.2, the successful parsing of L (versus H) is achieved by faithful domain alignment, but unfaithful H expression, that is by EXPRESS\(_L \gg\) EXPRESS\(_H\). Tableau 2 (62) displays the depression anticipation interactions (realignment of LD left-edge).

\((62)\) **Tableau 2:** Depression anticipation

\(\text{kulimagalaniisa} \, \text{‘to help cultivate indiscriminately for each other’}\)

<table>
<thead>
<tr>
<th>/ ku-+lim-ag-el-an-is-a /</th>
<th>BA-Rt (L)</th>
<th>Crisp(L)</th>
<th>WSA-Lf (L)</th>
<th>Express L</th>
<th>Express H ((\sigma))</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) [ku+{limage}la]niisa</td>
<td>*</td>
<td>*</td>
<td>***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) [kú+{limage}la]niisa</td>
<td>*</td>
<td>*</td>
<td>**<em>!</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) [kú+{limege}la]niisa</td>
<td>*</td>
<td>*!*</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) [kú+lí{mage}la]niisa</td>
<td>*!*</td>
<td>*</td>
<td>**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) [kú+límá{ge}la]niisa</td>
<td>*!*</td>
<td>*!*</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) [kú+{limage}la]niisa</td>
<td>*!</td>
<td>*!*</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(g) [kú+{limagela}ja]niisa</td>
<td>*!</td>
<td>*!*</td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- (a) fails EXPRESS\(_H\) several times, but all expression failure instances are ‘approved’ by EXPRESS\(_L\); (b) fails by excessive violation of EXPRESS\(_H\): no non-LD-internal H syllables can fail to express H; (c) fails to properly express the contents of LD as L; (d-e) fail to realign the Lf edge of a LD to its widest point where crispness is maintained; (f) fatally realigns the Lf-edge of a LD too far left, violating CRISP(L), even though it appears to better satisfy WSA-LF (L); (g) extends the LD rightwards where it should not, violating highly ranked BA-Rt(L).

\(^{43}\) There is a configuration not considered here: the non-realignment of a LD left-edge if that LD commences to the right of a HD, that is, on the penult or ultima in a word where the HD reaches only as far as the antepenult. This configuration is resolved in §7.4.3.3, where violation of *OVERLAP is rejected using a distinct instantiation of L/H clash, motivated as: *L-IN-H. Tableau 10 (124j-m vs. n-p) demonstrates the interactions. That is, in words such as [kú+límaa{ga}] and [kú+límáli{gi}ja]sa, the LD cannot realign leftwards into the HD.
7.3.3. **ODT vs. Autosegmental Representations**

It has been shown in the previous section that Phuthi tolerates a L domain nested inside a H domain. While this can be insightfully represented in the LD and HD configurations in (62) above, it is even more notable that this nested tone domain configuration has no equivalent in autosegmental representation, if locality and sequentiality (or, **NO_OVERLAP**, in the form of the **NO_CROSSING_CONSTRAINT**) are to be maintained. That is, the Phuthi anticipation data could either be represented as (63a), where a single H sponsor is fissioned into two instantiations (sponsor H and discontinuous H), if locality is to be maintained, or as (63b), where the single H is linked to the two discontinuous portions, but locality is significantly violated. Neither representation is satisfactory, since a major tenet of phonological theory would need to be suspended in either case: in (63a), uniqueness (a single UR tone source no longer correlates to a single, unified surface tone feature); in (63b), locality (the single surface tone feature is non-locally linked).

(63) **Autosegmental accounts of depression anticipation**

a. kú+limagalánisa

\[H \quad H\]

b. kú+limagalánisa

\[H\]

(63) confirms that ODT has a wider expressive scope than autosegmental theory. ODT demonstrates that locality can be maintained if domain structure is separated out from domain expression. On the other hand, one may be concerned that ODT is too powerful; the range of possible tone representations achievable through nested domain structure may be wider than what is attested in any human language. As with all Optimality Theory architecture, and, by extension Optimal Domains Theory, the theory (or framework) is the substantive constraints: it remains a (partially) open question what phonological properties, units and parameters output candidates may reflect. Up to this point in the life of the framework, the separability of domain structure and expression is a critical strength of ODT, whereas the conflation of domain parameters and
surface realisation in autosegmental representations in (63) means that fundamental tone configurations in a language like Phuthi would be without adequate representation.

7.3.4. Conclusion

In this section we have seen very robust evidence (§7.3.1) for the necessary separation of phonational breathiness from tonal depression (both tonal behaviours interpreted as lowness): the entire syllable string is bounded at the left edge by a morphological boundary (stem left-edge), requiring L realignment leftwards (§7.3.2), and is bounded on the right by the (breathy) depression trigger syllable—anywhere up to, and including, the ‘head’ syllable (until now, ‘head’ = antepenult). Through the demonstrated necessary separation of domain parsing and domain expression of the L feature in Phuthi, ODT has been shown to be an architecture theoretically superior to conflated domain/expression characterisation that is necessary in a domain-less framework (such as autosegmental phonology). The Phuthi facts, quite simply, cannot be accounted for in a framework that does not make domains explicit, and does not allow for the separation of parsing and expression.

7.3.5. Constraint Summary

I summarise the new rankings (64), and the entire tone/voice constraint set up to this point (65), with the dominance relations visually sketched in (66).

(64) Constraint set (tone/voice), version 2: new rankings

- Anticipating L
  a. Crisp(L) >> WSA-Lf (L) (from 61)
  b. WSA-Lf (L) >> BA-Lf (L) (from 61)
  c. BA-Rt (L) >> WSA-Rt (L) (from 61)

(65) Total constraint summary (tone/voice, partial): version 2

- Resolving Clash
  a. BA-Lf (L), BA-Rt (L)
  b. Express_L >> Express_H
  c. Max-H, Max-L >> Express_L >> Express_H >> *Rise

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• Anticipating \( L \)
  a. Crisp(L) >> WSA-Lf (L) >> BA-Lf (L)
  b. BA-Rt (L) >> WSA-Rt (L)

(66) Constraint rankings (tone/voice), version 2: dominance orderings

<table>
<thead>
<tr>
<th>*Masking (Contrast_L)</th>
<th>Crisp(L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Express_L</td>
<td>WSA-Lf (L)</td>
</tr>
<tr>
<td>Express_H</td>
<td>Max-H, Max-L</td>
</tr>
<tr>
<td>*Rise</td>
<td></td>
</tr>
</tbody>
</table>
7. 4. Depressor Shift and Block

Up to this point I have avoided considering any representations where the rightmost syllable in a HD (whose sponsor lies leftwards of the antepenult) is depressed, in other words, where a HD would normally extend, say, to the antepenult, but the antepenult itself is ineligible for expressing H, given its depressed state. Such a clash configuration can have two possible outcomes: (a) the HD extends one mora further to the right (depressor shift), e.g. \([bá-yá-yûlí]isa\) \(*[bá-yá-yûl]iisa\) ‘they help open’; or (b) the H is parsed \textit{in situ} on the penult, if the penult is also depressed (depressor block), e.g. \([bá-yá-yú]gii\isa *\([bá-yá-yugí]isa\) ‘they cause to agree’.

In fact, the depressor shift/block phenomenon is not limited to antepenult/penult interactions: \textit{any} rightmost syllable in a HD which syllable is also depressed will attempt to shift one mora further rightwards. Summarising the patterns that are detailed in the data sets that follow (71-85) ahead, Tableau 3 (67) plots possible HD right edges, and their shifted forms, and compares this to non-shifting data where the H ends at the same prosodic position (but where that position is not depressed). Rows (b) and (g) are nearly identical: only the phrase-final vs. phrase-medial property changes (the shift properties remain identical).

\[44\] The phrase-final form of the present indicative (62a) contains a heavy (long = bimoraic) penult, as expected. A depressed antepenult shifts its H onto the \textit{first} of the two moras in the long penult (for a discussion of the representation of falling and rising penults as bimoraic, see Chapter 5 §5.3). Hence, I have phrased shift here in terms of moras (even though in all other (non-phrase-final-penult) environments, shift simply moves a tone into the following syllable).
Tableau 3: Depressor shift (vs. non-shift) HD right edges

<table>
<thead>
<tr>
<th>Paradigm</th>
<th>rightmost HD σ (depressed)</th>
<th>Shifted right edge</th>
<th>shift (&amp; depressor) example</th>
<th>gloss</th>
<th>non-shift example</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>phrase-final</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) lexical: present indicative</td>
<td>antepenult</td>
<td>penult</td>
<td>kű-vuléela...</td>
<td>to open for</td>
<td>kű-libaala</td>
<td>to remember</td>
</tr>
<tr>
<td>(b) other pre-antepenult σs: (= pre-stem), e.g. OP</td>
<td>σs</td>
<td>σs+1</td>
<td>aká-gí-líbááli</td>
<td>s/he doesn’t forget me</td>
<td>aká-bá-libááli</td>
<td>s/he doesn’t forget them</td>
</tr>
<tr>
<td>phrase-medial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) lexical: present participial</td>
<td>antepenult</td>
<td>penult</td>
<td>ká-vuléla...</td>
<td>him/her opening for...</td>
<td>ká-libala...</td>
<td>him/her forgetting...</td>
</tr>
<tr>
<td>(d) lexical: present indicative</td>
<td>penult</td>
<td>ultima</td>
<td>kű-vulá...</td>
<td>to open...</td>
<td>kű-líma...</td>
<td>to cultivate...</td>
</tr>
<tr>
<td>(e) grammatical, σ2-to-ultima: short perfective...</td>
<td>penult</td>
<td>ultima</td>
<td>aká-vulí...</td>
<td>s/he does not open...</td>
<td>aká-lími...</td>
<td>s/he doesn’t cultivate...</td>
</tr>
<tr>
<td>(f) grammatical, σ2-to-ultima: imperative...</td>
<td>ultima</td>
<td>initial</td>
<td>ladža mákootí</td>
<td>fetch the bride!</td>
<td>khokhá mákootí</td>
<td>take out the bride!</td>
</tr>
<tr>
<td>(g) other pre-antepenult σs: (=pre-stem) e.g. OP</td>
<td>σs</td>
<td>σs+1</td>
<td>aká-gí-líbááli...</td>
<td>s/he doesn’t forget me...</td>
<td>aká-bá-libááli...</td>
<td>s/he doesn’t forget them...</td>
</tr>
</tbody>
</table>

The shift data (column 4) and non-shift data (column 6) from (67) is provided here (68) with full domain structure (to be demonstrated further in the data sets that follow).

---

45 The present negative, used here in examples (67b,e,g) will be examined in full only in §7.8.1. I have selected this grammatical tone paradigm to exemplify the shift pattern at this point, because the OP is unambiguously in its own 1σ domain, as opposed to the present indicative where the OP fuses with the tone in the H stem; and in the toneless (Low) paradigm (exemplified here), the OP would fail to express H on itself, but would extend the HD to the antepenult (first syllable of the toneless/Low stem). As such, in the case of depressor shift, the H would shift onto an already H syllable, slightly obscuring the shift phenomenon. The antepenult (here, stem σ1) in the present negative is unambiguously toneless since this is a σ2 grammatical paradigm, and the OCP (*AE) prevents the short OP HD from even satisfying minimality by extending to the toneless first stem syllable. Because the OP fails to extend rightwards in the non-shift form, it surfaces as H -bá- to satisfy Contrast. If it surfaced as toneless, as we expect it to from lexical paradigms (Chapter 5 §5.4), then the OP H tone would be completely neutralised.

I have selected a 3-σ toneless stem for the present negative data in (67b,g; 68b,g), and below in (69b,g, 70b,g) to avoid having to discuss at this point the grammatical L tone I argue in (cf. §7.8.1.2ff) is parsed on the penult of all non-depressor-bearing toneless/low stems. Cf. footnote 46.
(68) Domain structure for right edge shift and non-shift data

<table>
<thead>
<tr>
<th>Shift</th>
<th>Non-shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [kú-{vu}lé]ela</td>
<td>[kú-lí]baala</td>
</tr>
<tr>
<td>b. a[ká]-{gi }-lî][báá]li</td>
<td>a[ká]-[bá]-lî[baá]li</td>
</tr>
<tr>
<td>c. [ká-{vu}lé]la...</td>
<td>[ká]-[lî]bala...</td>
</tr>
<tr>
<td>d. [kú-{vu}]lá...</td>
<td>[kú-lî]ma...</td>
</tr>
<tr>
<td>e. a[ká]-{vu}lî...</td>
<td>a[ká]-[lî]mi...</td>
</tr>
<tr>
<td>g. a[ká]-{gi }-lî][bá]li...</td>
<td>a[ká]-[bá]-lî[ba]li...</td>
</tr>
</tbody>
</table>

Similarly, Tableau 4 (69) summarises the depressor block patterns, which contrary to expectations based on tone shift arising from depression reveal that a H in the rightmost HD position does not move rightwards, if it is trapped between two depressor syllables (that is, ‘on’ the first, and before the second). The block data, thus, looks identical to the non-shift (here: non-block) data from (67) above (repeated in 69).

---

46 In §7.8.1, it will be proposed that the penult of toneless/low stems in the present negative contains a grammatical L tone domain, crucially triggering downstep. This domain is not reflected in this data set (67b,g=68b,g). It will also be seen, from §7.8.1.6, that the grammatical L tone is not inserted on H stems, nor on toneless/low stems already containing a LD; hence such a L tone does not require reflection in the block data that follows here, either (69b,g=70b,g).
The block data (column 3) from 69 is provided here (70) with full domain structure (to be demonstrated further in the data sets that follow).

(69) Tableau 4: Depressor block (vs. non-depressor) HD right edges

<table>
<thead>
<tr>
<th>Paradigm</th>
<th>Rightmost HD ( \sigma ) (depressed, &amp; followed by depressed)</th>
<th>Block (2 depressors) example</th>
<th>Gloss</th>
<th>Non-block (no depressors) example</th>
</tr>
</thead>
<tbody>
<tr>
<td>phrase-final</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) lexical: present indicative</td>
<td>antepenult</td>
<td>kú-bhébbhiisa</td>
<td>to help carry on the back</td>
<td>kú-líbaala</td>
</tr>
<tr>
<td>(b) other pre-antepenult ( = ) pre-stem ( \sigma_s ): e.g. OP</td>
<td>( \sigma_s )</td>
<td>aká-gí-vu’lééli</td>
<td>s/he doesn’t open for me</td>
<td>aká-bá-libááli</td>
</tr>
<tr>
<td>phrase-medial</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) lexical: present participial</td>
<td>antepenult</td>
<td>ká-bhébbhíisa</td>
<td>him/her helping carry on the back</td>
<td>ká-líbaala...</td>
</tr>
<tr>
<td>(d) lexical: present indicative</td>
<td>penult</td>
<td>kú-bhébbha...</td>
<td>to carry on the back...</td>
<td>kú-líma...</td>
</tr>
<tr>
<td>(e) grammatical, ( \sigma_2 )-to-penult: short perfective...</td>
<td>penult</td>
<td>aká-bhébbhi...</td>
<td>s/he does not carry on the back...</td>
<td>aká-lími...</td>
</tr>
<tr>
<td>(f) grammatical, ( \sigma_2 )-to-ultima: imperative...</td>
<td>ultima</td>
<td>ladjá bhíi li</td>
<td>fetch first!</td>
<td>khokhé makootí</td>
</tr>
<tr>
<td>(g) other pre-antepenult ( \sigma_s : ) e.g. OP</td>
<td>( \sigma_s )</td>
<td>aká-gí-vu’lééli...</td>
<td>s/he doesn’t open for me...</td>
<td>aká-bá-libááli...</td>
</tr>
</tbody>
</table>

The block data (column 3) from (69) is provided here (70) with full domain structure (to be demonstrated further in the data sets that follow).

(70) Domain structure for right edge block data

a. \([\text{kú-}[^{\text{bhé}}]}[^{\text{bhiis}}]sa\)
b. \(a[^{\text{ká-}}][^{\text{gí}}][-^{\text{vu}}][^{\text{léé}}]li\)
c. \([^{\text{ká-}}][^{\text{bhé}}]}[^{\text{bhiis}}]sa...\)
d. \([^{\text{kú-}}][^{\text{bhé}}]}[^{\text{bha}}]...\)
e. \(a[^{\text{ká-}}][^{\text{bhé}}]}[^{\text{bhiis}}]...\)
f. \(la[^{\text{dzá}}]}[^{\text{bhiis}}]li...\)

47 The negative paradigm examples given here (69b,e,g) are only examined in detail in §7.8.1. See comments in preceding footnotes 45, 46.
I first consider the shift/block data in data sets illustrating all three shifts (antepenult to penult in §7.4.1.1, penult to ultima in §7.4.1.2, ultima to initial in §7.4.1.3), then all three blocking environments (antepenult blocked from penult in §7.4.2.1, penult blocked from ultima in §7.4.2.2, ultima blocked from initial in §7.4.2.3). I then present the analysis of both effects (§7.4.3), hinging on a pivotal theoretical construct: the ‘derived’ prosodic position, HEAD. All three prosodic shifts rightwards are accounted for in the same fashion, via reference to the ‘derived’ HEAD. I note an alternative analysis by Cassimjee (1998), in §7.4.3.1, involving meta-domains, which I will show not to be a well motivated departure from the basic principles of ODT, which departure offers the architecture massive and possibly incoherent generating power.

7.4.1. DEPRESSOR SHIFT DATA

The data following in (71-89) is arranged in order of depressor-shifted right-edge HD-target, as in Tableau 3 above (67). Depressors deeper into stems than σ1 trigger depression anticipation (stem-edge-to-depressor LD), as expected. Cf. Appendix A for even fuller data sets.

7.4.1.1. Antepenult target: shift to penult

Lexical paradigms

We examine first words from lexical paradigms, where depressor consonants are found within the stem domain. In all of what follows, I indicate the penult length of all surface forms by spelling out both moras; in this way, falling tones (occurring only on the penult) are transparently a sequence of high and toneless moras: -ượ-. Data is from the long present indicative (71-72), long perfective (73-74) and long infinitive (75-76).

Long present indicative

(71)  depressor = σ1

Toneless (low) stems (H prefix + toneless stem)

a. bá-yá-yulísa [bá-yá-{-yú}lí]ísa they help open
b. bá-yá-dzakáala [bá-yá-{d}zakáala] they become injured

c. bá-yá-bhacáama [bá-yá-{b}hacáama] they lie down on their stomachs

- There are no H stems are relevant for the antepenult-penult shift where the depressor is in σ1 position, since in H stems, the minimality effect (HD-MIN) requires alignment onto the penult, obscuring the shift effect.

(72) depressor = σ2
Toneless (low) stems (H prefix + toneless stem)

a. bá-yá-ladzeláana [bá-yá-{lad}zé]lánana they follow each other

b. bá-yá-mabhetéela [bá-yá-{mabhe}t]élana they delay

c. bá-yá-lugišáana [bá-yá-{lugi}šá]íana they help each other repair

High stems (toneless prefix + H stem)

d. si-ya-tshegeláana si-ya-{tshége}lánana we buy for each other

e. si-ya-khabheláana si-ya-{khabhe}lánana we visit each other

f. si-ya-tshadzisifísa si-ya-{tshadzi}siʃísa we love intensively

Long perfective

(73) depressor = σ1
Toneless (low) stems (H prefix + toneless stem)

a. bá-vuliiye [bá-{yu}lıi]yé they have opened

b. bá-dzakéele [bá-{dzaké}ele] they have become injured

c. bá-bhacéeme [bá-{bha}cé]éme they are

(74) depressor = σ2
Toneless (low) stems (H prefix + toneless stem)

a. bá-ladzeléene [bá-{ladze}lé]éne they have followed e.o.

48 Stative/inchoative verbs (cf. Chapter 2 §2.2.4.7 (118)) such as -bhacama convey meaning of a present state: present (non-perfective) 'they lie down' > perfective 'they have come into a state of lying down', that is, 'they are lying down'. This perfective is also imbricated (§2.2.4.8).
b. bá-mabhetéele [bá-{mabhe}té]ele they have delayed
c. bá-lugi síye [bá-{lugi}sí]ye they have fixed

High stems
d. si-tshegeléene si-[{tshege}lé]ene we have bought for e.o.
e. si-khabheléle si-[(khabhe)]léle we have visited each other
f. si-tshadzísíye si-[(tshadzi)sí]ye we have caused to love

Long infinitive

(75) **depressor = σ1**
Toneless (low) stems (H prefix + toneless stem)

a. kú-vulfésa [kú-{vu}l]fesa to help open
b. kú-dzakáala [kú-{dza}ká]ala to become injured
c. kú-bhacáama [kú-{bha}cá]ama to lie down on one’s stomach

(76) **depressor = σ2**
Toneless (low) stems (H prefix + toneless stem)

a. kú-ladzeláana [kú-{ladze}l]áana to follow each other
b. kú-mabhetéela [kú-{mabhe}té]ela to delay
c. kú-lugi sáana [kú-{lugi}sá]ana to help each other fix

High stems (H prefix + High stem)⁴⁹
d. kú-tshegeláana [kú-{tshege}lá]ana to buy for each other
e. kú-khabheláana [kú-{khabhe}lá]ana to visit one another
f. kú-tshadzísísa [kú-{tshadzi}sí]sa to love intensely

---
⁴⁹ The domained representations here reflect fusion of adjacent HDs: infinitive H kú- and lexical stem H fuse, as motivated in Chapter 5 §5.2.
Grammatical paradigms

Grammatical paradigms which target the antepenult display identical shift properties to the lexical stems above, whether there is a separate ultima H tone (present relative, present subjunctive) or not (present participial, present potential).

Data is provided from the present subjunctive (77), where contrastive stem tone is irrelevant—and therefore lexical sponsors are not indicated, as *\text{MAX-H}_{\text{LEX}}\ (\text{Chapter 6 §6.2.2.1-§6.2.2.2}) \text{ prohibits the stem lexical H from appearing.}

Present subjunctive

(77) \text{depressor} = \sigma_1

Toneless (low) stems (H prefix + de-toned stem)

a. bá-\text{yulísé} \quad [bá-{yũ}lįjį[sé]] \quad \text{they should help open}

b. bá-\text{bhacáamé} \quad [á-{b hà}cąjá[mé]] \quad \text{they should lie on their stomachs}

High stems (H prefix + de-toned stem)

c. bá-\text{yníísé} \quad [bá-{yũ}nįjį[sé]] \quad \text{they should help harvest}

d. bá-\text{genísé} \quad [bá-{ge}nįjį[sé]] \quad \text{they should help enter}

7. 4. 1. 2. Penult target: shift to ultima

Lexical paradigm

Short present indicative

Data comes from two lexical paradigms, the short present indicative (78) and short infinitive (79).

(78) \text{depressor} = \sigma_1

Toneless (low) stems: 1 H prefix sponsor

a. bá-\text{yulá...} \quad [bá-{yũ}lá...\] \quad \text{they open...}

b. bá-\text{getá...} \quad [bá-{ge}tá...] \quad \text{they add...}
High stems: 1 H stem sponsor

c. si-vuná... si-[vu]ná... we harvest...
d. si-gená... si-[ge]ná... we enter...

A depressor in σ2—that is, stem-final—position would not be relevant for two-syllable stems, since minimality does not override the lexical H sponsor target for short penult stems; a σ2 depressor on the ultima would have no effect on HD parsing since it falls beyond the right edge of the HD.

Short infinitive

(79) depressor = σ1
Toneless (low) stems: 1 H prefix sponsor

a. kú-vulá... [kú-{yu}lá]... to open...
b. kú-getá... [kú-{ge}tá]... to add...

High stems: 2 H sponsors (prefix + stem)

c. kú-vuná... [kú-{vu}ná]... to harvest...
d. kú-gená... [kú-{ge}ná]... to enter...

Grammatical paradigms

Data is provided from the short perfective alone (80-81), although it is paralleled by depressor shift in the present negative (§7.8.1) and other penult paradigms (Chapter 6 §6.3.1 for penult paradigm properties, of the short perfective in particular; cf. Appendix A, paradigm J).
σ2-to-penult: short perfective

(80)  depressor = σ1

Toneless (low) stems

Note: no examples were found of a 1-σ toneless stem with initial depressor consonant.

High stems: 1 H stem sponsor

a. si-dliyé... si-[(dli)yé]... we have eaten...
b. si-viyé... si-[(vi)yé]... we have heard...

(81)  depressor = σ2

Toneless (low) stems

a. si-ladziyé... si-[(ladzi)yé]... we have fetched...
b. si-mabhįyé... si-[(mabhį)yé]... we are holding...

High stems: 1 H stem sponsor

c. si-tshadziyé... si-[(tshadzi)yé]... we have loved...
d. si-khabhįyé... si-[(khabhį)yé]... we have gone...

7. 4. 1. 3. Ultima target: shift to initial of next word

A H tone which targets the depressed ultima of a PWord shifts onto the initial syllable of the following word. Besides the few instances of lexical H sponsored on the ultima (82) or extended to the ultima to satisfy minimality (HD-M̄̄̄̄N̄̄) (83), it is only certain grammatical paradigms that routinely target the ultima (84-87).

Even though this is a σ2-to-penult paradigm, the reader will recall from Chapter 6 §6.3.1 that the short bisyllabic stem (monosyllabic root) does bear the grammatical H tone on its single available TBU (the ultima is unavailable); I have argued in §6.3.1.4 that the tone which surfaces is H_GRAM, not H_LEX. Thus, the examples here do support depressor shift.

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Lexical paradigms

Present indicative

(82)  depressor = $\sigma_1$

Toneless (low) stems

Note: no examples were found of a 1-$\sigma$ stem with initial depressor consonant.

High stems: 1 H stem sponsor

a.  si-dla hláang  si-[[dla] hlá]ang  we eat nearby$^{51}$
b.  si-va ká’kgúulú  si-[[va] ká][kgúulú]  we hear a lot

(83)  depressor = $\sigma_2$

High stems: 1 H stem sponsor

a.  si-khabha hláang  si-[[khabha] hlá]ang  we walk nearby
b.  si-tshadza ká’kgúulú  si-[[tshadza] ká][kgúulú]  we love a lot

Grammatical paradigms

Data is provided from the imperative (84-86) and the perfective negative (87-89); the other ultima-targeting paradigms mimic these patterns—remote past (cf. Appendix A, paradigm L); subjunctive with OP (Appendix A, paradigm I). The LD left-edge aligns vacuously with the left edge of the stem edge; the first stem syllable does not support a H in toneless stems.

$\sigma_2$-to-ultima: imperative

(84)  depressor = $\sigma_1$

Toneless (low) stems

Note: no examples were found of a 1-$\sigma$ stem with initial depressor consonant.

High stems

a.  idla hláang  [[idla] hlá]ang  eat nearby!
b.  iva ká’kgúulú  [[iva] ká][kgúulú]  hear a lot!

$^{51}$ The adverb hlaang is bisyllabic (both syllables toneless); <ng> is syllabic $[n]$.
(85)  
**depressor = \( \sigma_2 \)**

**Toneless (low) stems**

a. ladža mákootí \( \ \ \  \ \ \ \ \ \ {\text{ladža}} \) mákootí

\( {\text{fetch the bride!}} \)

b. mabha ká’kgúulú \( \ \ \ \ \ \ \ \ {\text{mabha}} \) ká’kgúulú

\( {\text{hold tightly!}} \)

**High stems**

c. tshadža mákootí \( \ \ \ \ \ \ \ \ {\text{tshadža}} \) mákootí

\( {\text{love the bride!}} \)

d. khabha ká’kgúulú \( \ \ \ \ \ \ \ \ {\text{khabha}} \) ká’kgúulú

\( {\text{walk a lot!}} \)

(86)  
**depressor = \( \sigma_3 \)**

**Toneless (low) stems**

a. limaga ká’kgúulú \( \ \ \ \ \ \ \ \ {\text{limaga}} \) ká’kgúulú

\( {\text{cultivate indiscriminately a lot!}} \)

b. basaga ká’kgúulú \( \ \ \ \ \ \ \ \ {\text{basaga}} \) ká’kgúulú

\( {\text{light fires indiscriminately a lot!}} \)

**High stems**

c. butaga ká’kgúulú \( \ \ \ \ \ \ \ \ {\text{butaga}} \) ká’kgúulú

\( {\text{ask indiscriminately a lot!}} \)

d. buluga ká’kgúulú \( \ \ \ \ \ \ \ \ {\text{buluga}} \) ká’kgúulú

\( {\text{keep a lot!}} \)

**\( \sigma_2 \)-to-ultima: perfective negative**

(87)  
**depressor = \( \sigma_1 \)**

**Toneless (low) stems**

Note: no examples were found of a \( 1-\sigma \) stem with initial depressor consonant.

**High stems**

a. asf-ta-dlí ká’kgúulú \( \ \ \ \ \ \ \ \ {\text{asf-ta-dlí}} \) ká’kgúulú

\( {\text{we have not eaten a lot}} \)

b. asf-ta-vi ká’kgúulú \( \ \ \ \ \ \ \ \ {\text{asf-ta-vi}} \) ká’kgúulú

\( {\text{we have not heard a lot}} \)
(88)  \( \text{depressor} = \sigma 2 \) (2-\( \sigma \) stems)
Toneless (low) stems

a. \( \text{a}s\text{-}t\text{-}l\text{a}^\text{d}z\text{i} \text{\acute{k}}\text{\acute{a}k\u{u}\u{l}\u{\u{u}}} \quad \text{we have not fetched a lot}\)

b. \( \text{a}s\text{-}t\text{-}m\text{a}^\text{b}h\text{i} \text{\acute{k}}\text{\acute{a}k\u{u}\u{l}\u{\u{u}}} \quad \text{we are not holding a lot}\)

High stems

c. \( \text{a}s\text{-}t\text{-}t\text{shad}z\text{i} \text{\acute{k}}\text{\acute{a}k\u{u}\u{l}\u{\u{u}}} \quad \text{we have not loved a lot}\)

d. \( \text{a}s\text{-}t\text{-}k\text{h\text{a}^\text{b}h\text{i}} \text{\acute{k}}\text{\acute{a}k\u{u}\u{l}\u{\u{u}}} \quad \text{we have not walked a lot}\)

(89)  \( \text{depressor} = \sigma 3 \) (3-\( \sigma \) stems)
Toneless (low) stems

a. \( \text{a}s\text{-}t\text{-}l\text{i}^\text{m}a^\text{g}i \text{\acute{k}}\text{\acute{a}k\u{u}\u{l}\u{\u{u}}} \quad \text{we have not cultivated indiscriminately a lot}\)

b. \( \text{a}s\text{-}t\text{-}b\text{a}^\text{s}a^\text{g}i \text{\acute{k}}\text{\acute{a}k\u{u}\u{l}\u{\u{u}}} \quad \text{we have not indiscriminately lit fires a lot}\)

\( H \) stems

c. \( \text{a}s\text{-}t\text{-}b\text{u}^\text{l}\text{u}^\text{g}i \text{\acute{k}}\text{\acute{a}k\u{u}\u{l}\u{\u{u}}} \quad \text{we have not kept a lot}\)

d. \( \text{a}s\text{-}t\text{-}b\text{u}\text{t}^\text{a}^\text{g}i \text{\acute{k}}\text{\acute{a}k\u{u}\u{l}\u{\u{u}}} \quad \text{we have not asked indiscriminately a lot}\)

The preceding data sets (71-89) make it clear that a third depression pattern can be stated as follows (90). Analysis follows in \( \S 7.4.3 \) below.

(90)  **Depression Pattern 3: depressor shift**
If the rightmost syllable in what \underline{\text{would}} be the regular HD is depressed, then the HD is extended rightwards to include the following mora.

---

52 The reader is reminded that -\( t\text{-}\) fails to become \( H \) even where it should (it should, because the following syllable is not \( H \), thus avoiding any OCP (*AE) blocking effect). That is, WSA-R\( \text{t} \) (\( H \)) is violated \( \text{more} \) than it should be, because the \( S\text{-}t\text{a} \) boundary is uncrossable, perhaps as an instantiation of Crisp\( \text{E}\text{dge} \); this issue was raised in Chapter 6 \( \S 6.3.3.2 \).
7. 4. 2. **Depressor Blocking: Anti-Shift**

The data in (91) to (107) exemplifies depressor blocking, illustrating the patterns already laid out in Tableau 4 (69). Low domains surround the depressor syllables, and the widescope extended LDs. The examples make it clear how, in these cases, the de-clashing of the depressed rightmost HD syllable cannot be achieved by expanding a HD one mora (or even one whole syllable) rightwards, since the post-rightmost syllable is also depressed.

The lexical paradigm data is drawn from the long present indicative (91-92), long present indicative (93-94), long perfective (95-96).

7. 4. 2. 1. Antepenult target: no shift to penult

**Lexical paradigms**

**Long present indicative**

(91) depressors = σ₁ & σ₂
Toneless (low) stems\(^\text{53}\): 1 H prefix sponsor

a. bá-yá-vúgiisa [bá-yá-{vú}][gii]sa they cause to agree
b. bá-yá-bhébhisiisa [bá-yá-{bhé}][bhii]sa they help carry on the back
c. bá-yá-gúdzi jsa [bá-yá-{gú}][dzi i]sa they help shear

- no relevant H stems.

(92) depressors = σ₂ & σ₃
Toneless (low) stems: 1 H prefix sponsor

a. bá-yá-ladzágiisa [bá-yá-{ladzá}][gii]sa they help fetch indiscriminately\(^\text{54}\)
b. bá-yá-mabhágiisa [bá-yá-{mabhá}][gii]sa they help hold indiscriminately

\(^{53}\) H stems are irrelevant here, because the minimality effect (HD-M\(\text{Fin}\)) extends a H off σ₁ onto σ₂, and therefore onto the penult, e.g. si-ya-gadziisa = si-ya-[g]dzi i/jsa; the minimality effect takes precedence over the depressor blocking effect.

\(^{54}\) The reader is reminded that \(-ag\) is the extensive suffix, glossed as ‘indiscriminately’; cf. comments made in §7.2.2.1 (footnote 15).

549
c. bá-yá-yadzágiisa  [bá-yá-{yadzá}]{gii}sa  they help extend indiscriminately

High stems: 1 H stem sponsor

d. si-ya-tségágiisa  si-ya-[(tségá)]{gii}sa  we cause to buy indiscriminately

e. si-ya-tevágiisa  si-ya-[(tevá)]{gii}sa  we cause to insult indiscriminately

f. si-ya-qedzágiisa  si-ya-[(qedzá)]{gii}sa  we cause to finish indiscriminately

Long perfective

(93) depressors = σ1 & σ2
Toneless (low) stems: 1 H-sponsor

a. bá-vúgiyiye  [bá-{vú}]{gii}yiye  they have agreed

b. bá-bhébhiiyiye  [bá-{bhé}]{bhi}yiye  they have carried on the back

c. bá-gúdziiyiye  [bá-{gú}]{dz}i{y}iye  they have sheared

(94) depressors = σ2 & σ3
Toneless (low) stems: 1 H prefix sponsor

a. bá-ladzágiyiye  [bá-{ladzá}]{gii}yiye  they have fetched indiscriminately

b. bá-mabhágiyiye  [bá-{mabhá}]{gii}yiye  they are holding indiscriminately\(^{55}\)

c. bá-yadzágiyiye  [bá-{yadzá}]{gii}yiye  they have extended indiscriminately

\(^{55}\) -mabhà is another stative/inchoative stem; -mabh-ag-iiye glosses as ‘(have come into the state of) holding indiscriminately’. Cf. comments about statives in footnote 48.
High stems: 1 H stem sponsor

d. si-tshégágiyiye  si-[(tshégá)]{gi}iye  we have bought indiscriminately

Long infinitive

(95)  

Depressors = σ₁ & σ₂

Toneless (low) stems: 1 H prefix sponsor

a. kú-vúgiisa  [kú-{vú}]{gi}iisa  to cause to agree

b. kú-bhébhiisa  [kú-{bhé}]{bhi}iisa  to help carry on the back

c. kú-gúdži,i sa  [kú-{gú}]{dzi,i}sa  to help shear

(96)  

Depressors = σ₂ & σ₃

Toneless (low) stems: 1 H prefix sponsor

a. kú-ladzágiisa  [kú-{ladzá}]{gi}iisa  to help fetch indiscriminately

b. kú-mabhágiisa  [kú-{mabhá}]{gi}iisa  to help hold indiscriminately

c. kú-yadzágiisa  [kú-{yadzá}]{gi}iisa  to help extend indiscriminately

High stems: 2 H sponsors (prefix + stem)

d. kú-tshégágiisa  kú-[(tshégá)]{gi}iisa  to cause to buy indiscriminately

b. kú-tfogágiisa  kú-[(tfogá)]{gi}iisa  to cause to insult indiscriminately

c. kú-qedzágiisa  kú-[(qedzá)]{gi}iisa  to cause to finish indiscriminately

Long infinitive

(95)  

Depressors = σ₁ & σ₂

Toneless (low) stems: 1 H prefix sponsor

a. kú-vúgiisa  [kú-{vú}]{gi}iisa  to cause to agree

b. kú-bhébhiisa  [kú-{bhé}]{bhi}iisa  to help carry on the back

c. kú-gúdži,i sa  [kú-{gú}]{dzi,i}sa  to help shear

(96)  

Depressors = σ₂ & σ₃

Toneless (low) stems: 1 H prefix sponsor

a. kú-ladzágiisa  [kú-{ladzá}]{gi}iisa  to help fetch indiscriminately

b. kú-mabhágiisa  [kú-{mabhá}]{gi}iisa  to help hold indiscriminately

c. kú-yadzágiisa  [kú-{yadzá}]{gi}iisa  to help extend indiscriminately

High stems: 2 H sponsors (prefix + stem)

d. kú-tshégágiisa  kú-[(tshégá)]{gi}iisa  to cause to buy indiscriminately

b. kú-tfogágiisa  kú-[(tfogá)]{gi}iisa  to cause to insult indiscriminately

c. kú-qedzágiisa  kú-[(qedzá)]{gi}iisa  to cause to finish indiscriminately

551
Grammatical paradigms

Grammatical paradigms which target the antepenult display identical shift properties to the lexical stems above, whether there is a separate ultima H tone (present relative, present subjunctive) or not (present participial, present potential).

Data is provided from the present subjunctive (97). Stem tone is irrelevant; therefore, lexical sponsors are not indicated, since *M_{\text{AX}}-H_{\text{lex}} \pi \text{ (Chapter 6 §6.2.2.1-§6.2.2.2) prohibits the stem lexical H from appearing in this paradigm.}

Present subjunctive

(97) depressors = \sigma_1 \& \sigma_2

Toneless (low) stems (H prefix + ‘de-toned’ stem)

a. bá-vúgiisé  
[\text{bá-}{\text{vú}}][\text{gii}][\text{sé}]  
they should cause to agree

b. bá-bhébhiisé  
[\text{bá-}{\text{bhé}}][\text{bhii}][\text{sé}]  
they should help carry on the back

c. bá-gúdži jú sé  
[\text{bá-}{\text{gú}}][\text{dzi}][\text{jú}][\text{sé}]  
they should help shear

High stems (H prefix + de-toned stem)

d. bá-gádžii sé  
[\text{bá-}{\text{gá}}][\text{dzi}][\text{ii}][\text{sé}]  
they should help stamp

e. bá-gádzeelé  
[\text{bá-}{\text{gá}}][\text{dzee}][\text{lé}]  
they should stamp for

7. 4. 2. 2. Penult target: no shift to ultima

A H tone which targets the penult fails to shift to a depressed ultima. All data in this section (lexical and grammatical) is in the ‘short’ form, that is, phrase-medial. If there were phrase-final forms which target the penult, there would never be evidence of shift or block, because phrase-final forms do not tolerate shift off the penult into the ultima; ‘block’ (in fact, simply, non-shift) is the default, in that case. But short (phrase-medial) forms typically target the penult, and do allow shift to the word ultima. Hence, the non-shift data below actively indicates depressor block at work.

552
Lexical paradigms

Short present indicative

Data comes from two lexical paradigms, the short present indicative (98) and the short infinitive (99).

(98) \( \text{depressors} = \sigma_1 \& \sigma_2 \)

Toneless (low) stems (H prefix + toneless stem)

a. \( \text{bá-vúga} \) ... \( [\text{bá-}{yú}\}{\text{ja}} \) ... they agree...

b. \( \text{bá-bhébha} \) ... \( [\text{bá-}{bhé}\}{\text{bha}} \) ... they carry on the back...

c. \( \text{bá-gúdzda} \) ... \( [\text{bá-}{gú}\}{\text{dza}} \) ... they shear...

High stems (toneless prefix + H stem)

d. \( \text{si-gúdzda} \) ... \( [\text{si-}{gá}\}{\text{dza}} \) ... we stamp...

A depressor in \( \sigma_2 \)—that is, stem-final—position would not be relevant for two-syllable stems, since minimality does not override the lexical H sponsor target for short penult stems; a \( \sigma_2 \) depressor on the ultima would have no effect on HD parsing since it falls beyond the right edge of the HD.

Short infinitive

(99) \( \text{depressors} = \sigma_1 \& \sigma_2 \)

Toneless (low) stems (H prefix + toneless stem)

a. \( \text{kú-vúga} \) ... \( [\text{kú-}{yú}\}{\text{ja}} \) ... to agree...

b. \( \text{kú-bhébha} \) ... \( [\text{kú-}{bhé}\}{\text{bha}} \) ... to carry on the back...

c. \( \text{kú-gúdzda} \) ... \( [\text{kú-}{gú}\}{\text{dza}} \) ... to shear

---

56 In my Phuthi lexical corpus (cf. Appendix D), I have only this one example of a H tone 2-\( \sigma \) verb stem with depressors in both first and second syllables.
High stems (H prefix + H stem)

d. kú-gándza... kú-[{gá}]{dza}... to stamp...

Grammatical paradigms

No data can be provided from the short perfective since it always ends with the perfective suffix -iye which cannot be depressed; this ensures that shift from the penult (= right-edge target for short perfective grammatical H domain) to the ultima -ye can never be prevented (blocked); thus, block cannot be demonstrated.

But the present negative (see also §7.8.1), in (100-101)—and other penult paradigms such as the present inclusive (cf. Appendix A, paradigm V)—can display block effects. The present negative is a σ2-to-penult paradigm; in its short (phrase-medial) form, shift onto the ultima would be expected when all else is equal, but is indeed not found when the environment for depression block is correct (that is, depression on both penult and ultima).

σ2-to-ultima: short present negative

(100) depressors = σ1 & σ2

Toneless stems: \( H_{\text{gram}} \) on σ1 (=penult)

a. aká-vúgi... a[ká]-[{vú}]{gi}... s/he doesn’t agree...

b. aká-bhéhhi... a[ká]-[{bhé}]{bhi}... s/he doesn’t carry on the back...

c. aká-gúdzi... a[ká]-[{gú}]{dzi}... s/he doesn’t shear...

\( H \) stems: \( H_{\text{gram}} \) on σ1 (= penult)

d. aká-gándzi... a[ka]-[{gá}]{dzi}... s/he doesn’t stamp...

(101) depressors = σ2 & σ3

Toneless stems: \( H_{\text{gram}} \) on σ2 (= penult)

a. aká-ladzági... a[ká]-{la[dzá]}{gi}... s/he doesn’t fetch indiscriminately...
b. aká-mabhági... a[ká]-{ma[bhá]}{gi}... s/he doesn’t hold indiscriminately...

c. aká-yadzági... a[ká]-{ya[dzá]}{gi}... s/he doesn’t extend indiscriminately...

H stems: \( H_{\text{lex}} \) on \( \sigma_1 \); \( H_{\text{gram}} \) on \( \sigma_2 \) (= penult)

d. aká-tshegá... a[ká]-{tshe}[gá]{gi}... she doesn’t buy indiscriminately...

e. aká-tfogági si... a[ká]-{[tfogá]}{gi}... s/he doesn’t insult indiscriminately...

f. aká-qedzágii si... a[ká]-{qedzá}{gi}... s/he doesn’t finish indiscriminately...

7. 4. 2. 3. Ultima target: no shift to initial

A H tone which targets the depressed ultima of a PWord fails to shift onto the initial syllable of the following word, when that following initial syllable is depressed too. Besides the few instances of lexical H which is sponsored on the ultima (102) or extends to the ultima to satisfy minimality (HD-MIN) (103), only a small number of grammatical paradigms target the ultima as a rule: the imperative (104-106), and the short perfective negative (107-109).

**Lexical paradigms**

**Present indicative**

(102) depressors = \( \sigma_1 \), depressed initial syllable

High stems

a. si-dlá bhiili si-[{dlá}] {bhii}li we eat first

b. si-vá bhiili si-[{vá}] {bhii}li we hear first

(103) depressors = \( \sigma_2 \), depressed initial syllable

High stems

a. si-khabhá bhiili si-[{khabhá}] {bhii}li we walk first

b. si-tshadzá bhiili si-[{tshadzá}] {bhii}li we love first
Grammatical paradigms

Data is provided here from the (short) imperative (104-106), and the (short) perfective negative (107-109); it will be seen later that the other ultima-targeting paradigms—remote past (§7.6.2), subjunctive with OP (cf. Appendix A, paradigm I)—mimic the patterns in this data.

The LD in the data that follows appears to left-align vacuously with the left edge of the imperative stem (the first stem syllable does not support a H in any of the stems, and the intonation is no higher on that stem σ-1 than on σ-2).

σ2-to-ultima: imperative

(104) depressors = σ1, depressed initial syllable
     Toneless (low) stems

     Note: no examples were found of a 1-σ stem with initial depressor consonant.

     High stems
     a. idlá bhi ili {[idlá]} {bhi }li eat first!
     b. ivá bhi ili {[ivá]} {bhi }li hear first!

(105) depressors = σ2, depressed initial syllable
     Toneless (low) stems

     a. ladzá bhi ili {la[dzá]} {bhi }li fetch first!
     b. mabhá bhi ili {ma[bhá]} {bhi }li hold first!

     High stems
     c. tshadzá bhi ili {[tshadzá]} {bhi }li love first!
     d. khabhá bhi ili {[khabhá]} {bhi }li walk first!

(106) depressors = σ3, depressed initial syllable
     Toneless (low) stems

     a. limágá bhi ili {li[mágá]} {bhi }li cultivate indiscriminately first!
     b. baságá bhi ili {ba[ságá]} {bhi }li light fires indiscriminately first!
High stems

(c. butagá bhiili \{butagá\} \{bhiili\} ask indiscriminately first!

d. bulugá bhiili \{bulugá\} \{bhiili\} keep first!

\(\sigma_2\)-to-ultima: perfective negative

(107) depressors = \(\sigma_1\) (1-\(\sigma\) stems), depressed initial syllable
Toneless (low) stems

Note: no examples were found of a 1-\(\sigma\) stem with initial depressor consonant.

High stems

a. asf-ta-dlį bhiili \{asf\}ta-\{dlį\} \{bhiili\} we have not eaten first

b. asf-ta-vį bhiili \{asf\}ta-\{vį\} \{bhiili\} we have not heard first

(108) depressors = \(\sigma_2\) (2-\(\sigma\) stems), depressed initial syllable
Toneless (low) stems

a. asf-ta-ladžį bhiili \{asf\}ta-\{ladžį\} \{bhiili\} we have not fetched first\(^{57}\)

b. asf-ta-mabhį bhiili \{asf\}ta-\{mabhį\} \{bhiili\} we are not holding first

High stems

c. asf-ta-tshadžį bhiili \{asf\}ta-\{tshadžį\} \{bhiili\} we have not loved first

d. asf-ta-khabhį bhiili \{asf\}ta-\{khabhį\} \{bhiili\} we have not walked first

(109) depressor = \(\sigma_3\) (3-\(\sigma\) stems) & depressed initial syllable
Toneless (low) stems

a. asf-ta-limagį bhiili \{asf\}ta-\{limagį\} \{bhiili\} we have not cultivated indiscriminately first

\(^{57}\) These examples reflect the somewhat surprising property of apparently violating HD-MIN
without reason: the first HD is not minimally extended rightwards onto the toneless prefix -\(ta-\)
(ct. the expected non-extension minimally with the H stems that follow immediately in (108c,d),
where the first stem syllable is lexically H, and therefore, by the OCP, where we do not expect
-\(ta-\) to become H). The apparent opacity of the -\(ta-\) prefix boundary has been analysed in
Chapter 6 §6.3.3.2 as falling out of paradigmatised CrispEdge requirements.
b. əs-ta-basəgi bhi ili əs-ta-{ba[səgə]} {bhi ili}  
we have not indiscriminately lit fires first

H stems

c. əs-ta-bulugí bhi ili əs-ta-{bulugə} {bhi ili}  
we have not kept first

d. əs-ta-butagí bhi ili əs-ta-{butagə} {bhi ili}  
we have not indiscriminately asked first

In all Nguni languages where depressor shift is active, depressor blocking is found too. We can summarise the behaviour of blocking as the overriding of the otherwise predicted tone shift, as in (110).

(110) **Depression Pattern 4: depressor block**
Depressor shift does not take place from a depressed syllable into an immediately following depressed syllable.

7. 4. 3. Depression analyses: shift and block

We have seen the full range of depressor shift and block phenomena illustrated and described in §7.4.1 and §7.4.2. I turn now to an analysis of these patterns.

7. 4. 3. 1. Derivationality

The shift and block patterns are considerably problematic for declarative architectures such as OT or ODT, because they appear at first to entail unavoidable derivationality, something which is fundamentally alien to both non-derivational frameworks. The apparent derivationality arises from a casting of the shift/block phenomenon as follows: ‘only if a particular configuration (in this case, the depressed right edge of a HD) arises, then fix it with this particular response (extension further rightwards)’. In other words the input to depressor shift is the output of another set of constraints, namely the constraints that build the right edge of a H domain. This sequence of steps seems to require more than just the two levels (deep and surface) that an ODT grammar makes available (cf. Chapter 3 §3.2.2.1). If this is really the case, then the
Phuthi data—and other comparable Nguni data—poses a serious challenge\(^{58}\) to an OT-type framework. Depressor shift involves two crucial parameters (111).

(111) Phuthi depressor shift parameters
a. source syllable from which tone shifts;
b. direction of shift.

Firstly, as we have seen repeatedly from the data in the previous sections, the syllable from which depressor shift occurs is the rightmost in a HD: typically, the antepenult, penult or ultima (or depressed H prefix, where there is a second H to the right). (112a) illustrates (in italics) the derived rightmost syllable (here: antepenult), which is in a clash configuration with depression. Notably, the leftmost syllable in the HD—the sponsor (here, the 3rd person plural prefix *ba-*)—is of no relevance. Shift/block makes no reference to this H-sponsor.

The shift trigger syllable is thus a position which cannot be specified without reference to the (derived) right edge of the normal HD, that is, where the HD *would* end if there were no depression in this rightmost syllable.

Secondly, the direction of resolution is crucial: depressor shift must *expand* (and not shrink) the HD (112b). As in the case of HD-MIN (minimality), depressor shift minimally expands a HD, in this example onto the penult, violating one mora of AVIDOUPROM (unlike HD-MIN, which consumes both penult moras). In its desire for an extra tone-bearing unit, depressor shift can even violate NONFIN (extending to the ultima), or the PWord boundary (extending to the initial syllable of the following word), if the word bearing the depressed penult or ultima (in these cases) is phrase-medial. That is, shift to the *right* (112c) is the only option (domain expansion), never to the left (domain shrinking), even though that would also seem to resolve the CLASH-H/L configuration (112d).

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\(^{58}\) This challenge is so serious that Cassimjee (1998:51-87) concludes that depressor shift/block in Xhosa is not explicable without reference to a processual aspect, where two levels of domain are built off a single sponsor; her approach (to be rejected in the present work) is examined in §7.4.3.4.
(112) Shift parameters: ‘they help open’
   a. (*) [bá-ya-vú]liisa rightmost syllable in ‘normal’ HD identified
   b. bá-ya-{vú}lfíisa H/L clash resolved: ‘normal’ rightmost syllable is ‘source’
      of shift
   c. [bá-ya-{vú}lfíisa final scope of HD is the conflation of (a) and (b)
   d. (*) [bá-ya-]vúliisa H/L clash cannot be resolved by shrinking a HD.

However, the constraint set as I have been arguing for it has no means to force a HD to
expand, rather than shrink. Tableau 5, using the extant constraint set, shows how the shrunk
candidate (113a) is wrongly predicted to be optimal, instead of the expanded (113c) which
violates one mora of the penult. The wrong prediction for antepenult-to-penult in (113) extends
to the other right-edge prosodic positions too; in every case, the shrunk candidate should be
optimal, yet is not.

(113) Tableau 5: Wrongly predicted shrunk HD
   • we are counting moras (not syllables) in evaluating violations of WSA-Rt
   *báýávúliisa ‘they help open’

<table>
<thead>
<tr>
<th></th>
<th>Express_L</th>
<th>Express_H</th>
<th>AvoidProm</th>
<th>WSA-Rt</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ bá- + -ya- + -vul-is-a /</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>∅ (a) [bá-ya-{vú}liisa</td>
<td></td>
<td></td>
<td></td>
<td>***</td>
</tr>
<tr>
<td>(b) [bá-ya-{vú}liíisa</td>
<td></td>
<td>*!</td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>(c) [bá-ya-{vú}lfííisa</td>
<td>*!</td>
<td>*</td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>(d) [bá-ya-]vúliíisa</td>
<td>*!</td>
<td></td>
<td></td>
<td>**</td>
</tr>
</tbody>
</table>

Depressor block appears equally reliant on derivation, and also on hypothetical shift: it
requires reference to the shift that would have happened, but now must not, given the location of
a second depressor in the syllable successive to the would-be shift site.

Something more highly ranked than Express_L or Express_H must force the expansion
(in the case of shift), and must force the failure to expand (in the case of depressor block). In the
following section I propose a non-derivational account for shift, and for block.
7. 4. 3. 2. Heads and edges: no derivations for depressor shift

The shift analysis I propose contains three parts: (a) a non-derivational constraint conjunction to locate the rightmost (head) position for any HD; (b) a stipulation that the head position be incorporated into the H domain which the head is part of; (c) a requirement that the right edge of every HD be expressed (even if misaligned).

First, I propose to encode ‘rightmost syllable in non-depressor-bearing HD’, using a subset of the constraint set, which derives a prosodic position I call ‘head’ (114).

(114) HEAD-HDₙ (Headₙ)
Headₙ = (*AEₙ >> NonFin(πₙ) >> HD-Minₙ >> AvoidProm(πₙ) >> WSA-Rt(πₙ) >> BA-Rtₙ)

The (right edge of the) Head of domain X is the position selected by the interaction of these six constraints, subject to paradigm πₙ-specific ranking of a right-edge subset.

For any H tone—say, Hₓ—the rightmost position of the well-formed HDₓ that parses Hₓ is defined by the subset of domain-edge alignment constraints in (114), that is: the rightmost position is the one which is most widely right-aligned (WSA-Rt), but not violating the penult (AvoidProm), or—even worse!—the ultima (NonFin), and which is minimally two syllables in length (HD-Min), but where that minimality does not entail a configuration with adjacent HD edges (*AE), nor entails extending onto the ultima. The instantiations of each HDₓ constraint that aligns the parsed feature Hₓ together form a set of constraints that ‘derive’ the Head position for HDₓ, but in a non-derivationally ranked way.

The subscript π reflects that some paradigms rerank NonFin, AvoidProm, and WSA-Rt, so that the right edge (and, therefore, head) becomes the penult, as in Chapter 4 §4.5 for phrase-medial lexical tone and in Chapter 6 §6.3.1, or even the ultima, as in Chapter 6 §6.3.2. The HEADₓ constraint rankings in (114) are always identical to the rankings that exist for the morphological paradigm π containing the HD in which the HEAD finds itself.

The range of possible heads arising from sponsors in pre-antepenult, antepenult, penult and ultima positions is given for (phrase-final, lexical tone paradigms) in Tableau 6 (115), with one or two non-optimal (incorrect) assessments of head position for all but the last form (f), which is too short to have any alternative head site. MAX-H is not included in this constraint conjunction, because the assumption is that HEAD cannot be evaluated at all without the
successful parsing of the H feature. If $\text{MAX-H}$ fails, then $\text{HEAD}_x$ vacuously fails too. (115d) only targets the penult if there is no stem boundary intervening between antepenult and penult, as demonstrated in Chapter 4 §4.3.

(115) Tableau 6: Head evaluations

- the $\text{HEAD}$ is indicated in ( ), the H sponsor in [ ].

<table>
<thead>
<tr>
<th>sponsor position</th>
<th>sponsor, $[\sigma]$</th>
<th>domain head, $[\sigma]$</th>
<th>$^*$AE$_x$</th>
<th>HD-Min$_x$</th>
<th>Avoid Prom$_x$</th>
<th>WSA-Rt$_x$</th>
<th>BA-Rt$_x$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) pre-antepenult</td>
<td>$[\sigma][\sigma][\sigma][\sigma]$ #</td>
<td>$^*$</td>
<td>**</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) pre-antepenult</td>
<td>$[\sigma][\sigma][\sigma][\sigma][\sigma][\sigma][\sigma]$ #</td>
<td></td>
<td>**</td>
<td>***</td>
<td>***</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>(c) pre-antepenult (+another HD)</td>
<td>$[\sigma][\sigma][\sigma][\sigma][\sigma][\sigma][\sigma]$ #</td>
<td></td>
<td>**</td>
<td>***</td>
<td>***</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>(d) antepenult</td>
<td>$[\sigma][\sigma]$ #</td>
<td></td>
<td>$^*$</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) penult</td>
<td>$[\sigma][\sigma]$ #</td>
<td></td>
<td>$^*$</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) ultima</td>
<td>$[\sigma]$ #</td>
<td></td>
<td>$^*$</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It is clear that the $\text{HEAD}_x$ constraint recapitulates what the (same) set of right-alignment constraints do in the process of establishing the right edge of a HD$_x$ (as argued for in Chapter 4 §4.1-4.2, also in Chapter 5 §5.1-5.2, and §5.6 where the HD parameters of nouns vs. verbs are clarified). But it has been shown above that this $\text{HEAD}$ position is the ‘at-least’ right edge, that is, the position up to which the HD must at least extend, and that reference must be made to this wide-aligned position for shift to be properly achieved; the constraint conjunction is thus well motivated.

Technically, $\text{HEAD-HD}_x$ only constructs the right-edge boundary of Head$_x$ for H$_x$. The head position is always only one TBU in length, and can bounded locally on its left side by a left-edge constraint. This default left-edge local bounding has no bearing on the analysis.

---

59 In fact, we should include under the $\text{HEAD}_x$ constraints all the constraints that address the rightwards expansion of a HD, including the $\text{CRISPEDGE\_\&_\_VOIDPROM}$ conjoined constraint that conditions the application of HD-MIN (§4.3), and the constraints relevant to the quirks of reduplication in 1-$\sigma$ and 2-$\sigma$ stems (§4.4). We can only assume that this is the case, and that we do not need to enumerate these constraints with the limited data set here.
Next, the ODT grammar for Phuthi requires that such a Head position be structurally inside its own HD (116), thus encoding a condition of ‘at-leastness’ (‘at least the Head must be ∈ HD’).

\[
\text{(116) HEAD-IN-HD (Head_H)}
\]
\[
\text{Head-H}_x \in \text{HD}_x
\]
\[
The \text{Head of every HD must be included in the HD of which it is the Head.}
\]

Finally, the rightmost edge of every HD must be expressed, without exception (117). It is this constraint which outranks \textit{EXPRESSION}_L, and which therefore forces the HD to be expressed at the right edge without fail. This will allow depressor shift to happen, as long as the right edge of the HD is expressed. The status of \textit{EXPRESSION}_\text{EDGE} is similar to \textit{ENDLOW}: its functional nature is both tonological and intonation phonological (that is, there is a phonological requirement that pitch be implemented within a right edge 2-σ window—either on the head, or realigned one mora rightwards).

\[
\text{(117) EXPRESSION\_RIGHT\_EDGE (Express_Edge)}
\]
\[
\text{Express (HD}_{\text{Right Edge}_x} \text{, H)}
\]
\[
The \text{right edge of a H domain must be surface expressed as H (that is, there must be a contrastive pitch excrescence marking the rightmost tone-bearing unit in the HD).}
\]

These three constraints are ranked with the express ranking that resolves a H/L clash configuration (118a = A); this set of expression constraints in turn outranks all the Head-aligning constraints from (114), as in (118b = B).

\[
\text{(118) Depressor shift rankings (A>>B)}
\]
\[
\text{A. Express_Edge >> Head_H >> Express_L >> Express_H}
\]
\[
\text{B. *AE}_x >> \text{NonFin}_x >> \text{HD-Min}_x >> \text{AvoidProm}_x >> \text{WSA-Rt}_x >> \text{BA-Rt}_x
\]

Tableau 7 demonstrates how a shifted HD (119e) falls out of these rankings, with no further architecture; this can be contrasted with (119a), which is the optimal candidate where the antepenult Head is not depressed. The HD head is given inside regular parentheses.
### Table 7: Depressor shift

*báyálímiisa* ‘they help cultivate’

<table>
<thead>
<tr>
<th>/ <strong>bá-</strong> + -ya- + -lim-is-a /</th>
<th>Express Edge</th>
<th>Head_H (antepenult)</th>
<th>Express L</th>
<th>Max-L</th>
<th>Express H (σ)</th>
<th>Non_Fin</th>
<th>Avoid_Prom</th>
<th>WSA-Rt</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) [<strong>bá-</strong>-yá-(li)]miisa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>(b) [<strong>bá-</strong>-yá-(l)í]miisa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td>**</td>
</tr>
<tr>
<td>(c) [<strong>bá-</strong>-yá-(l)í]mí]sa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><em>!</em></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>(d) [<strong>bá-</strong>-yá-(l)i]miisa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td>*<em>!</em></td>
</tr>
</tbody>
</table>

*báyávulíisa* ‘they help open’

<table>
<thead>
<tr>
<th>/ <strong>bá-</strong> + -ya- + -vul-is-a /</th>
<th>Express Edge</th>
<th>Head_H (antepenult)</th>
<th>Express L</th>
<th>Max-L</th>
<th>Express H (σ)</th>
<th>NonF</th>
<th>Avoid_Prom</th>
<th>WSA-Rt</th>
</tr>
</thead>
<tbody>
<tr>
<td>(e) [<strong>bá-</strong>-yá-{(vu)}lí]isa</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td>**</td>
</tr>
<tr>
<td>(f) [<strong>bá-</strong>-yá-{(vu)}lí]sa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td>**</td>
</tr>
<tr>
<td>(g) [<strong>bá-</strong>-yá-{(vu)}]liisa</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>(h) [<strong>bá-</strong>-yá-{(vú)}]liisa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td>**</td>
</tr>
<tr>
<td>(i) [<strong>bá-</strong>-yá-{(vu)}]liisa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td>***</td>
</tr>
<tr>
<td>(j) [<strong>bá-</strong>-yá-{(vu)}]liisa</td>
<td></td>
<td></td>
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<td>**</td>
</tr>
</tbody>
</table>

- **Notes:** for the non-depressed candidates, in (b) the HD is overlong, (c) even worse so, in (d) the HD is too short, not reaching the Head syllable (here, **HEAD** = antepenult); for the depressor-bearing candidates, (e) acceptably fails to express H on the head (antepenult), as the **HEAD**_H constraint requires only that the head syllable be structurally included in the HD, not that it be *expressed* as H; (e) also minimally violates one mora of the anti-align constraint keeping the HD off the WAP head (penult); (f) overviolates **AVOID PROM**; L—and LD—is never underparsed, *contra* (g); (h) parses L, but fails to express the L feature; (i) fails to include the antepenult head; (j) fails to express the right edge of the HD as H.

With the same rankings, it is clear in Tableau 8 (120) why there is no shift with short stems where the sponsor is on the penult (120a-c) nor where it is on the ultima (120d-f).
Tableau 8: Depressor shift failure

### siyaadlá ‘we eat’

<table>
<thead>
<tr>
<th>/ si- + -ya- + -dlá /</th>
<th>Express Edge</th>
<th>Head_H (ultima)</th>
<th>Express L</th>
<th>Max-L</th>
<th>Express H (σ)</th>
<th>Non Fin</th>
<th>Avoid Prom</th>
<th>WSA-Rt</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d) si-yaa-[(dlá)]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) si-ya-[(dlá)]</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) si-[yáá]-[(dlá)]</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(g) si-ya-[(dlá)]</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I observe that this approach (114-118) is successful in that it requires no special additional assumptions about O(D)T architecture; on the contrary, constraint conjunction has been argued for elsewhere in this dissertation, invoked in Chapter 4 §4.4 (and cf. Chapter 8 §8.1.2, §8.2.3). Furthermore, the direction of the realignment of the HD right edge still falls out of a non-processual constraint set: no constraint is required that specifically instructs the tone
grammar to expand rightwards rather than shrink leftwards. This is significant, given the impasse that other scholars have reached with reference to depressor shift and block (e.g. Cassimjee (1998:52-57); and cf. below in §7.4.3.4).

We do not need to refer to any absolute prosodic position (e.g. antepenult) as the Rt edge of the HD which needs to be shifted. This is appealing, since that Head edge does not exist ‘after’ the shift has taken place; the constraint subset in (118a) will uniquely target the correct position regardless of sponsor location.

We also do not need to do anything like invoke an output-output constraint forcing [bá-yá-yulí]asa to partially correspond in its tone pattern to non-depressed verbs of the same morphological shape and tonal profile, or to correspond to ‘at least’ a certain part of the prosodic shape that all other similar tone-words have, that is, a HD extending up to the antepenult (in the case of 112). Thus, we do not need to invoke any form of Sympathy Theory (McCarthy 1998)\(^{60}\).

7. 4. 3. 3. Heads and edges: no derivations for depressor blocking (anti-shift)

We saw in (71-89) that a HD always extends at least as far as the head position, even if that involves ‘crossing’ any number of depressor consonants to get to that position; but if that head position itself is depressed, the HD will attempt to expand by one mora (shift); we then saw in (91-109) that if the post-head syllable is also depressed, then the depressed H is trapped (that is, blocked from shifting).

The constraint set at this point cannot yet properly account for depressor block since it predicts in Tableau 9 (121a) that an overexpanded HD should be the optimal resolution to a sequence of two depressed Hs; the overexpanded candidate seems preferable to the optimal one (112b) where the head syllable violates the proper expression of the L feature.

\(^{60}\) It may seem tempting to appeal to some notion of Sympathy Theory (McCarthy 1998): a depressor shifted form seems to be being weakly faithful to a class of words whose HD extends at least to the penult (that is, the non-depressor-bearing words such as 119a-d), rather than to the antepenult. But the notion of Sympathy is so unconstrained that it is not clear it has a role to play anywhere in a phonological grammar, given that it makes no predictions at all.
(121) **Tableau 9:** Depressor blocking: wrong prediction  
'báyávigisa' ‘they cause to agree’

<table>
<thead>
<tr>
<th>/ bá- + -ya- + -yug-is-a /</th>
<th>Express Edge</th>
<th>Head_H (antepenult)</th>
<th>Max-L</th>
<th>Express L</th>
<th>Express H (σ)</th>
<th>Non Fin</th>
<th>Avoid Prom</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) [bá-yá-(vú) {gí} ]sá</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) [bá-yá-{(vú)}] {gí} sa</td>
<td></td>
<td></td>
<td>***</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) [bá-yá-{(vú)}] {gí} sa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td>*</td>
<td>**</td>
</tr>
<tr>
<td>(d) [bá-yá-{vú} {gí} ] sa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td>*</td>
<td>**</td>
</tr>
<tr>
<td>(e) [bá-yá-vú] {gí} ] sa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) [bá-yá-{(vú)} ] {gí} sa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(g) [bá-yá-{vú}] {gí} ] sa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

(121a) seems ill-formed because of a type of **NonFin** effect which should prevent the HD from extending to the ultima, but **NonFin** is too lowly ranked to have any effect (similar to how **WSA-Rt** was ranked too low in (114) to have any effect in extending a shift domain rightwards); since both depressed syllables are realised as low in the pseudo-optimal candidate (121a), there are no **Express_L** violations, which will always make such a candidate more optimal than the actually optimal (121b), where **Express_L** is violated on the head syllable (here: antepenult)\(^61\).

Similarly, (121c) must be rejected in favour of (121b), even though both candidates equally violated **Express_L**. Thus, a constraint is required which explicitly bans the presence of any LDs inside HDs, that is, which militates against the interruption of a HD by the presence of a parsed L feature. Such an antagonism was first identified with **CLASH-H/L**—then replaced by the

---

\(^61\) Importantly for a consistent interpretation, in the correct surface form (121b), the head (ýú), is regarded as violating **Express_L**, even though the surface implementation of that tone is somewhat rising, since the choice for evaluation of **Express_L** is binary: either a syllable obeys the constraint—in which case the surface realisation is low, as in the case of anticipated depression (§7.3)—or a syllable violates the constraint—in which case the surface realisation is not low, that is, is high. This contrasts with an ultima rising H syllable, where both L and H are satisfied, exceptionally.
**EXPRESS** \_L >> **EXPRESS** \_H interaction—to capture the local repelling of H from L. But this higher order effect of repelling L structure from anywhere inside a HD has not been articulated up to this point in the grammar. Yet, given the range of grounded H/L conflicts adduced in §7.2, it is quite uncontroversial that we motivate (122) to serve to minimise the structural interruption of a HD with parsed L features.

\begin{equation}
(122) \quad *L\text{-in-H} \quad *\text{[...{...}LD...]}\text{HD}
\end{equation}

Do not parse a Low Domain within the scope of a High Domain.

An equivalent observation has been made, to the same end, by Cassimjee (1998:56, 126) as ‘(...)Depressed Syllable...)\text{HD}’ [sic], clearly intended as ‘*(...)Depressed Syllable...)\text{HD}, that is: ‘no depressed syllable inside a H domain’. This constraint is presented for Xhosa as a revision of the more specific (1998:53) ‘*(Depressed Syllable, H)’, which corresponds here to **EXPRESS** \_L >> **EXPRESS** \_H.

The rankings necessary to implement successful barring of LD from within HD, but still tolerating LD interrupting HD where necessary, and never failing to parse L, are given in (123a-c). Returning to depression anticipation from §7.4, I add (123d), which serves to prevent excessive left-alignment of WSA-Lf (L), where such wide-alignment would otherwise incorrectly extend a L from beyond a HD into that HD (to be demonstrated in Tableau 10 as (124j-p).

\begin{equation}
(123) \quad \text{Anti-LD rankings}
\end{equation}

\begin{enumerate}
\item a. **Express**\_Edge >> *L\text{-in-H} \quad \text{better to express the right edge than exclude L}
\item b. Max-L >> *L\text{-in-H} \quad \text{no underparsing L to satisfy H/L domain antagonism}
\item c. Head\_H >> *L\text{-in-H} \quad \text{better to include Head position, even if L}
\item d. *L\text{-in-H} >> \text{WSA-Lf (L)} \quad \text{better to bar L from being inside HD, if it is not sponsored inside the HD}\text{\textsuperscript{62}}
\item e. *L\text{-in-H} >> **Express**\_L \quad \text{better to exclude L from within HD, rather than faithfully express any number of LDs that are found inside a HD.}
\end{enumerate}

Tableau 9 is repeated as Tableau 10, with formerly pseudo-optimal candidate (121a=124b) now adequately excluded by *L\text{-in-H}. Thus (121a=124b) now fails by virtue of violating *L\text{-in-H} twice, whereas optimal (121b=124a) does so only once. It is, thus, clear that an \textsuperscript{62} WSA-Lf (L) is inserted into the rankings here, whereas previously it was ranked only in relation to \textit{Crisp} (L) and BA-Lf (L).
important assumption for the interpretation of *L-IN-H is that violation is a gradient possibility: two\(^{63}\) instances of *L-IN-H violation in a domain are worse than one.

Tableau 10 is also amplified with a set of candidates (124g-i) containing several instances of L, repeated from §7.2.2.1: \(kúbhebhagišélaana\) \([kúbhebhagišé]\)aana ‘to help carry on the back indiscriminately for each other’, which demonstrates that the new *L-IN-H constraint can never prevent legitimate instantiations of L sponsored inside a HD from being parsed.

Finally, Tableau 10 contains depression anticipation candidates where the L sponsor lies within the HD, and then where the L sponsor lies to the right of the rightmost HD syllable (here: on the ultima, but the penult would operate in the same way). The new constraint, *L-IN-H, prevents L from illicitly extending leftwards into the stem, as indicated in (123d) above.

(124) **Tableau 10**: Tableau 9 with *L-IN-H: depressor blocking

\(báyáviga\)sa ‘they cause to agree’

<table>
<thead>
<tr>
<th>/ bá- + -ya- + -yug-is-a /</th>
<th>Express Edge</th>
<th>Head_H (antepenult)</th>
<th>Max- L</th>
<th>*L-in-H</th>
<th>Express L</th>
<th>WSA- Lf (L)</th>
<th>Express H</th>
<th>Non</th>
<th>Avoid</th>
<th>Prom</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\varphi) (a) ([bá-yá-{vú}]{gii}sa)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) ([bá-yá-{vu}]{gii}sá)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) ([bá-yá-{vu}]{gíí}sa)</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(d) ([bá-yá-vú]{gii}sa)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) ([bá-yá-{vu}]{gii}sa)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) ([bá-yá-{vu}]{gii}sa)</td>
<td></td>
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</tbody>
</table>

- optimal (a) fails to express the head as L, but does not include one too many LDs inside the HD, as (b) does, underlining the fact that each lexical LD must be counted separately; (c) attempts a version of depressor shift, but failing to achieve anything more optimal, it also has too many LDs inside its HD; (d) looks the same as optimal (a), but would be ‘optimal’ without parsing L, thus, the antepenult should not be rising; (e) is too short (Head is excluded); (f) lacks an expressed H right edge.

\(^{63}\) For successful interpretation of *L-IN-H here, there must be an assessment of violation without LD fusion; and yet, in what follows (§7.8.1.8 footnotes 199-200), I will argue that adjacent LDs must fuse, just as adjacent HDs must fuse. An attempt to resolve the interpretation problem will be made when the topic reemerges below.
**kúbhebhagi sélaana** ‘to help carry on the back for each other’

<table>
<thead>
<tr>
<th>/ ku- + -bhebh-ag-is-el-an-a /</th>
<th>Express Edge</th>
<th>Head_H (antepenult)</th>
<th>Max- L</th>
<th>*L-in-H</th>
<th>Express L</th>
<th>WSA-Lf (L)</th>
<th>Express H</th>
<th>Non</th>
<th>Avoid</th>
</tr>
</thead>
<tbody>
<tr>
<td>(g) [kú_] {bhe} [bha] [gi] sé]laana</td>
<td></td>
<td></td>
<td></td>
<td>***</td>
<td>* , ** , ***</td>
<td>***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(h) [kú-bhébhág] [sé] laana</td>
<td></td>
<td></td>
<td></td>
<td>!***</td>
<td>(*** )</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) [kú-] {bhe} [bha] [gi] selaana</td>
<td>*!</td>
<td>*</td>
<td>**</td>
<td>*</td>
<td>**</td>
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</tr>
</tbody>
</table>

- optimal (g) tolerates three *L-IN-H violations, but doesn’t underparse L, as (h) does; the H right edge in (i) is not sufficiently far rightwards, as it excludes the antepenult Head position; (i) also shows that better satisfying *L-IN-H won’t necessarily lead to surface happiness.

**kú-patalagelániisa** ‘to help pay indiscriminately for each other’

<table>
<thead>
<tr>
<th>/ ku- + -patal-ag-el-an-is-a /</th>
<th>Express Edge</th>
<th>Head_H (antepenult)</th>
<th>Max- L</th>
<th>*L-in-H</th>
<th>WSA-Lf (L)</th>
<th>Express L</th>
<th>Express H</th>
<th>Non</th>
<th>Avoid</th>
</tr>
</thead>
<tbody>
<tr>
<td>(j) [kú-] {patalag} lá] niisa</td>
<td></td>
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<td></td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(k) [kú-pátá] [læg] ] lá]niisa</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>!***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(l) [kú-pátálá] [ge] ] lá]niisa</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>!****</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(m) [kú-pátálágél] ] niisa</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- optimal (j) parses the L, and therefore extends it maximally (subject to Crisp(L), which is not included here); suboptimal (k-l) fail to extend the LD as far left as possible; (m) fails to parse it altogether.

**kúpáta]laaga** ‘to pay indiscriminately’

<table>
<thead>
<tr>
<th>/ ku- + -patal-ag-a /</th>
<th>Express Edge</th>
<th>Head_H (antepenult)</th>
<th>Max- L</th>
<th>*L-in-H</th>
<th>WSA-Lf (L)</th>
<th>Express L</th>
<th>Express H</th>
<th>Non</th>
<th>Avoid</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n) [kú-páta] ] laaga</td>
<td></td>
<td></td>
<td></td>
<td>***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(o) [kú-pátá] ] laa[] ga</td>
<td></td>
<td></td>
<td></td>
<td>!****</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(p) [kú-] ] [pata] laaga</td>
<td>*!</td>
<td></td>
<td></td>
<td>*</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
optimal (n) extends the LD only as far as the right boundary of HD; suboptimal (o) fails to extend the LD as far leftwards as the H/L [...] boundary; (p) demonstrates fatal H/L overlap.

7. 4. 3. 4. Alternative analysis: parasitic domains

I examine one proposal that appears to succeed at accounting for shifted HDs, also in an ODT architecture, though only at great cost: it departs from a crucial aspect of the framework’s basic relationship established between the parsing feature and its feature domain.

Cassimjee (1998:54-55), in an explicit attempt to avoid serial derivation, proposes to overcome the apparently ‘processual’ depressor shift problem in Xhosa (which has essentially the same properties of shift as Phuthi) not by the parsing of a second tone feature, L (with all of the implications of that strategy, including Low Domains), but by allowing a second tier of HD-structure to be built parasitically off the first domain-alignment tier. She indicates that her analysis is driven by a desire ‘to confine CON [the device that generates all possible output candidates, Prince & Smolensky (1993)] to constraints rather than procedures’ (1998:54). I strongly concur with this line of thinking, that is, that the great strength of OT is the move away from the ‘telic’ procedures that characterised generative phonology, where phonological events (such as rules) contained both start and end points, driving an input sound pattern towards a specific goal. The consensus that emerged in the early 1990s is that this type of grammatical device is far too powerful; rather, a grammar composed entirely of declarative statements of required or impossible structures is the constrained, atelic way to proceed. This would hugely simplify the class of possible behaviours that a phonological grammar needs to be capable of.

As such, statements of a processual nature, as suggested for an adequate description of shift (given in Depression Pattern 3 in (90) above, and then rejected as unencodable in an ODT grammar) are ineligible as constraint types in OT, and in ODT.

Cassimjee concedes, however, that her proposed analysis confines CON to constraints ‘by introducing a degree of serialism’ (1998:54). This comes in the form of a two-tiered H domain structure: a basic domain parsing the feature H, and a second meta-domain built off the right edge of the basic domain. That is, HD₁ is the regular domain that parses a H feature; a level of ‘HD₂’ structure then builds itself off the head of the ‘HD₁’ structure, where the head of HD₁ is the antepenult, that is, the rightmost extent of a HD under normal conditions (and assuming the
discussion is limited to antepenult-targeting paradigms such as the present indicative phrase-final paradigm). Cassimjee does not use the notion Head here, but does refer to heads in expressing only the rightmost syllable in a HD as H, e.g. she prevents Xhosa non-heads from being expressed as H by means of *(H, nonhead) (1998:31)

Cassimjee seems to intend a set of domain structure alignment constraints, parallel to the H domain alignment constraints used in that work and also here in Chapter 4 §4.4. She then seems to desire that the rightmost element in that domain be identified by a Head alignment constraint, inferred as (125).

(125) **HD\textsubscript{1} Head**

\[
\text{Align (Head}(\sigma), \text{Rt, HD}\textsubscript{1}, \text{Rt})
\]

A HD\textsubscript{1} head, then, is the starting point for a second level of domain structure: HD\textsubscript{2} (126).

(126) **Basic Alignment: parasitic HD-structure**

a. **BA-Lf (HD\textsubscript{2})**: Align (HD\textsubscript{2}, Lf, Head\textsubscript{HD\textsubscript{1}}, Lf)

b. **BA-Rt (HD\textsubscript{2})**: Align (HD\textsubscript{2}, Rt, Head\textsubscript{HD\textsubscript{1}}, Rt)

The depressor/H clash constraint(s) would then apply to this new domain, HD\textsubscript{2} (127a), stretching it wider (127b), if the head of HD\textsubscript{1} is depressed.

(127) **Schema of HD\textsubscript{1} and HD\textsubscript{2} tier relations**

a. \[
[(\sigma)]_2 \backslash\sigma\sigma\sigma\sigma(\sigma)\backslash\sigma\sigma \#\text{pWord}
\]

b. \[
[(\sigma) \sigma]_2 \backslash\sigma\sigma\sigma\sigma(\sigma)\backslash\sigma\sigma \#\text{pWord}
\]

With respect to non-depressed (antepenult) heads, HD\textsubscript{2} is redundant, serving no purpose. But with respect to a depressed head, we can infer three assumptions: (a) HD\textsubscript{2} must obey the CLASH effect (in the present work, HD\textsubscript{2} would be triggered by EXPRESS\_L), that is, a breathy

---

64 This is also the case in Digo, Jita, standard Xhosa and standard Zulu, where nonheads fail to properly express the domain-parsing feature. The expression of heads vs. nonheads is considered further in Chapter 8 §8.2.3.
syllable cannot be expressed as H on the surface; (b) HD₂ must be expressed somewhere (see earlier discussion of *MasKing and ConTraST, in §7.2.5 (37-38)); (c) there must follow a theoretical convention that conflates HD₁ and HD₂, resulting in a single HD output, perhaps much as grid theories of stress conflate lines 0-2 asterisks (Halle & Vergnaud 1987). The rankings suggested in (128) would predict the surface shapes in Tableau 11 (129), including the correct output for a word with a non-depressed antepenult (129a), and for one with a depressed antepenult (129c).

(128) HD₂ ranking
    Clash (= Express_L) >> Contrast >> BA-Lf (HD₂), BA-Rt (HD₂)

(129) Tableau 11: Parasitic HD₂ structure

*báyálímíisa* ‘they help cultivate’

<table>
<thead>
<tr>
<th>/ ba- + -ya- + -lim-is-a /</th>
<th>Clash (=Express_L)</th>
<th>Contrast (HD₂)</th>
<th>BA-Lf &amp; BA-Rt (HD₂)</th>
<th>Express_H</th>
<th>Avoid</th>
<th>WSA-Rt</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(a)</em> [bá-yá-(lí)miisa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>**</td>
</tr>
<tr>
<td><em>(b)</em> [bá-yá-(lí)mí]isa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>**</td>
</tr>
</tbody>
</table>

*báyáyúliisa* ‘they help open’

<table>
<thead>
<tr>
<th>/ ba- + -ya- + -úli-is-a /</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(c)</em> [bá-yá-(úli)]isa</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
<td>**</td>
</tr>
<tr>
<td><em>(d)</em> [bá-yá-ú]líisa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>**</td>
</tr>
<tr>
<td><em>(e)</em> [bá-yá-(yú)]tíisa</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>***</td>
</tr>
<tr>
<td><em>(f)</em> [bá-yá-(yú)]tíiisa</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>***</td>
</tr>
<tr>
<td><em>(g)</em> [bá-yá-(yú)]tíiais</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>**</td>
</tr>
</tbody>
</table>

- HD₂ structure is indicated by ‘( )’, extending the Head notation slightly.
- Gratuitously extending the HD to the penult in (b) is bad (for unclear reasons); (c) resolves Clash (here, Express_L >> Express_H) and Contrast(HD₂) by expanding to the penult; (d) fails to parse any HD₂ structure; (e) fails to contrast its HD₂ because there is no surface expression of any syllable in this HD; (f-g) contrast HD₂ but at the expense of Express_L.

It is specifically the interplay of what I am calling Express_L and ConTraST_H that force the expansion of HD₂ in (129c), so that the extension to the penult can take place, which is
crucial in the case of a depressed H antepenult. The problem, as we now turn to it, concerns what status a construct such as HD$_2$ would have in OT or ODT.

7. 4. 3. 5. Objections to parasitic domains

Among a number of objections to parasitic domains, five stand out.

First, ODT explicitly takes the realisation of a feature specification on the surface as indication of the presence of a domain which uniquely parses that feature (Cole & Kisseberth (1994, 1995a-b, 1997)). Thus, expressed H tones signal the presence of a H domain. According to the parasitic domains approach just articulated, HD$_1$ and HD$_2$ both parse aspects of the same feature H. Thus, the unique relationship between F-sponsor and F-domain is lost; apart from the undeniably tricky internal logic of depressor shift, there is no motivation for a second type of HD, since there is no second type of H-tone. This strikes me as a serious analytic impasse.

Second, and related to the first point, HD$_2$ has no sponsor in the normal sense of the word. Its left edge is premised on the location of unarticulated HD$_1$ head. This might not be as serious as it seems, since grammatical H tone domains lack sponsors in the normal (lexical) sense too. Nevertheless, H$_{\text{gram}}$ does not violate the unique [sponsor feature]:[feature domain] relationship. And HD$_2$ is not the result of a grammatical H; it is a positional ‘derivation’ built off a lexical H.

Third, HD$_1$ and HD$_2$ overlap, and intrinsically so by the way that HD$_2$ is constructed; this violates the ban on overlapping domains of the same type. To this one may respond that HD$_1$ and HD$_2$ are essentially different domain types, and therefore *OVERLAP is irrelevant. And yet they are fundamentally and inescapably triggered by the same H feature$^{65}$.

Fourth, it is not the case that the full set of alignment constraints that apply to HD$_1$ now also apply to HD$_2$. HD-MIN, for example, must explicitly not apply to HD$_2$; if it did, then one would expect a H always to right-align from the antepenult to the penult, not only when the antepenult is depressed.

$^{65}$ This overlap objection to parasitic domains loses some of its impact when it is seen in §7.7.1 below that two HDs can (and must) overlap, to satisfy expression and clash requirements. The important difference between the present (rejected) shift analysis involving parasitic domains and the overlapping HDs in §7.7.1 is that the overlap below will be seen to be motivated by independently observable demands on the tone grammar. There is no independently motivated overlap regarding shift and block domains. *OVERLAP was introduced in Chapter 3 §3.3.2.
Fifth, all of the parasitic domain structure is established by Cassimjee to achieve the crucial inclusion of the antepenult within the scope of a widely aligned lexical H tone. The second parameter—resolving the HD in a rightwards direction—fortuitously falls out of the fact that H domains never realign leftwards. There is no principled reason why HD\textsubscript{2} should resolve the depressor problem by extending rightwards, and not leftwards, or by aligning itself to the right edge of the word, and so on.

Thus, the tone shift facts can be ground out with parasitic domains, but it is not clear how theoretically tenable or how insightful this approach is. The burden of proof would remain on Cassimjee to demonstrate that such a radical innovation away from standard O(D)T theoretical machinery is truly motivated.

The account I have proposed in §7.4.3.2 and §7.4.3.3 does not encounter any of these problems. Instead, my account avoids the problems just enumerated, as follows. First, the [feature]:[feature domain] relationship remains unique; H and L domains uniquely reflect underlying H and L features. Second, each domain has a distinct sponsor: H and L domains are not ever triggered by the same sponsor. Third, there are typically\textsuperscript{66} no instances of domain overlap, where the overlap is between instantiations of the same domain (e.g. H, or L). True, HD and LD do overlap (crucially) in my analysis, but this does not violate any general notion of overlap which refers to the proper construction of domains parsed linearly by distinct instantiations of the same feature. Fourth, there is no confusion over whether constraints apply only to H, or to both H and L, since they invoke separate sets of constraints, as they are distinct featural entities. Finally, the expansion of depressor-induced shift crucially expands (as opposed to shrinks) a HD, once the inclusion of the domain head has been identified as critical. There is no further comment needed with respect to directionality: shift can only be resolved by expansion.

For these five reasons, then, the analysis proposed above in §7.4.3, is more integrated and less architecturally divergent than a parasitic domains analysis.

\textsuperscript{66} But cf. §7.7.2, where a single H sponsor can trigger what is analysed to be two distinct instantiations of a H domain right edge.
7.4.3.6. Pre-O(D)T approaches

There have been a variety of pre-ODT (and pre-OT) proposals for the behaviour of depressor-induced shift and block in southern Bantu languages such as Zulu (Cope (1966), Khumalo (1981, 1982, 1987), Lieber (1987), Laughren (1984)), Xhosa (Claughton 1992), Swati (Bradshaw 1999), and Ikalanga (Hyman & Mathangwane 1998). Except for Cope (1966:67) who explicitly rejects the possibility that depressor consonants can carry an inherent L tone, all authors cited consider that this shift phenomenon involves the insertion of a redundant L feature which is triggered postlexically by depressor consonants (or by grammatical insertion). When this L feature is inserted on a syllable already occupied by a H tone, then the ill-formed L\H configuration requires resolution; this is invariably achieved by spreading the H rightwards, and delinking it from LH, resulting in a parsable (shifted) syllable sequence of L-H. In the case of depressor block, LH-L cannot be resolved by spreading H over L (which would result in crossed association lines). The rising tone, L\H, must thus be parsed in situ.

I will not review these approaches in any detail, since none is forced to engage with the range of empirical data already seen in sections §7.2-§7.4 here (in particular, with the anticipation data in §7.3). All offer a certain structural insight into these processes; none can be readily stretched to handle the Phuthi data set; nor does any manage to unpack the shift/block/depression anticipation data in the functionally explicit ways I believe I have been able to in this chapter so far.

7.4.4. CONCLUSION

In this section, we have seen robust data sets that demonstrate the common Nguni phenomenon of depressor shift (§7.4.1) and depressor block (§7.4.2), summarised in anticipation in Tableaux 3 (67) and 4 (69). For the shift and block patterns, the data has been drawn from both lexical and grammatical paradigms, from all three relevant right-edge prosodic positions: antepenult-to-penult, penult-to-ultima and ultima-to-initial. The analysis proposed has strongly rejected derivationality (§7.4.3.1), instead proposing a Head-HD, strategy invoking a nested constraint ranking (§7.4.3.2-§7.4.3.3). Competing analyses—one within ODT, but derivational (§7.4.3.4-§7.4.3.5), others that invoke a redundant L feature (§7.4.3.6)—are firmly rejected.
We turn, in the next two sections (§7.5-7.6), to paradigm-specific patterns which incorporate grammatically triggered depression. In the two sections following that (§7.7-7.8), I turn my attention to extensions of the tone/voice interactions that are empirically unprecedented elsewhere in Nguni, to the best of my knowledge. The shift/block analysis in the present section is robustly confirmed in all data sets that follow (there will be a significant challenge to the analysis in the form of depression block triggered without breathy voicing, cf. §7.8.1).

7. 4. 5. **Constraint Summary**

I summarise the new rankings (130), and the entire tone/voice constraint set up to this point (131), with the dominance relations visually sketched in (132).

(130) **Constraint set (tone/voice), version 3: new rankings**

- **Shift rankings**
  a. Head, = (*AE, >> NonFin(π), >> HD-Min, >> AvoidProm(π), >> WSA-Rt(π), >> BA-Rt,)
     (from 114)
  b. Express_Edge >> Head_H >> Express_L >> Express_H
     (from 118)

- **Block rankings**
  a. Express_Edge >> *L-in-H
     (from 123)
  b. Max-L >> *L-in-H
     (from 123)
  c. Head_H >> *L-in-H
     (from 123)
  d. *L-in-H >> WSA-Lf (L)
     better to bar L from being inside HD, if it is not sponsored inside the HD
     (from 123)
  e. *L-in-H >> Express_L
     better to exclude L from within HD, rather than faithfully express any number of LDs that are found inside a HD.

(131) **Total constraint summary (tone/voice, partial): version 3**

- **Resolving Clash**
  a. BA-Lf (L), BA-Rt (L)
  b. Express_L >> Express_H
  c. Max-H, Max-L >> Express_L >> Express_H >> *Rise

- **Anticipating L**
  a. Crisp(L) >> WSA-Lf (L) >> BA-Lf (L)
  b. BA-Rt (L) >> WSA-Rt (L)

---

WSA-Lf (L) is inserted into the rankings here, whereas previously it was ranked only in relation to Crisp (L) and BA-Lf (L).

577
• Shift rankings
  a. $\text{Head}_x = (*\text{AE}_x >> \text{NonFin}(\pi)_x >> \text{HD-Min}_x >> \text{AvoidProm}(\pi)_x >> \text{WSA-Rt}(\pi)_x >> \text{BA-Rt}_x)$
  b. Express_Edge >> Head_H >> Express_L >> Express_H

• Block rankings
  a. Express_Edge, Max-L, Head_H >> *L-in-H >> Express_L, WSA-Lf (L)

(132) Constraint rankings (tone/voice), version 3: dominance orderings
7.5. Grammatically Invoked Lexical Depression in Noun Copulas

Nominal tonology was introduced in Chapter 5 §5.6, where it was seen that nouns demonstrate essentially the same tone behaviour as found in Phuthi verb tonology. It was shown that nouns do differ morphologically in that every (focused) noun class prefix is specified for a H tone feature. In addition, unlike verbs, nouns can support independent lexical tones on every stem syllable.

Nominal tone properties, first presented in §5.6.1, are recapitulated in (133).

(133) Tonal properties of nouns
   a. H targets the phrasal antepenult as the rightwards extent of HD-alignment, e.g. [tí-nó]nyáana ‘birds’;
   b. H on phrasal antepenult extends to the penult, e.g. [ébáá]-tfú ‘people’;
   c. H does not extend to the penult if stem boundary intervenes between antepenult & penult, e.g. [mú]-tfwaana ‘child’;
   d. H on ultima must parse, e.g. ...tii-[tfó] ‘things [non-focus]’;
   e. Every stem syllable can be lexically specified independently: ...mu-tfwaana ‘child’, ...mu-hláa[bá] ‘ground’, ...mu-[ táá]li ‘parent’, ...mu-[khoó][tí] ‘friend’.

Concerning nouns in the discussion of tone and voice, we now turn to the interaction of H tone and depression in nouns. It will be seen that nouns demonstrate tone/depression interaction identical to that found in the verb paradigms: general L/H antagonism; depressor shift from antepenult to penult; depression anticipation; depressor blocking between two depressors.

These properties can be demonstrated from any noun which contains a depressor consonant in its stem domain; most of the properties can also be observed by way of the productive morphological copula (introduced in Chapter 2 §2.2.1.7), which involves either (a) the preprefixing of a depressed consonant / syllable—for a large subset of noun classes (134); or (b) the grammatical insertion of depression alone (in my analytic terms: a L feature) on the noun prefix—for almost every noun class (135).

---

68 Depressor anticipation cannot be demonstrated with copulative prefixes, because there are no pre-depressor syllables to be depressor-anticipated, as can be seen from the data in (131). When there is the morphological option of a full segmental copula syllable (in Classes 1, 1a, 2b, 3), then that syllable is always phonologically depressed too.

69 Class 1a and 2b have no non-segmental copula; but these classes act in a grammatically distinctive or aberrant way in every Bantu language that has them. Thus, the Class 1a copula prefix (Ø-) is unsurprising, since the (non-copula) citation form lacks an overt segmental prefix.
too. Although Class 2b has a segmental non-copula citation form noun prefix ( bó-), this is in all likelihood historically a preprefix, or a contraction from another part of speech; it displays irregular behaviour in Phuthi in other ways too, e.g. the vowel -o- of bó- does not harmonise under mid-vowel ATR harmony conditions: it has a fixed [+ATR] value:

 bó-ğkèèkè *bó-ğkèèkè ‘grandmothers’, bó-nyɔoɔɔ *bó-nyɔoɔɔ ‘your mothers [taboo]’.

70 Gloss conventions: ‘(it is a) child’ indicates the non-copula citation gloss: ‘child’, and the copula citation gloss: ‘it is a child’ (this gloss ‘it is...’ is selected over ‘s/he is a child’, because there is obligatory coreference between ‘s/he’ and the head noun, here: ‘child’). For ease of comparison, all stems exemplifying the copulative here are toneless (low) and bisyllabic. The only Class 1a/2b bisyllabic (non-depressor-bearing) stem I have recorded is the one given in this table: ‘his/her mother’ (there is also ú-ňoого ‘your mother’, but it contains a depressor in the σ2 position); the word is mostly used in a taboo register (or the very familiar style, to and among children); this word is atypical for Class 1a, in that it contains a prefix vowel (which, however, makes no difference for the copulative). Almost all examples in Class 1a lack a segmental or tonal prefix, e.g. ɲtaaté ‘father’. H tone must continue to be sponsored on the segmental noun prefix (where this overt) as well as on the copula prefix: although no noun prefix commences with a breathy (depressor) consonant (so that non-shift off the depressed copula prefix (that is, depression block) cannot be tested), shift off a depressed antepenult onto a long penult should produce a falling H (that is, first mora H, second mora toneless). Instead, the penult is level H: Class 1 prefix is sponsored with UR H:

 múú-tfu ‘person’, gu-múú-tfu ‘it is a person’ (the penult parses and expresses two HDs; cf. unincorporation in §7.7.2.2).

71 In Sigxodo Phuthi, the default copula is yhi-, which can be used for any noun class, in place of the segmental copula for that class, e.g. not only gu-múú-thwaana ‘it is a child’, but also yhi-múú-thwaana (where Sigxodo thw corresponds to Mpapa tfw). This accords with the use of the same prefix as a general copulative with pronouns (see footnote 73 below).

72 ‘Citation (form)’ indicates a noun not in the copula, e.g. ‘child’, ‘children’.

73 This is the default copulative prefix (used with other parts of speech, e.g. pronouns), and also in some dialects (e.g. Sigxodo) as a productive copulative prefix with any noun class.

580
<table>
<thead>
<tr>
<th>NC#</th>
<th>Copula form</th>
<th>NC Prefix</th>
<th>Citation form</th>
<th>Copula form</th>
<th>Glosses</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>yhi-</td>
<td>mi-</td>
<td>mí-miito</td>
<td>yhi-mí-miito</td>
<td>(it is a) throat</td>
</tr>
<tr>
<td>5</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>6</td>
<td>g(e)-</td>
<td>ema-</td>
<td>émá-tiipho</td>
<td>ge-má-tiipho</td>
<td>(it is) nails</td>
</tr>
<tr>
<td>7</td>
<td>—</td>
<td>—</td>
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<td>—</td>
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<tr>
<td>9</td>
<td>yhi-</td>
<td>i-</td>
<td>í-tshaaba</td>
<td>yhi-tsháaba</td>
<td>(it is a) mountain</td>
</tr>
<tr>
<td>10</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
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(135) Phonational (depressor) copulas

<table>
<thead>
<tr>
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<th>Citation form</th>
<th>Copula form</th>
<th>Glosses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>mú-tfwáana</td>
<td>mú-tfwáana</td>
<td>(it is) person</td>
</tr>
<tr>
<td>2</td>
<td>ébá-tfwáana</td>
<td>ba-tfwáana</td>
<td>(it is) people</td>
</tr>
<tr>
<td>1a</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2b</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>3</td>
<td>mú-míito</td>
<td>mú-míito</td>
<td>(it is a) throat</td>
</tr>
<tr>
<td>4</td>
<td>mí-míito</td>
<td>mí-míito</td>
<td>(it is) throats</td>
</tr>
<tr>
<td>5</td>
<td>lí-tiipho</td>
<td>lí-tiipho</td>
<td>(it is a) nail</td>
</tr>
<tr>
<td>6</td>
<td>émá-tiipho</td>
<td>mà-tiipho</td>
<td>(it is) nails</td>
</tr>
<tr>
<td>7</td>
<td>sí-liimo</td>
<td>sí-liimo</td>
<td>(it is) year</td>
</tr>
<tr>
<td>8</td>
<td>tí-liimo</td>
<td>tí-liimo</td>
<td>(it is) years</td>
</tr>
<tr>
<td>9</td>
<td>í-tshaaba</td>
<td>yhi-tsháaba</td>
<td>(it is a) mountain</td>
</tr>
<tr>
<td>10</td>
<td>tí-tshaaba</td>
<td>tíi-tsháaba</td>
<td>(it is) mountains</td>
</tr>
<tr>
<td>14</td>
<td>búú-tfu</td>
<td>búú-tfu</td>
<td>(it is) humanity</td>
</tr>
<tr>
<td>15</td>
<td>kú-liima</td>
<td>ku-líima</td>
<td>(it is) cultivating</td>
</tr>
</tbody>
</table>
If the copula syllable structure is identical for every noun class, then Class 1a and 2b in (134) demonstrates that the copula prefix must be (a) a full syllable, and (b) tonally H in the UR, as indicated in (136a-l).

(136) **Copula prefix consists of a H syllable**

- a. ntaa[té] father, man
- b. [{gu}-n]taa[té] it is a father / man
- c. m[má] mother
- d. [{gu}-nú:]má it is mother 74
- e. [ú]-n:na his/her mother [taboo]
- f. [{gu}-n:]na it is his/her mother [taboo]
- g. [bó-ŋ]taa[té] fathers, men
- h. [{yhi}-bó-ŋ]taa[té] it is fathers / men
- i. [bó]-m[má] mothers
- j. [{yhi}-bó]-m[má] it is mothers
- k. [bó]-n:na his/her mothers [taboo]
- l. [{yhi}-bó]-n:na it is his/her mothers

The tone/depressor properties which have emerged in §7.2 to 7.4 are largely demonstrable in the copula paradigms too. Firstly, all copula examples show general L/H antagonism where the pre-prefix (134) or the prefix itself (135) is depressed and expressed L on the surface, even though H in the UR. This can be seen from the copula examples that instantiate, secondly, depressor shift from the depressed antepenult (here: depressed noun class prefix) to the long penult, which in turn becomes a falling (phrasal) H tone, as in the data above in (135). Thirdly,

74 The penult of gu-ŋmá and gu-ŋna bears a falling tone, obscured slightly by the syllabic penult representation, effectively [ʔ], in other words, -ŋmí- or -ŋni-. These examples used for Class 1a are typical, in that they have no class prefix, but only Ø-. But the example used to illustrate Class 1a in (134, 136e) is unusual; its class prefix is ú-.
depressor blocking between two depressors (prefix and first stem syllable) behaves just like the depressor block in §7.4.2, as in (137).

(137) Depressor blocking in nouns

citation copula
a. lí-dvoolo lí-dvoolo (it is) a knee
b. mú-bhíñi mú-bhíñi (it is) a singer

Finally, depression anticipation (that is, realigning a LD leftwards to the left edge of the stem) is demonstrated in (138a,d,f) vs. (138b,c,e,g) where the depressors lie outside the HD and have no realignment effect.

(138) Depression anticipation (single sponsor)

a. mú-labhonyáana little river
b. mú-laabhó river
c. mú-lájaana little river75
d. mú-tibhanyáana a little body
e. mú-tiḇha body
f. mú-tsheįnyáana little buyer
g. mú-tsheégi buyer

In (138a, d), a single H prefix sponsor appears disjunctively on the prefix—that is, on the domain preceding the noun stem—and also shifts onto the penult; stem σ1 in both cases is toneless by virtue of LD realignment leftwards (depressor anticipation). This contrasts with the unextended stems in (b, e), where the sponsor does not extend at all (because of the conjoined HD-MIN & CRISPSTEM constraint from Chapter 4 §4.3. In (138c), a second type of diminutive shows the regular HD expansion to the penult; the depressor in this example is irrelevant.

75 Nouns with a labial consonant in the final syllable often display a version of the now non-productive morphophonemic pattern called ‘palatalisation’ in the literature (cf. Chapter 2 §2.2.1.6); here: “bh > jh.”
because it lies outside the scope of the HD. Similarly in the H stem noun, (138g), the depressor lies in the ultima, and has no effect on the sponsor stem σ1; in (f), however—the diminutive of (g)—the pre-depressor (post-stem-edge) syllable is toneless (-tshe-) by virtue of LD anticipation.

7.5.1. Low Domain Minimality

Thus far we have seen that nouns manipulate depressor/H interactions in exactly the same way as verbs do in §7.3-7.4 above. We now turn to an additional property of L domains: L appears to obey minimality effects, in that the syllable following a depressor trigger also surfaces as depressed low (at least, in the prefix domain, as exemplified in (139-142): 6th-last in (139), 5th-last in (140), and 4th-last in (141); these right edge-relative positions are exemplified so that it is clear that LD-Min is indeed the correct constraint, and not some form of WSA-R† (LD) which would simply target the antepenult (as with H domains).

That is, (139a-142a) are the citation form base nouns (with diminutive suffix already attached); the (b) examples reflect what for many speakers is the standard copula form, with two depressed syllables in the prefix sequence; some speakers will also accept the otherwise predicted non-minimal LD forms in (139c-142c), under as yet slightly unclear non-default conditions.

(139) **Minimality effect from 6th-last to 5th-last syllable**76

<table>
<thead>
<tr>
<th>a. mú-tfwáná-nyaana</th>
<th>a tiny child</th>
<th>citation form (no depressed σ)77</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. {gu-mu}-tfwáná-nyaana</td>
<td>it is a tiny child</td>
<td>default copula form78: depressed post-depressor syllable79</td>
</tr>
</tbody>
</table>

76 For simplicity of exposition in these examples (139-142), HD structure is omitted.

77 Morpheme structure in this data set is as follows: mú- NOUN CLASS 1 PREFIX + -tfwáná-RIGHT + -nyaana DIMINUTIVE SUFFIX. Copulas, e.g. (139b), contain a copula prefix that is both segmental and phonational, e.g. gu-.

78 Insufficient data is as yet available to determine conclusively whether the stem boundary plays a crucial role, that is, whether it is preferable to extend a LD rightwards simply because it precedes the stem boundary (as it does here). Stem-internal data (142) does not resolve this question. But cf. Appendix A, paradigm H, template III, (46b,f), and the discussion in footnote 55 where it seems clear that the present relative depressed SP triggers LD-Min onto the following OP.

79 An alternative analysis could consider that segmental copula prefix gu- and potentially
c. {gū}-mū-tfwāna-nyaana it is a tiny child non-default copula form

(140) **Minimality effect from 5th-last to 4th-last σ**

a. mū-lá{jhāa}na little river citation form
b. {gū-mu}-lá{jhāa}na it is a little river default copula form: depressed post-depressor syllable
c. {gū}-mū-lá{jhāa}na it is a little river non-default copula form

(141) **Minimality effect from 4th-last to 3rd-last (antepenult) σ**

a. mū-tfwāana child citation form
b. {gū-mu}-tfwāana it is a child default copula form: depressed post-depressor syllable
c. {gū}-mū-tfwāana it is a child non-default copula form

(142) **Depressed stem syllable, toneless/low stem: minimality effect from 4th-last to 3rd-last σ**

a. lī-{dvo̞}lo knee underived citation form
b. {lī-dvolo}nyāana it is a little knee default (derived) citation form: depressed post-depressor syllable
c. {lī-dvọlo}lónyaana it is a little knee non-default citation form

It must be observed that the second syllable of the now extended LD is not apparently breathy: it does not have the acoustic footprint of late F2 onset and high frequency turbulence; it does, however, maintain pitch at a uniformly low level, suggesting a proposed LD analysis as follows: there is a constraint, parallel to HD-MIN (from Chapter 4 §4.2), which requires that a L feature be parsed across (at least) two syllables: LD-MIN (143)⁸⁰.

phonationally depressed Noun Class prefix mū- are both simply depressed in the lexicon (or, at least, in the output of the grammatically depressed copula morphology), hence, that these forms merely reflect the concatenation of two depressed morphemes, not the instantiation of the constraint to be proposed immediately below: LD-MIN. Such a ‘depressor sequence’ analysis is contraindicated by the (admittedly slim) data in (142).

⁸⁰ In fact, this constraint is in part dialect-, speaker- and register-dependent, and the exact
(143) **Low Domain Minimality** (LD-M\(_{\text{IN}}\))

\*\([\sigma]_{LD}\)

A L domain cannot consist of a single syllable.

LD-M\(_{\text{IN}}\) cannot, however, operate in unrestricted fashion: unlike resolving a \*L-\text{IN}-H violation, LD-M\(_{\text{IN}}\) cannot be satisfied by extending rightwards onto a penult syllable (144), nor onto an ultima (145).

(144) **LD-M\(_{\text{IN}}\): no extension to penult (or ultima)**

a. \[\text{[m}u\text{-tfwá}][a]na\] correct copula output: LD-Min is violated
b. \*\[\text{[m}u\text{-tfwa}[a][n]á]\] LD-Min incorrectly extended to penult syllable; HD expresses edge on ultima
c. \*\[\text{[m}u\text{-t[wa]}][á]na\] LD-Min incorrectly extended to first penult mora; HD expresses edge on second penult mora
d. \[\text{[g}u\text{-múú]}\text{-tfu}\] correct (segmental) copula output: LD-Min is violated
e. \*\[\text{[g}u\text{-mu}][ú][f]\] LD-Min incorrectly extended to penult syllable; HD expresses edge on ultima
f. \*\[\text{[g}u\text{-mu}][ú][f]\] LD-Min incorrectly extended to first penult mora; HD expresses edge on second penult mora

(145) **LD-M\(_{\text{IN}}\): no extension to ultima**

a. \[\text{[m}u\text{-[b}hi]i\text{-tf}][n]i\] correct output: LD-Min is violated
b. \*\[\text{[m}u\text{-[b}hi]i\text{-n}][í]\] LD-Min incorrectly extended to second mora of penult; HD expresses edge on ultima
c. \*\[\text{[m}u\text{-[b}hi]i\text{-n}][í]\] LD-Min incorrectly extended to ultima; HD expresses edge on ultima
d. \[\text{[t}i\text{-[bho]}][ó][n]i\] correct output: LD-Min is violated
e. \*\[\text{[t}i\text{-[bho]}][ó][n]i\] LD-Min incorrectly extended to second mora of penult; HD expresses edge on ultima

Sociolinguistic performance conditions are not yet well understood.
f. *...ti-[{bhooňi}]  
LD-Min incorrectly extended to ultima; HD expresses edge on ultima

- copulas in (144) are glossed: *mu-tfwáana ‘it is a child’; *gu-miútju ‘it is a person’; citation forms in (145) are glossed: *...mu-bhiŋi ‘singer’; *...ti-bhoōni ‘maize (cobs)’.

The data we have seen in (144-145) demonstrates that the ranking in (146) holds, in that the default copula and default citation forms typically expect a depressor syllable to be low, and the syllable successive to that as well.

(146)  **LD-Min rankings**

a. NonFin, AvoidProm >> LD-Min  
LD cannot extend to either the penult or ultima
b. LD-Min >> Express_H  
Minimally extended LD better than all Hs expressed

(146) presents a transitivity problem. Since we know that **EXPRESSION_H** is fairly highly ranked (constraint summaries in Chapters 4, 5, e.g. §4.5.3; §5.5.8), and **EXPRESSION_H** outranks both **NONFIN** and **AVOIDPROM**, we have the problem identified in (147).

(147)  **LD-Min transitivity problem**

**NONFIN, AVOIDPROM** >> LD-Min >> **EXPRESSION_H** >> **NONFIN, AVOIDPROM**

It seems from this that **NONFIN** and **AVOIDPROM** may need splitting into two sets of anti-edge constraints: the lower ranked set addresses the parameters of HD-construction; the higher ranked set addresses the parameters of LD construction. In other words Phuthi needs all the constraints in (148).

(148)  **NONFIN, AVOIDPROM explosion**

a. **NonFin**\_HD  
No **HD** may be parsed on the ultima.
b. **AvoidProm**\_HD  
No **HD** may be parsed on the penult.
c. **NonFin**\_LD  
No **LD** may be parsed on the ultima.
d. **AvoidProm**\_LD  
No **LD** may be parsed on the penult.

(147) is reconceived as (149), in the light of (148).
Although any constraint ‘explosion’ needs to be approached with great conservativeness, it is not clear that a way around the proliferation in (149) presents itself. There are precedents to such proliferation in the form of paradigm-specific varieties of constraints which handle grammatical H distribution in short stems: HD-MIN_{\text{SUBJUTC}}(\pi) in Chapter 6, §6.2.2.3; NONFIN (reranked in §6.3.1.2 but not ultimately exploded).

Finally, LD-MIN cannot be satisfied if a second LD follows immediately (the depression blocking effect); this is an effect of domain integrity, implemented—I suggest—by an instantiation of \text{*OVERLAP(L)}, as applied to a sequence of L features.

The optimal interaction of LD and HD in a form such as (139b) above, \text{*gu-mu}-tfwána-nyaana, is presented in Tableau 12 (151).

\footnote{These examples (150b,c) raise the question of domain overlap and domain fusion. It will be argued in §7.7.1 below that no LDs or HDs can ever overlap while maintaining structural coherence; but it will be seen in §7.8.1 below that there are clear paradigm-specific occasions where adjacent depression domains (LDs) must be argued to fuse, and perhaps more generally too. The paradox that will emerge is that even in such fused configurations, the identity of each LD must remain distinct at some level, for the purpose of \text{*L-IN-H evaluation (cf. §7.4.3.3 footnote 63; comment under Tableau 17 (203) in §7.7.2.2; fusion in §7.7.2.4; §7.8.1.7 footnote 159; §7.8.1.9 footnotes 182-183; §7.8.1.10 footnotes 199-200).}
(151) **Tableau 12: LD-M\textsubscript{IN} interactions**

**LD-M\textsubscript{IN} optimally satisfied**

*gumutf\textsubscript{w}ân\textsubscript{á}nyaana* ‘s/he is a little child’

<table>
<thead>
<tr>
<th>/ gu- + -mu- + -tfwana-nyaana /</th>
<th>Express Edge</th>
<th>NonFin (LD)</th>
<th>Avoid Prom (LD)</th>
<th>LD-M\textsubscript{IN}</th>
<th>Express_L</th>
<th>Express_H</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) {[gu-mu]-tfwaná}-nyaana</td>
<td></td>
<td></td>
<td></td>
<td>**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) {[gu-mu-tfwa]ná}-nyaana</td>
<td></td>
<td></td>
<td></td>
<td><strong>!</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) {[gu-mú]-tfwaná}-nyaana</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>(d) {[gu]-mú-tfwaná}-nyaana</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) {[gu-mu]-tfwana}-nyaana</td>
<td>*!</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td>****</td>
</tr>
</tbody>
</table>

**LD-M\textsubscript{IN} optimally violated**

*gum\textsubscript{ú}u\textsubscript{tf}u* ‘s/he is a person’

<table>
<thead>
<tr>
<th>/ gu- + -mu- + -tfu /</th>
<th>Express Edge</th>
<th>NonFin (LD)</th>
<th>Avoid Prom (LD)</th>
<th>LD-M\textsubscript{IN}</th>
<th>Express_L</th>
<th>Express_H</th>
</tr>
</thead>
<tbody>
<tr>
<td>(f) {[gu]-múú}-tfu</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>(g) {[gú]-múú}-tfu</td>
<td></td>
<td></td>
<td>*</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(h) {[gu-muu]-tfú}</td>
<td></td>
<td></td>
<td>*!</td>
<td>***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) {[gu-mu]ú}-tfu</td>
<td></td>
<td></td>
<td>*!</td>
<td>**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(j) {[gu]}-muu-tfu</td>
<td>*!</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

- Note that in (f), Avoid\textsubscript{Prom} (LD) is not violated, since the prominent penult is not being compromised to satisfy LD-M\textsubscript{IN}, even though the penult is being compromised: it is the original Avoid\textsubscript{Prom} (HD) that is being violated (not charted here).
- Other forms such as were not included: */[gú]*/-muu-tfu would fail on the Express\_L >> Express\_H violation (as well as the obvious Max-H violation);

\{[gú]-múu\}-tfu and \{[gú]-múu\}u-tfu would underexpress or underparse the lexical prefix H.
7.5.2. Conclusion

In this section, I have shown that a specific morphological configuration—the noun copula—confirms the tone/voice interactions demonstrated in the preceding sections (§7.2-§7.4), with the additional wrinkle that L domains have now been shown to mimic the properties of H domains in an additional way: they are also subject to minimality requirements (§7.5.1).

And yet the two tones continue not to have identical align properties: LD right-edge anti-align constraints (\textit{NonFin}, \textit{AvoidProm}) are ranked distinctly from the equivalent HD constraints, adding a further instance of constraint explosion to the theoretical profile of this language.

Further LD minimality instantiation is found in §7.8.1.9, where the present negative extends the LD set up by a depressed SP onto the following OP. And the effect of LD minimality is visible in the verbal paradigms at least in the present relative (Appendix A, paradigm H, template III: the discussion in footnote 55), from depressed SP onto OP.

7.5.3. Constraint Summary

I summarise the new rankings (152), and the entire tone/voice constraint set up to this point (153), with the dominance relations visually sketched in (154).

\begin{itemize}
\item (152) Constraint set (tone/voice), version 4; new rankings
\begin{itemize}
\item \textit{L Minimality}
\begin{itemize}
\item a. NonFin, AvoidProm >> LD-Min \hspace{1cm} (from 146)
\item b. LD-Min >> Express\_H \hspace{1cm} (from 146)
\item c. NonFin\(_{LD}, \text{AvoidProm}_{LD} >> LD\text{-Min} >> \text{Express}\_H >> \text{NonFin}_{HD}, \text{AvoidProm}_{HD}\) (149)
\item d. \text{*Overlap}(L) >> LD-Min \hspace{1cm} (from 150)
\end{itemize}
\end{itemize}
\end{itemize}

\begin{itemize}
\item (153) Total constraint summary (tone/voice, partial); version 4
\begin{itemize}
\item \textit{Resolving Clash}
\begin{itemize}
\item a. BA-Lf (L), BA-Rt (L)
\item b. Express\_L >> Express\_H
\item c. Max-H, Max-L >> Express\_L >> Express\_H >> *Rise
\end{itemize}
\end{itemize}
\end{itemize}

\begin{itemize}
\item \textit{Anticipating L}
\begin{itemize}
\item a. Crisp\(L\) >> WSA-Lf (L) >> BA-Lf (L)
\item b. BA-Rt (L) >> WSA-Rt (L)
\end{itemize}
\end{itemize}

\rightmargini
• **Shift rankings**
  a. Head_\_x = (*AE_\_x >> NonFin(\pi)_x >> HD-Min_\_x >> AvoidProm(\pi)_x >> WSA-Rt(\pi)_x >> BA-Rt_\_x)
  b. Express_Edge >> Head_H >> Express_L >> Express_H

• **Block rankings**
  a. Express_Edge, Max-L, Head_H >> *L-in-H >> Express_L, WSA-Lf (L)

• **L Minimality**
  a. NonFin, AvoidProm >> LD-Min
  b. LD-Min >> Express_H
  c. NonFin_{LD}, AvoidProm_{LD} >> LD-Min >> Express_H >> NonFin_{HD}, AvoidProm_{HD}
  d. *Overlap(L) >> LD-Min
     *Overlap(L), NonFin_{LD}, AvoidProm_{LD} >> LD-Min >> Express_H >> NonFin_{HD}, AvoidProm_{HD}

[turn to the next page for (154) ‘Constraint rankings (tone/voice), version 4: dominance orderings’]
It is not possible to uniquely rank all constraints, since the interactions are often explicitly ranked for just one or two other constraints, e.g. *L-∞H >> WSA-Lf(L) and EXPRESS_L; this was reflected in the ranking summaries of §7.4.5 (130-131). But WSA-Lf(L) is not uniquely ranked with reference to many other constraints. Instead of writing it floating next to EXPRESS_L, it is now offered at the right, as part of another ranking fragment. The ordering hierarchy and expository demands on an ODT constraint set inhibit ranking grammars from being explicit in any salient visual way.
7. 6. **Masked Depression and Quasi-depression: SP and OP Affixes**

This section briefly considers the role of depression—a wider, more complex, more nuanced range of depression effects than has yet been seen—in a closed set of morphological affixes: subject prefixes (SP) and object prefixes (OP). I will argue that subsets of these prefixes behave in three distinct ways: (a) as regular depressor syllables (which display the full range of depression effects), in §7.6.1; (b) as positionally masked depressors (which display the full range of depression effects, but which effects are masked in most paradigms), in §7.6.2; and (c) as quasi-depressors (which fail to surface as H, and which prevent a H being depressor-shifted onto them, as expected from depressors, but which do not manifest depressor shift or block to their right)\(^83\), in §7.6.3. The outcome of this discussion will be that SP—and particularly OP—morphemes display a startling range of variation on canonical (lexical) depression. These pronominal prefixes will be considered lexically depressed underlingly, but with paradigm-specific suspension of that depression\(^84\).

7. 6. 1. **First Person Singular SP and OP**

It is instructive to test for depressor shift in pre-antepenult, pre-stem position, to see whether depressors in such positions behave similarly to the way they do inside the stem domain. Yet there is a dearth of available pre-stem morphological candidates which contain depressors. Of the SPs and OPs, only the first person singular (1ps), \(-gi\)-, is unambiguously depressed, since it commences with a depressor consonant\(^85\). No other subject or object prefix contains a segmental depressor, as has been shown in Chapter 2 §2.2.4.1, §2.2.4.2.

Lexically, the 1ps *subject* prefix—like all non-third person subject prefixes—is toneless in the present indicative and other lexical paradigms (Chapter 4 §4.1). As such, toneless SP \(gi\)- is uninteresting. There are, however, paradigms where this prefix is H due to a grammatical tone

\(^83\) There is a fourth type of ‘extended’ depression (though unrelated to SP or OP morphemes), grammatically assigned to a particular prosodic position, e.g. penult, which (a) does display shift and block effects, (b) is not segmentally but grammatically triggered, and (c) is subject to certain OCP effects on the grammatical insertion of depression (discussed in §7.8.1).

\(^84\) There is a further consideration, to be addressed subsequently in §7.8.1 below, whether to consider all instances of what is being claimed as depression to reflect the same phonological property. The conclusion there will be that there are two distinct types: \(L_{\text{gram}}\) and \(L_{\text{lex}}\).

\(^85\) Cf. Chapter 2 §2.1.1, and this chapter §7.2, for the inventory of depressor consonants.
condition on prefixes, e.g. the past subjunctive $g\acute{a}$- (examples in §7.6.2 below); the remote past $g\acute{a}$- (§7.6.2 below; cf. Appendix A, paradigm L); the present subjunctive, $g\acute{i}$- (Chapter 6 §6.1)

Like all object prefixes, the 1ps OP is underlyingly H $g\acute{i}$- for all paradigms (though it surfaces as H itself in only a few paradigms, excluding the present indicative). Examples from the present indicative in (155) indicate that the 1ps OP behaves tonally as expected: it contributes a H to the output (155a-c, 156a-c), while not itself being expressed as H (for two reasons: OPs try always to anti-express, as argued in Chapter 5 §5.4; also, the OP is now segmentally depressed in this case). Where not blocked by a stem-initial depressor consonant (156a), the 1ps OP H depressor-shifts into the toneless stem, visible only on the penult (155a), and not visible on longer stems (155b-c). In H stems, the OP itself is H (155d, 156d) because the stem is too short to support shift (or block); the OP is toneless on the surface in (155e-g, 156e-g), not through any resolution of the H/L clash, but because the OP H domain fuses with the stem H domain (also demonstrated in §5.4). The 1ps OP thus behaves in all respects as a regular depressor syllable.

(155) **First person singular Object Prefix**

Toneless (low) stems: no stem depressors

| a. li-ya-gi-hláaba | you (pl.) stab me | 2-σ stem |
| b. li-ya-gi-líbaala | you (pl.) forget me | 3-σ stem |
| c. li-ya-gi-líbátiisa | you (pl.) delay me | 4-σ stem |

H stems: no stem depressors

| d. li-ya-gi-pha | you (pl.) give me | 1-σ stem |
| e. li-ya-gi-bóóna | you (pl.) see me | 2-σ stem |

---

86 The first two of these three prefixes can be argued to be a complex morphological sequence, where the H is not assigned to the 1ps grammatically, but to the tense/mood/aspect marker -á-, that is, they are $g\acute{i}$-á- $\Rightarrow$ $g-\acute{a}$- . There is no synchronic evidence of a segmental host for the subjunctive H tone, however. Cf. Appendix A, paradigm I.

87 First person singular OP examples with a depressor stem syllable in post-σ1 position (e.g. σ2, σ3) are provided in §7.7 below.

88 Domain structure, expositionally too distracting here, is to follow in (157-158) below.
f. li-ya-gi-bóníisa you (pl.) show me 3-σ stem

g. li-ya-gi-bóníisiisa you (pl.) see me intensively 4-σ stem

(156) **First person singular Object Prefix (depressor)**

**Toneless (low) stem: depressor in σ1**

a. li-ya-gi-bheeka you (pl.) look at me 2-σ stem

b. li-ya-gi-vuléela you (pl.) open for me 3-σ stem

c. li-ya-gi-dzakáliisa you (pl.) injure me 4-σ stem

**H stem: depressor in σ1**

d. li-ya-gi-dla you (pl.) eat me 1-σ stem

e. li-ya-gi-yhaála you (pl.) refuse me 2-σ stem

f. li-ya-gi-yhalíisa you (pl.) make me refuse 3-σ stem

g. li-ya-gi-yhalíisiisa you (pl.) refuse me intensively 4-σ stem

Depressor shift is demonstrated with domain configurations in (157a-b), depression blocking in (157c). All three are toneless (low) stems, repeated from (156) above. In (157a), shift is triggered by the depressed 1ps syllable, which is the head of the HD; in (157b), shift is triggered by the H from the 1ps OP reaching the HD head, itself the segmentally depressed antepenult; here, the OP is early enough in the word—that is, pre-antepenult—not to cause depression blocking. In (c), the OP in the antepenult is blocked from shifting to the depressed penult.

(157) **Shift and block with 1ps OP and toneless stems**

a. li-ya-[[gi]-hlá]aba you (pl.) stab me depressor shift off OP

b. li-ya-[[gi]-{vu}lé]ela you (pl.) open for me depressor shift off segmental depressor trigger head

c. li-ya-[[gī]-{bhee}ka you (pl.) look at me depressor block at OP/stem boundary
H stems, however, fuse with the HD of the preceding OP, and thus neither shift nor block can be demonstrated with this data. (158a-b)—(155e, 156e) repeated—exemplify this.

(158) No demonstrable shift and block in fused 1ps OP and H stems

a. li-ya-[{gi}-bóó]na HD-fusion precludes shift
b. li-ya-[{gi}-{yha}á]la HD-fusion precludes block

Thus, the 1ps behaves just as expected tonally of any segmentally depressed syllable.

7. 6. 2. Masked Depression: Non-Third Person SP

Some Nguni language researchers—Rycroft (1980b, 1983), Cassimjee (1998), Jokweni (1995)—have claimed that non-third person (hence: non-3p) subject prefixes in Nguni languages act as depressors: not only is the 1ps depressed (by virtue of its depressor onset consonant: Xhosa nd-, Zulu/Swati n(g)-; now also Phuthi g-), but the remaining non-3p prefixes are also grammatically depressed. Rycroft (1983:98-99), for example, analyses the non-3p prefixes as depressed for the closely related Nguni language, Zimbabwean Ndebele. He claims the same status for Swati non-3p prefixes (1980b:7,11). I name this depressed state ‘masked depression’, because, largely, the phonological (as opposed to phonetic) depressor status of these prefixes is typically masked.

We have already seen one example of grammatically triggered depression, in the form of the depressor copula, achieved by inserting a depression feature (that is, L tone) on the noun prefix (in §7.5 above). Non-3p SP depression in the present discussion would be a second form of grammatical depression\(^{89}\).

Phuthi non-3p SPSs (besides the segmentally depressed 1ps gi-) are: 2ps u-, 1pp si-, 2pp li-). These morphemes typically surface toneless in Phuthi; up to now, they have been regarded as tonally inert\(^{90}\). In the paradigms where these prefixes are toneless on the surface,

\(^{89}\) There are, in fact, several instantiations of grammatically triggered and lexical depression, summarised below in §7.8.2.

\(^{90}\) These non-3ps SPSs are possibly phonetically low (that is, lower than toneless). No systematic study has been performed for Phuthi yet, but the phonetic degree of pitch lowering on its own is an insufficient criterion for phonological L-ness. From a phonetic standpoint, the
there is no H which can appear on such a SP, by definition; there is also no pre-SP sponsor syllable that could trigger H spread onto the SP (which would then allow depressor shift to be manifest off the SP and onto a following syllable), since no prefix can precede a SP in a lexical tone paradigm. So, the claim to L status for these non-3p SPs appears to be untestable.

There is, however, a cross-paradigm source of potential phonological comparison: in certain grammatical tone paradigms, such as the present participial or the remote past, there is a grammatical requirement that all SPs be H. This morphological environment could—and does—pose a test case for the depressor status of non-3p SPs, since we would expect a depressed H prefix syllable to display shift / block properties.

The data presents conflicting information on depression, however. In the present participial (treated in §6.2.1.1), not only are the 3p participial prefixes H (159e-f, k-l below), but the non-3p SPs are all H too (159a-d, g-j). And the non-3p SPs are clearly (audibly and instrumentally) not depressed (159b-d, h-j), except—predictably—for the segmentally depressed 1ps (159a, g). So, the masked depression hypothesis is not born out for this paradigm.

**Present participial**

(159) **Non-3p vs. 3p SPs: Toneless (L), H stems**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>gí-liíma</td>
<td>...me cultivating 1ps</td>
</tr>
<tr>
<td>b.</td>
<td>sí-liíma</td>
<td>...us cultivating 1pp *sí-liíma</td>
</tr>
<tr>
<td>c.</td>
<td>ú-liíma</td>
<td>...you cultivating 2ps *u-liíma</td>
</tr>
<tr>
<td>d.</td>
<td>lí-liíma</td>
<td>...you (pl.) cultivating 2pp *lí-liíma</td>
</tr>
<tr>
<td>e.</td>
<td>ká-liíma</td>
<td>...him/her cultivating 3ps *ká-liíma</td>
</tr>
<tr>
<td>f.</td>
<td>bá-liíma</td>
<td>...them cultivating 3pp *ba-liíma</td>
</tr>
<tr>
<td>g.</td>
<td>gí-bóóna</td>
<td>...them seeing 1ps</td>
</tr>
<tr>
<td>h.</td>
<td>sí-bóóna</td>
<td>...them seeing 1pp *sí-bóóna</td>
</tr>
<tr>
<td>i.</td>
<td>ú-bóóna</td>
<td>...them seeing 2ps *u-bóóna</td>
</tr>
<tr>
<td>j.</td>
<td>lí-bóóna</td>
<td>...you (pl.) seeing 2pp lí-bóóna</td>
</tr>
<tr>
<td>k.</td>
<td>ká-bóóna</td>
<td>...him/her seeing 3ps ka-bóóna</td>
</tr>
<tr>
<td>l.</td>
<td>bá-bóóna</td>
<td>...them seeing 3pp ba-bóóna</td>
</tr>
</tbody>
</table>

Phuthi data remains insufficiently closely examined. Until this occurs, the assumption could fall conservatively towards claiming that non-3p SPs are straightforwardly toneless.
In the remote past, by contrast, all SPs are tonally H (160a-l), and, in addition, non-3p SPs—that is: 1ps, 1pp, 2ps, 2pp—are depressed (160a-d, g-j); they also display depressor block characteristics, in that these prefixes fail to shift their audibly depressed H onto the immediately following (depressed)\(^91\) penult of the toneless (160a-f) or H (160g-l) verb stem.

**Remote past**

(160) Non-3p SPs (depressed)\(^92\) vs. 3p SPs (not depressed): toneless (L) vs. H stems\(^93\)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>I cultivated</td>
<td>1ps</td>
</tr>
<tr>
<td>b.</td>
<td>we cultivated</td>
<td>1pp</td>
</tr>
</tbody>
</table>

\(^91\) The role of depression in paradigms such as the remote past tense stem is difficult to resolve; this is dealt in a fuller way with respect to the present negative, in §7.8.1. It seems to be that toneless/low stems can support depression—whether actually breathy voicing or not is not clear—on the penult, salient only in these short 2-σ stems. In the remote past (different to all other paradigms in the language), there is downstep at the prefix+stem boundary, which cannot be explained merely by inserting a L in the toneless (low) stem. Even the H stems (160g-l) block (abstract) tone shift across the stem boundary: a depressed H prefix remains H. The opacity to tone shift reflects a prefix+stem prosodic juncture anomaly widely recognised for remote past paradigms in Nguni languages, that is, where there is a morphologically long vowel (not necessarily in penult position (Doke 1954:108); the remote past tense is likely a contracted form, arising from (auxiliary + main stem).

\(^92\) The details of how depression is realised on the surface are not entirely resolved: the grammatically depressed SPs here are clearly breathy voiced, and this appears to extend to their preceding onset sonorant consonants \(w-\), \(l-\), but not clearly to the non-sonorant \(s-\) (it is not clear that \([s]\) is a meaningful representation, outside a Ní Chiosáin & Padgett-esque (1997, 2001) model of strictly local harmony, which tolerates consonants with articulatorily vowel harmonic settings). Because depression is triggered here on the subject prefix as a whole (though likely triggered on the nucleus, since the depressability of the onset is not relevant in assigning depressed status), I indicate depression (breathy voice) only on the depressable consonants, thus excluding \(s-\) (as earlier for the copulative in §7.5 where no depression was indicated on Class 7 \(s-\), 8,10 \(t-\), class 15 \(k-\)). Nothing hinges on this particular representational choice. But the fact that \(s(i)-a-\) is included in the set of depressed SPs for this paradigm allows us—crucially—to distinguish between two distinct depression strategies that Phuthi paradigms invoke: (a) toneless morpheme depressor attraction; and (b) sonorant attraction, where all sonorant-initial prefixes—corresponding nearly exactly to the set of prefixes from the traditional Bantu weak noun classes (1, 1a, 3, 4, 6, 9)—attract depression, such as occurs in the past subjunctive (further discussion in §7.8.2).

\(^93\) The recent past tense/aspect, formed with fixed prefix vowel \(-e-\) —cf. Chapter 2 §2.2.4.7 (116f)—has precisely the same tone properties as the remote past paradigm: H SP (which is depressed in non-3p forms); stem σ1 is reserved for lexical tone; stem grammatical H tone extends to ultima. Swati (Nguni: Tekela) has the same distribution of prefixes and tones as in
7. 6. 2. 1. Unified analysis: toneless morphemes are Low

For toneless/low stems, the explanation offered is that the stems themselves are
depressed, that is, have a depression property (L) associated with them. In the case of the
paradigm just discussed (remote past), and in others to come (present negative, cf. §7.8.1), the
toneless/low stem depression (L) is manifest on the penult (for the data in (160), the penult
happens to be the stem-initial syllable). An independent principle in §7.8.2 will target the penult
as a prosodically ‘salient’, that is, as the likely position for the depression property (L) to reveal
itself.

An explanation for non-shift in the case of H stems—(160g-l), modelled in (162c,d)—is
more difficult to provide, given that these H stems do not appear to be depressed in any way
(further instrumental work is called for, in the case of the remote past paradigm). We can note as
plausibly causal in the case of this unexpected shift failure (160g-l) that the remote past tense

Phuthi: 1ps, 1pp, 2ps, 2pp are all depressed; 3ps and 3pp are not depressed, e.g. from the remote
past: sá-liimá, ‘we ploughed’; vs. sá-liimá ‘s/he [class 7] ploughed’; wá-bóona ‘you saw’,
wá-bóona ‘s/he saw’ (Rycroft 1980b:7,14). Given that Swati is the most closely related language
to Phuthi (cf. Chapter 1 §1.1.7), it is not surprising that even such apparently low level prosodic
properties are shared with Phuthi.
prefix syllable, for both toneless/low and H stems, is audibly lengthened. In line with other Nguni languages, these lengthened prefixes are analysed as phonologically long\textsuperscript{94}. It seems that phonological length inhibits depressor shift\textsuperscript{95}. This accords with our expectation that shift would fail here, because the first mora of the lengthened vowel satisfactorily parses depression (L), and the second mora can be reserved for H-ness (160a-f and 160g-l).

For toneless/low prefixes (non-3p), by comparing the behaviour of non-3p SPs in the remote past, above, with that of lexical paradigms (e.g. present indicative, perfective indicative, as seen in Chapters 4-5), we are able to unify the underlying representation of ‘toneless’ SPs if we analyse these non-3p SPs as invariably depressed: their lexical representation includes a L tone (161a-d). (161a) is uninteresting, given its predictable segmentally triggered depression. But (161b-d) are departures from what is typically considered to be lexical tonelessness. The three columns reflect the underlying form, and the surface forms with domain structure, first where there is no H requirement on non-3p subject prefixes, then where there is such a H condition.

[turn to the next page for (161) ‘Non-3p subject prefixes are L, not toneless’]

\textsuperscript{94} See footnote 91, concerning remote past \texttt{<prefix><stem>} juncture anomaly. If the observation here about prefix vowel length is correct, then such an observation clearly violates my earlier statement (in Chapter 4 §4.1) to the effect that the only prosodic position for syllable length is the phrase penult: in this instance of the remote past paradigm, the lengthening site is a word-\textit{internal} syllable. The generalisation made earlier does remain true, however: non-penult lengthened syllables—such as found here in the remote past tense—are extremely rare in Nguni, outside of the ideophone lexicon (ideophones frequently bear extra-systemic phonological properties, such as lengthening, ultra-H pitch, extraneous phonemes, \textit{in any position}, cf. Doke (1954:43-44), Cassimjee & Kisseberth (1999)).

\textsuperscript{95} This is analogous to other phonological effects, such as vowel syncope, which fail in the case of long vowels; long vowels appear to be prosodically ‘strong’ (David Odden, Jennifer Cole, lecture notes, Seminar on Grounded Phonology, Fall 1993).
(161) Non-3p subject prefixes are L, not toneless
underlying                              surface: toneless                              surface: H
a. 1ps  gi-                             {gi}-                                            [[{gí}]-
     L
b. 2ps  u-                             {u}-                                            [[{ú}]-
     L
c. 1pp  si-                             {si}-                                            [[{sí}]-
     L
d. 2pp  li-                             {li}-                                            [[{li}]-
     L

In the general case, then, this depression is masked, because no H needs to try to surface on the non-3p prefixes (1ps, 1pp, 2ps, 2pp). But where these prefixes arise in grammatical paradigms which do require prefixal H (e.g. remote past), the depressor nature of these SPs becomes clear\textsuperscript{96}.

Where the remote past prefix syllable is depressed, I include only the first mora inside the LD; the second mora realises the H of the HD (exactly as happens under conditions where the rightmost syllable in a HD is the long phrasal penult). The depressor block pattern from the minimal pair (2ps, 3ps) is illustrated, with full domain configuration, for toneless/low stems (162a,b), and for H stems, too (162c,d).

(162) Configuring LD on a 2ps (vs. 3ps) subject prefix
a. [{wa}á]-[lii][má]                    you cultivated                                    2ps
b. [wáá]-[lii][má]                     s/he cultivated                                  3ps
c. [{wa}á]-[bóo][ná]                    you saw                                          2ps
d. [wáá]-[bóo][ná]                     s/he saw                                        3ps

\textsuperscript{96} Even with this claim, there is a problem: there is at least one paradigm—the present participial, cf. Chapter 6 §6.2—which requires grammatically H SPs, but does not display depression on non-3p prefixes (except the lexically depressed (breathy) 1ps). See discussion that follows, and the anti-parse constraint proposed in (163).
The elegance of this account is analytically fruitful: (a) all lexical stems now have a tone specification, H or L, thus removing the asymmetry of H vs. toneless; (b) all non-3p prefixes (not only the consonantally triggered 1ps) are now uniformly lexically L (not H), whatever the particular paradigm they occur in; (c) the link between toneless and Low requires no explanation: Low stems would in some instances simply have their L-ness suspended, and would remain toneless.

Assuming non-3p SPs are in fact underlyingly L, then in the case of grammatical paradigms where the prefix is H but not depressed (e.g. present participial, in 159), that is, not Low, we need to invoke a paradigm-specific anti-parse constraint (163) suppressing the lexical depressor status of the non-3p prefixes, with the cophonological ranking in (164b). This is the first occasion in Phuthi that we would encounter the underparsing of lexical L (and specifically a SP L tone). Data from the present indicative and present participial exemplify (165a-b).

(163)  
*Max-L (π)  
Do not parse L, subject to paradigm π-specific conditions (e.g. π = present participial).

(164)  Suppressing depression in non-3p prefixes  
a. Max-L >> *Max-L (π)  
general L ranking for non-3p SPs (including remote past: 165a-b, c-d)  
b. *Max-L >> Max-L (π)  
paradigm-specific L ranking (e.g. participial: 165e-f)

(165)  Masked vs. unmasked vs. underparsed SP depression: 2ps vs. 3ps  
Present indicative (masked depression)  
a. {ʊ}yaliima ~ {ʊya}liima  
you cultivate  
2ps  
b. [ʊyá]liima  
s/he cultivates  
3ps  
Remote past (unmasked depression)  
c. [{wa}á]-{lii} [má]  
you cultivated  
2ps  
d. [wáá]-{lii} [má]  
s/he cultivated  
3ps  
Present participial (underparsed depression)  
e. [ú]-liima  
you cultivating  
2ps  
f. [ká]-liima  
him/her cultivating  
3ps
Although this reanalysis of non-3p SPs as depressed means that in all preceding data the non-3p SPs can be rewritten as depressed (that is, underlying L), there are no immediate analytic consequences for this, given the generally masked status of the depression.

It remains to be seen how \(^\text{\#Max-L} (\pi)\) would apply in the event that it targets only specific morphemes; so far, the SP\(^\text{97}\) would be a candidate for underparsing of L in any paradigms where there is a grammatical H assigned to the prefix, and yet no sign of L-ness (that is, also no sign of depression); so far, only the present participial is a sure candidate for this anti-parse constraint.

In many lexical paradigms, the status of ‘toneless’ stems as toneless or as Low is typically phonologically indeterminate, if depression were to be grammatically manifestable only on the penult syllable (cf. discussion of the present negative in §7.8.1, where toneless stems are argued to unambiguously display a L in bisyllabic toneless/low stems, and in all longer toneless/low stems by hypothesis); this is so, since phrase-final widescope H alignment usually does not extend beyond the antepenult for lexical paradigms (grammatical paradigms would be expected to show depression effects more readily, since their right target is frequently the penult or ultima).

There are three ways to assess the putative toneless vs. Low settings for all toneless/low stems: (a) if the Head position (widescope right-align limit) is the antepenult, we expect the penult-ultima sequence to manifest a gradual intonational descent from high(ér)ness to lowness, in which case we may argue that there is no stem depression (since depression demands near-immediate pitch adjustment to low); (b) in paradigms where a H does reach\(^\text{98}\) a grammatically depressed penult, we expect shift effects off that depressed penult onto the ultima; (c) in all items where the antepenult head is depressed, we expect depressor block (pitch rise) between the lexically L antepenult, and the grammatical L penult (triggered by the lexical item itself, if it belongs to the toneless/low class). But unfortunately, in the light of the present negative paradigm data in §7.8.1 to follow, we will not be able to use any of these tests as a diagnostic for what I will claim is a grammatical L domain: L\(^\text{\text{gram}}\).

\(^97\) We will see in the following section (§7.6.3) that the OP, too, can be depressed, and will need paradigm-specific underexpressing.

\(^98\) A verb H tone could reach the penult in either a lexical or a grammatical paradigm (though more commonly in grammatical); phrase-final penults are never H for toneless/low stems in Phuthi lexical paradigms.
In all paradigms where the penult of a toneless stem is clearly not depressed (not L), we would need to assume that the *MAX-L (π) constraint needs invoking (e.g. participial present tense, phrase-medial (short) present indicative). This, then, is the likely status of so called ‘toneless’ stems and prefixes (perhaps all affixes) in Phuthi: they are grammatically L in the underlying representation (L^GRAM, to anticipate the claims in §7.8.1).

Having noted the elegance of reanalysing the High vs. toneless lexical stem contrast as High vs. Low (with paradigm-specific suspension of the Low feature), I continue for expositional clarity and consistency to refer in the remainder of this dissertation to the stem contrast as the traditional High vs. toneless. The matter is resumed briefly in §7.8.1.10, in the discussion of present negatives.

I note, crucially, that the underlying status of OPs is not called into question by the toneless-is-Low claim made in this section: OPs are demonstrably underlyingly H (and not L), as will be confirmed in the discussion in §7.6.3.

7.6.2.2 Alternatives: Low enhances toneless stems and affixes

An analysis with the opposite specifications is also possible: non-3p SPs are underlyingly toneless; but under certain paradigm-specific conditions they attract lexical depression; in that case, under different paradigm-specific conditions (such as the participial) this depression attraction would simply fail.

But aspects of the toneless/Low association would remain unexplained, even paradoxical, under this alternative approach: (a) why is lexical depression attracted to toneless SPs in certain paradigms where SPs surface H (e.g. remote past), and to stem penults in paradigms where there is a (grammatical) H on the penult (e.g. remote past, present negative)? (b) why is there any

---

99 The suppression of L would apply to these phrase-medial forms in Mpapa (where H reaches the penult, cf. Chapter 4 §4.5.1). In Sigxodo, phrase-medial lexical Hs do not reach beyond the antepenult (§4.5.1).

100 It would also remain unexplained why in other paradigms (e.g. present participial) the toneless/Low SPs and toneless/Low stems fail to attract depression. But this is not necessarily a weakness; under either approach, there will be a set of paradigms simply stipulated (marked in the lexicon) as manifesting their toneless/low SPs and/or toneless/low stems as depressed (L), or not. The basis for the toneless/Low association is clearly finessed according to paradigm, without there (yet) being any clear pattern for why certain paradigms exploit this association, and others do not.
kind of phonological enhancement between tonal depression (L) and tonelessness at all, given that the two constitute distinct tone settings, and given that there is no *a priori* reason why L should enhance tonelessness (that is, the complete absence of tone)? The theoretical means for implementing such an ‘enhancement’ is not self-evident: a distinction would need to be made between, for example, a SP occurring as surface-H in some paradigms (e.g. remote past, past subjunctive), and its being faithful to its occurrence in (most) other paradigms as toneless/low. Thus, there would need to be cross-paradigm references (perhaps achievable through a paradigm uniformity effect).

On the other hand, this alternative strategy would not entail claiming a lexical tone property (L) for toneless prefixes and stems, which L property is hardly ever *directly* attested (though see §7.6.3 below for a similar situation with regard to the general absence of H tone from (surface-toneless, but UR-H) object prefixes). Such a more surface-true set of lexical items could constitute an advantage through economy of representation (if economy still constitutes analytic advantage). Given the reasons above that seem to speak against a toneless-attracts-L strategy, I propose that all toneless morphemes in Phuthi, including stems and affixes (such as the SP), are underlyingly L. (Later, in §7.8.1, it will be shown that L_{lex} and L_{gram} do not have the same properties; cf. footnote 102; demonstrable surface non-L-ness is achieved through underparsing lexical L. But for reasons of expository clarity and consistency, I continue in all sections that follow to name and configure L morphemes as toneless morphemes).

7.6.3. Quasi-Depression: Reevaluating Anti-Expression

In Chapter 5 §5.4, it was seen that the object prefix (OP) introduces a H tone into a representation, but *optimally* fails to surface as H itself, restricting H expression to all post-OP syllables in the OP-triggered HD. Analytically cornered, I proposed a ‘morpho-phonetic’ constraint in §5.4 to force the antiexpression of H *just on the OP*: *EXPRESS_*(OP, H), or simply *EXPRESS_OP.

We will see in what follows, however, that the OP data is inconsistent, on the one hand suggesting that OPs are not generally depressed (§7.6.3.1), but on the other indicating that OPs in some paradigms do behave as if they are depressed (§7.6.3.2). We are forced in this section to admit the existence in the grammar a class of morpheme, the OP, that selects in a very
paradigm-specific way different aspects of depression that it will manifest. I will conclude that the OP is not lexically depressed in the UR; rather, OP depression is invoked paradigm-specifically.

7.6.3.1. No general OP depression

As observed earlier in Chapter 5 §5.4.1.4, if the OP is considered to be generally lexically L (at least in the present indicative phrase-final (long) form), then the OP should display salient shift and block effects (166b-c, 167b-c), here, from antepenult to penult, which effects it does not manifest. Rather, it does so only for the segmentally depressed 1ps (166a, 167a) where the predicted shift/block forms coincide with what does in fact occur.

(166) **No depressor shift off non-1ps OP**

<table>
<thead>
<tr>
<th>actual surface form</th>
<th>predicted shift form</th>
<th>example</th>
</tr>
</thead>
<tbody>
<tr>
<td>{l̓i} -ya-[{g̊i}]-hláaba</td>
<td>{l̓i} -ya-[{g̊i}]-hláaba</td>
<td>you (pl.) stab me</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>b. {l̓i} -ya-[ťi]-hlaaba</td>
<td>*{l̓i} -ya-[{t̊i}]-hláaba</td>
<td>you (pl.) stab them</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>c. {l̓i} -ya-[b̊a]-hlaaba</td>
<td>*{l̓i} -ya-[{ba}]-hláaba</td>
<td>you (pl.) stab them</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>

(167) **No depressor block off non-1ps OP**

<table>
<thead>
<tr>
<th>actual surface form</th>
<th>predicted block form</th>
<th>example</th>
</tr>
</thead>
<tbody>
<tr>
<td>{l̓i} -ya-[{g̊i}]-{bheék}ka</td>
<td>{l̓i} -ya-[{g̊i}]-{bheék}ka</td>
<td>you (pl.) stare at me</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>b. {l̓i} -ya-[ťi]-{bheék}ka</td>
<td>*{l̓i} -ya-[{t̊i}]-{bheék}ka</td>
<td>you (pl.) stare at them</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>c. {l̓i} -ya-[b̊a]-{bheék}ka</td>
<td>*{l̓i} -ya-[{ba}]-{bheék}ka</td>
<td>you (pl.) stare at them</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>

The non-occurring depressor block forms in (167b-c) differ only from the well-formed candidates in that they contain depressed OPs (_PKT̊i_, _-PKb̊a_), whereas on the surface these non-1ps OPs are not apparently depressed, that is, if we assume (as I do) that lexical depression always reflects some form of breathy voicing.\(^{102}\)

---

\(^{101}\) The OPs used here are Class 2 -b̊a- ‘them’ (human), Class 10 -ťi- ‘them’ (usually non-human, even inanimate ‘them’), and Class 14 -b̊u- ‘it’ (to refer to the default object noun for this verb, b̊u-nya ‘excrement’).

\(^{102}\) We do not in fact need to assume *a priori* that depression uniquely reflects breathy
Similarly, in monosyllabic stems where the OP surfaces as H (e.g. *si-ya-[búú]-nya* ‘we excrete it’, *si-ya-[báá-pha]*, ‘we give them’), this OP H is not a rising H tone; therefore, it is not depressed (and is certainly not breathy voiced). To complicate matters further, in other paradigms—including the present indicative phrase-medial (short) form, cf. Appendix A, paradigm C (16)—the non-1ps OP universally expresses surface-H, that is, failing to lower even in longer stems.

But in all longer toneless (low) stems and in all H stems in the present indicative long form, I have posited that the OP morpheme is consistently underlyingly H, but surface-low (168). One possibility for these non-short stems is that the OP is indeed depressed in every instance, as suggested in (168).

(168) **Positing OP as L in all other stems**

a. *si-ya-[{ba}]-límiisa* we help them cultivate  
b. *si-ya-[{ba}]-libátiisa* we delay them  
c. *si-ya-[{ba}]-libát[si]isa* we delay them intensively  
d. *si-ya-[{ba}]-bóó]na* we see them  
e. *si-ya-[{ba}]-bóníf]sa* we show them  
f. *si-ya-[{ba}]-sébé]tiisa* we use them  
g. *si-ya-[{ba}]-hlóníphü]l* we are disrespectful to them

But we cannot maintain such a depressed OP proposal in the face of the annoying and persistent presence of not only the short 2-σ forms above (166-167), and similarly the 1-σ stems, but also OPs in all other paradigms where it is clear that (non-1ps) OPs are not only underlyingly voicing, nor that depression is triggered exclusively by segmental breathiness. If we suspend this assumption, however, a considerable problem arises concerning what exactly the nature of depression is. The analysis of depression in this work involves categorial tone lowering (I reflect elsewhere how depression is distinct from downstep, cf. §7.9, and Chapter 8 §8.1.4, §8.3.10). All other things being equal, I continue to assume that depression *does* involve identifiably low (in the default case: breathy) properties, as identified in §7.2 above: (a) H tones realised on depressed syllables are rapidly rising; (b) a non-H depressed syllable is lower than toneless; (c) given the right prosodic environment, H on a depressed syllable is shifted to the right, or blocked from shifting by a following depressor. I have, however, already acknowledged the analytic role of tonal (non-breathy?) depression in the form of widescope leftward depressor anticipation (examined at some length in §7.3). Lexical depression always involves breathy voice, *contra* grammatical depression (to be seen in §7.8.1), which is independent of segmentally or grammatically triggered lexical depression, and does not involve breathy voice. (Chapter 8 §8.3.10 concludes the discussion on the relationship between breathy voicing and depression).
H, but are also not depressed on the surface; in fact, they express as consistently surface-H! Thus the uneasy linking of phonological H expression and morphology in the form of the anti-parse constraint, *EXPRESS_ (OP, H), as proposed for phrase-final (long) lexical paradigms in Chapter 5 §5.4 must remain, no matter how phonetically ungrounded it may appear. Given the failure to display shift and block effects (166-167) and the absence of audible depression (as a rising H) in monosyllabic stems, and the OP information from other paradigms, we cannot straightforwardly maintain that the OP is generally depressed or L in the same sense that all preceding L data in this chapter has been seen to behave.

Thus, there are two reasons for rejecting general OP depression: first, it would be a very marked, theoretically inelegant constraint indeed that required OPs to be depressed but where the realisation of that depression was contingent on the prosodic length of the lexical stem (‘only in stems longer than two syllables’); second, even if we were to maintain general OP depression, it is not clear how depression could be suspended in paradigms such as the present indicative on all OPs except the segmentally-triggered depression of the 1ps -gi-.

There is further OP data in the following section which seems to make the choice for non-depressed OPs much harder to maintain, but which will not ultimately alter the conclusion reached here: to opt for OPs as underlyingly non-depressed (and to maintain the anti-expression constraint proposed in Chapter 5 §5.4).

7.6.3.2. OP quasi-depression: shift resisted; shift not triggered

There are grammatical tone paradigms such as the past subjunctive where the OP acts as though it were depressed. It will be seen, however, that this effect is achieved not by lexical depression of the OP, but by the effect of LD-MIN, minimally requiring a sequence of two syllables within a single morphological domain to be depressed.

The past subjunctive has a grammatical tone pattern like the present participial (Chapter 6, §6.2.1.1): the SP is always H; the stem retains its lexical status as toneless or H. In addition, the past subjunctive SP is invariably depressed (169), as reflected by successful depressor shift.

The paradigm name ‘past subjunctive’ is traditional among Southern Bantu scholars, but is somewhat opaque: the paradigm is typically used as a consecutive form, in sequence with specific auxiliaries, such as Phuthi -se (SPγ-se SPγ-X ‘Has Y ever X-ed?’), or in series with other main verbs: ...SPγ-X ‘...and Y X-ed’. Also cf. Chapter 2 §2.2.4.9.

The past subjunctive, in fact, has two sets of possible realisations, one where all SPs are
in (169a-d, e-h), unambiguously demonstrable only in (169b), though breathy phonation is audible throughout the SPs.

(169) Past subjunctive: successful shift into stem

Toneless (low) stems
a. ... baá-nya
   {[baá]}-nya ...and they excreted
b. ... ba-liíma
   {[ba]}-lííima ...and they cultivated
c. ... ba-líbaala
   {[ba]-lí]baala ...and they forgot
d. ... ba-líbátiisa
   {[ba]-líbá]tiisa ...and they delayed

H stems
e. ... bá-a-khá
   {[bá-a-khá]} ...and they drew (water)\[^{105}\]
f. ... ba-bóóna
   {[ba]-bóó]na ...and they saw
g. ... ba-bóníísa
   {[ba]-bóníí]sa ...and they showed
h. ... ba-khúlúmiisa
   {[ba]-khúlú]miisa ...and they helped speak

In this past subjunctive paradigm, OPs refuse to accept a depressed H shifted off the SP into the OP syllable. Up to now, a Phuthi syllable has blocked a H being shifted onto it from its depressed (as the data reflects here); another where third person (3p) SPs are not depressed (not illustrated here, but cf. Appendix A, paradigm N). In this second possible realisation, non-3p SPs (e.g. 2ps) are still obligatorily depressed, e.g. 2ps wá-, *wá- vs. 3ps wá- ~ wá-. In this second realisation, the OP consistently fails to fuse its H with that of a preceding H SP as indicated by a downstep, even in positions where downstep should not otherwise occur, that is, earlier in the word that the antepenult-penult boundary: e.g. wá-’bá-hlaaba ‘sh/they stabbed them’, wá-’bá-bóóna ‘s/he saw them’. One may argue that this downstep is the residue of a depression effect on the OP domain. Alternatively, it could be that Phuthi requires there to be a Register Domain boundary between SP and OP. For further discussion of Register Domains and depression, see §7.9.

\[^{105}\] This is the first time we have seen a depressed falling H, that is, a required sequence of LHL across the penult, because the ultima is also H, but where the penult is depressed at the same time. This rising-falling tone shape was indicated in Chapter 2 §2.1.1 (3d). The H/L CLASH conflict is thus not resolved across such penults, contra the case of non-depressed H penults where the two features can be phased as LH; rather, the tones present across the two syllables in (169e) are: LHØ-H (where ‘-’ separates the syllables).
left, *only* if the would-be recipient syllable is depressed. There are now two analytic escapes: (a) we can conclude that in paradigms such as the past subjunctive shift is once again being blocked by depression, that is, by a depressed OP; or (b) we need to stipulate that the SP-OP boundary is opaque to shift in this paradigm (I will end up adopting this second strategy).

Pursuing strategy (a) first, we see in (170a-d, e-g) that non-shift off the (clearly) depressed SP could be blocked by the depressed OP’s LD left edge.

(170)  *Past subjunctive OP opacity: shift failure (block) into OP could imply depressed OP*  

**Toneless (low) stems**

a. ... bá-búú-nya  
   *[bá]-*[búú]-nya  
   ...and they excreted it  

b. ... bá-tí-liima  
   *[bá]-*[tí]-liima  
   ...and they cultivated them  

c. ... bá-tí-liibaala  
   *[bá]-*[tí]-liibaala  
   ...and they forgot them\(^{106}\)

d. ... bá-tí-líbátíisa  
   *[bá]-*[tí]-líbátíisa  
   ...and they delayed them  

**H stems**

e. ... bá-tí-kha  
   *[bá]-*[tí]-kha  
   ...and they picked / drew it\(^{107}\)

f. ... bá-tí-bóóna  
   *[bá]-*[tí]-bóóna  
   ...and they saw them

g. ... bá-tí-bóníisa  
   *[bá]-*[tí]-bóníisa  
   ...and showed them

h. ... bá-tí-khúlu míisa  
   *[bá]-*[tí]-khúlu míisa  
   ...and they helped them speak

If this analysis is correct (with domain structure as above), we now face two further problems: how to explain why in (170a) there is no audible rising H on the OP in the short stem, and why in (170b) there is no depressor-induced shift off the OP onto the first stem syllable.

\(^{106}\) Recall that all toneless (low) stems longer than 2\(\sigma\) fail to express the OP morpheme (syllable) itself as H; this phenomenon is quite independent of the past subjunctive paradigm.

\(^{107}\) Recall from Chapter 5 §5.4.1, §5.4.2.6 that 1-\(\sigma\) H stems fail to express H if they occur immediately after another H syllable (here: the OP), to which they fuse their HD.
Under this analysis, the problem of non-shift off the SP onto the OP has simply been transferred to the following morpheme; nothing has been solved. I concede, thus, that there is no strategy more insightful at this point than the second strategy suggested above: to construe the SP-OP boundary as opaque to shift under conditions specific to a paradigm like the past subjunctive. Analytically, this does not mean that the depressor shift constraints \((\text{HEA}_D H; \text{EXP}_E \text{NS}_E \text{GE})\) must be rerankable (since they continue to be satisfied by the depressed H SP in this paradigm); rather, it means only that the more lowly ranked \(\text{EXP}_L\) must be reranked beneath \(\text{EXP}_H\), such that the failure to express the depressed SP as L is not an obstacle for the wellformedness of this past subjunctive subject prefix morpheme at the surface. The reranking to achieve this occurs paradigm-specifically, much as occurred with the reranking of domain right-edge constraints (addressing antepenult, penult or ultima positions) for grammatical paradigms in Chapter 6. (171) indicates the reranking of the two expression constraints; (172) exemplifies.

(171) **Past subjunctive depressor shift expression reranking**

a. \(\text{SP}_{\text{general}}\): \(\text{Express}_E \text{dge}, \text{Head}_H >> \text{Express}_L >> \text{Express}_H\)

b. \(\text{SP}_{\text{past subjunctive}}\): \(\text{Express}_E \text{dge}, \text{Head}_H >> \text{Express}_H >> \text{Express}_L\)

(172) **No shift predicted (given reranking)**

a. \((*)\) \(...[\{b\acute{a}\}]\)-tí-liima \(\text{Express}_L >> \text{Express}_H\) correct surface form

b. \((\checkmark)\) \(...[\{ba\}]\)-tí-liima \(\text{Express}_L >> \text{Express}_H\) incorrect surface form (but predicted as correct without reranking)

c. \(\not\checkmark\) \(...[\{b\acute{a}\}]\)-tí-liima \(\text{Express}_H >> \text{Express}_L\) correct surface form

d. \(*\) \(...[\{ba\}]\)-tí-liima \(\text{Express}_H >> \text{Express}_L\) incorrect surface form

Without reranking the two express constraints, the non-shifted past subjunctive SP is incorrectly predicted to be ill-formed (172a), and the shifted form (172b) should be correct (but in fact is not). Once \(\text{EXP}_E\) has been reranked over \(\text{EXP}_L\) (172c-d), however, the non-shifting surface form (172c) is correctly predicted as optimal, because it is no longer
desirable that L is underexpressed for this morpheme; similarly, depressor shift is now predicted to be undesirable (172d).

I term the OPs in paradigms such as examined here ‘quasi-depressors’, because they act in part like depressors, but are demonstrably not depressed. The past subjunctive OPs seem to want the best of both phonological worlds, if ‘best’ can be understood as perfect alignment of phonological and morphological categories; essentially, ‘H domain boundaries must not misalign with morpheme edges’. We can see in this paradigm that OPs resist boundary blurring: no H / OP domain misalignment at the OP left edge (no shift). Yet they also resist H / OP domain misalignment (triggering shift) at the right edge.  

I note that the quasi-depressed OPs in (170) above contrast with real (non-quasi-) depression triggered segmentally by the first person singular OP in this same past subjunctive paradigm; the depressed (but lexically H) 1ps OP then triggers shift onto the penult (173a), and triggers block (173b), precisely as ‘real’ depressors should. This pattern confirms the analysis of quasi-depressors as non-depressed.

(173) True OP depression: shift off segmentally depressed 1ps
a. ... bá-gí-hláaba [{bá}]-{gí}-hláaba ...and stabbed me shift
*... bá-gí-hlaaba * [{bá}]-{gí}]-hláaba hypothetical non-shifting OP
b. ... bá-gí-bheeka [{bá}]-{gí}-bheeka ka ...and looked at me block

Given the data in this section from the past subjunctive, we need to admit that a morphological entity such as the OP—perhaps the OP is the only example in the language—can seem to be depressed in one respect (shift off the depressed SP onto the (depressed) OP is resisted), and yet seem not to be depressed in another respect (the OP itself does not trigger shift into the stem, unless it is segmentally depressed).  

108 I observe that this apparently phonological/morphological optimal alignment does not contradict the *Masking (= Contrast_L) claim made in §7.2.5, where only the perfect alignment of two distinct phonological categories (H, L) was rejected.

109 The cline of tone/depression effects is considered further in Chapter 8 §8.3.8, §8.3.10.
Since I have suggested above that OPs are *not* lexically depressed as a class, the left-edge anti-expression of the OP (motivated in Chapter 5 §5.3, and imitated in many OP paradigms) appears to reveal no profounder explanatory insight. It strikes one impressionistically as an *almost* lexically depressed morpheme, given that it could be analysed that way in all cases except 1-σ and 2-σ stems in certain paradigms. We may speculate that just this locus of ambiguity may have provided speakers the chance historically to reanalyse the OP away from being depressed to being (mostly) unexpressable as H, ‘ameliorating’ some of the depression effects.

But the opposite may also be true: the OP may be becoming fully depressed, in which case we may expect that non-depressor characteristics discussed here would recede, for example, the failure to display shift/block properties. This latter possible reinterpretation of the OP is supported by the propensity of the 1psOP *not* to invoke its disjoint HD option (cf. the phenomenon to be examined in §7.7.2) in present tense short form paradigm data where the 1psOP should otherwise allow two surface-forms (one disjoint ‘double’ reflex of the single UR H; and one non-disjoint ‘single’ reflex of the single UR H). Cf. Appendix A, paradigm C, especially the data in (19), and cf. footnote 27 in that appendix.

We may speculate, then, that based on these cross-paradigm inconsistencies (that is, the tonal instability of the OP), we may have located an example of language change in progress. Such ambiguity has long been speculated to be the locus of language change. A parallel phenomenon from Zulu has been documented and explored in Downing (2001), where apparent ambiguity of analysis in Zulu is leading to a change in stem tone.

### 7.6.4. **Conclusion**

A continuum of incomplete depression effects in Phuthi has been revealed in data from SP and OP prefixes. I have argued that in addition to the 1ps SP/OP being unambiguously lexically depressed (that is, L) by virtue of its depressor onset consonant (§7.6.1), it is more correctly all non-3ps SPs that are lexically L (§7.6.2); it is just that in many instances, this L is masked (in other paradigms, the L is underparsed).

OPs, on the other hand, while displaying paradigm-specific depressor properties (such as unwillingness to receive a H depressor-shifted onto them, and the general tendency to be
surface-expressed as L), are merely quasi-depressors. Masked depression is thus analytically quite distinct from quasi-depression.

Toneless stems in Phuthi may be argued all to be lexically L, where this specification is underparsed paradigm-specifically. It appears more explanatory to underparse L, than to require insertion of L only for ‘toneless’ stems (again, only in certain paradigms).

### 7.6.5. Constraint Summary

I summarise the new rankings (174), and the entire tone/voice constraint set up to this point (175), with the dominance relations visually sketched in (176).

#### (174) Constraint set (tone/voice), version 5: new rankings

- **Masked and quasi-depression**
  - a. $^{*}\text{Max-L (}\pi^{}) \gg \text{Max-L}$  $\pi$ = past subjunctive, ... (from 164)
  - b. $(\text{Express}_H \gg \text{Express}_L)(\pi)$ $\pi$ = past subjunctive, ... (from 171)

#### (175) Total constraint summary (tone/voice, partial): version 5

- **Resolving Clash**
  - a. BA-Lf (L), BA-Rt (L)
  - b. Express_L $\gg$ Express_H
  - c. Max-H, Max-L $\gg$ Express_L $\gg$ Express_H $\gg$ *Rise

- **Anticipating L**
  - a. Crisp(L) $\gg$ WSA-Lf (L) $\gg$ BA-Lf (L)
  - b. BA-Rt (L) $\gg$ WSA-Rt (L)

- **Shift rankings**
  - a. Head$_x$ = $^{*}\text{AE}_x \gg$ NonFin ($\pi_x$) $\gg$ HD-Min$_x$ $\gg$ AvoidProm($\pi_x$) $\gg$ WSA-Rt($\pi_x$) $\gg$ BA-Rt$_x$
  - b. Express_Edge $\gg$ Head_H $\gg$ Express_L $\gg$ Express_H

- **Block rankings**
  - a. Express_Edge, Max-L, Head_H $\gg$ *L-in-H $\gg$ Express_L, WSA-Lf (L)

- **L Minimality**
  - a. NonFin, AvoidProm $\gg$ LD-Min
  - b. LD-Min $\gg$ Express_H
  - c. *Overlap $\gg$ LD-Min
  - d. *Overlap, NonFin$_{LD}$, AvoidProm$_{LD}$ $\gg$ LD-Min $\gg$ Express_H $\gg$ NonFin$_{HD}$, AvoidProm$_{HD}$

- **Masked and quasi-depression**
  - a. $^{*}\text{Max-L (}\pi^{}) \gg \text{Max-L}$ $\pi$ = past subjunctive
  - b. $(\text{Express}_H \gg \text{Express}_L)(\pi)$ $\pi$ = past subjunctive
(176) Constraint rankings (tone/voice), version 5: dominance orderings

- paradigm(\(\pi\))-specific reranking of \texttt{EXPRESS\_H} over \texttt{EXPRESS\_L} is from the past subjunctive.
7. 7. **Edgeness Blurred: Unincorporated and Disjoint H Domains**

We turn to examine two phenomena observed in words containing depressed *prefixes*. First, in §7.7.1, some words appear to abstractly violate the fundamental assumption that domains parsing the same feature type cannot overlap sequentially with one another, that is, two adjacent HDs—the first a depressed prefix, the second a depressor-bearing HD whose left edge is anticipated as depressed—seem to manifest overlapping edges triggered by depressor shift at the prefix+stem boundary. The analysis to follow will avoid such overlap by minimally misaligning the parsing domain of a lexical stem H sponsor one syllable rightwards. Second, in §7.7.2, a depressed H prefix preceding a toneless/low stem with depressor in non-σ1 position appears either to instantiate its H feature twice, or to instantiate it once but disjointly: at the stem edge, and again at the domain head. This is argued not to be an instance of tone fission proper, but rather a boundary marking at the left edge (a form of morphological headedness).

7. 7. 1. **Unincorporation and H Sponsor Misalignment**

7. 7. 1. 1. Apparent overlap reflects Incorporation failure

Depressor shift is valued so highly in Phuthi that it must be satisfied even at the expense of causing a H sponsor to be disconnected—unincorporated—from its parsing domain, causing two HDs in sequence to appear to overlap. If this configuration were to be analysed as overlap, it would violate the universal phonological parsing principle expressed through *\text{Overlap} (cf. overlap discussion in Kisseberth (1994:134)), a constraint which forbids any configuration of the sort \([\ldots[y]\ldots]x\ldots\), where \(x\) and \(y\) refer to distinct tokens of the same feature category (e.g. harmonic features such as H, L or ATR). Any sequence of tokens of the same feature that would overlap, would lead immediately to incoherent—that is, uninterpretable—feature configurations.

There are two cases of ‘overlap’ which are distinct from the data to be considered in this section, and which can be demonstrated to be analytically unproblematic. First, potentially overlapping configurations were raised in the discussion under locality (§7.2.2.1): the overlap of H and L features was considered in relation to depression anticipation. It was noted that split tone configurations are ruled out as incoherent by a ‘no gapping’ principle (13). Rather, L and H tones that compete for the same syllables are typically phased across parsable material (§7.2.5.1). Only
in rare cases was it necessary to parse and express both tones on the same mora\textsuperscript{110}. In addition, it turned out that H and L did not constitute a *OVERLAP violation in this analysis, since the two tone features are claimed in this work to be privative, and thus strictly do not inherently compete for the same domain ‘plan’ (or on the same tier, if the metaphor is tiers).

Second, we have seen a kind of overlap response to the anti-adjacency condition (*AE)—the OCP on H tones—in Chapter 5 §5.2.2. When two or more adjacent HDs fuse, I claimed that the edges of the new domain are each parsed as many times as there are fusing H features; for every H feature in a fused HD, at least one HD edge is being parsed nonlocally, for example \([x_y \sigma_x, \sigma_y]_{xy}\), where the two H sponsors \(\sigma_x\) and \(\sigma_y\) fuse their adjacent edges, thus avoiding a violation of *AE, but obliging that each ‘basic’ sponsor edge be successfully parsed, even if nonlocal to the sponsor. It must be acknowledged that a special parse condition is required to allow the two H features—and later, in §7.8.1.10, two L features as well—to overlap, but only on condition of perfect overlap. That is, both (or however many) left edges, and both (or however many) right edges must coincide. The left position and right position can only be computed once for any adjacent edgemate (ruling out all possibility of overlap for domains of the same feature type).

Turning to the fresh depressor data that suggests overlap in this section, the present participial mood in (178), with segmentally depressed—but H—1ps SP\textsuperscript{111}, will suggest that the depressor-shifted H tone from the prefix overlaps with the immediately following H token from the stem, as indicated by the would-be domain structure in the righthand column. Thus, the question of overlap in the toneless stems does not arise in (177a-f) as there is but a single H token present. Nor does edge overlap arise in (177g-h) as the (non-depressed) prefix and stem H tones fuse unproblematically (which in fact amounts to perfect overlap, yet this overlap which is not depressor-driven but rather OCP-driven, cf. Chapter 5 §5.2). Nor does edge-overlap arise in (177i-j) where the prefix H and stem H parse and express adjacently without any HD fusion (this fusion failure is dealt with subsequently in §7.8.1.7-§7.8.1.9, cf. the fusion typology in (292)).

\textsuperscript{110} We have seen that HD and LD in Phuthi seek to avoid gratuitous overlap, articulated by the anti-parse (clash) constraint, *L-IN-H (§7.4.3.3, Tableau 10). The effect of this tone clash constraint is depressor block (124a-f); ‘overlap’ in this sense—of L and H—is only tolerated if forced by the parse requirements on the L feature (124g-p).

\textsuperscript{111} All SPs are lexically H in this grammatical paradigm (including the 1ps), cf. Chapter 6 §6.2.1.1, and Appendix A, paradigm G.
By contrast, in the 1ps (depressed) prefix forms with H stems (178a-f), there does seem to be overlap between prefix and stem H. I provide domain representation of the would-be overlap in (178), which analysis is to be abandoned in light of the ensuing discussion, and to be reconfigured as unincorporation in (180) below.

**Present participial**

(177) **Toneless/low stems, stem-σ2 depressor: no apparent depression-induced overlap possible**

1ps  

a. gi-láadza  
me fetching  
{{gɪ}-lāa{dza}}

b. gi-ládeela  
me following  
{{gɪ}-lā}{dzee}la

c. gi-ladzelíísa  
me helping follow  
{{gɪ}-{ladze}líísa} 

3ps  

d. ká-laadza  
him/her fetching  
[ká]-laa{dza}

e. ká-ládeela  
him/her following  
[ká-lá}{dzee}la

f. ká-ladzelíísa  
him/her helping follow  
[ká-{ladze}líísa]

**H stems, H non-depressed prefix (prefix+stem fusion): no apparent depression-induced overlap possible**

3ps  

g. ká-búluuga  
him/her saving  
[xyká-bű]{luuga}

h. ká-búlūgíísa  
him/her helping to save  
[xyká-bülü]{gíísa}

i. ká-bülúgíisíísa  
him/her saving intensively  
[ká]-{būlu}íísiíísa

j. ká-bülúgíisíísa  
h/h helping save intensively  
[ká]-{būlu}íísiíísa

112 There is another surface form for this word, gi-ládzelíísa, where the single H sponsor (the prefix) surfaces disjointly both before and after the stem depressor -dze-. Similarly, there are alternative disjoint H forms for all longer toneless/low stem category items (treated in §7.7.2). For a rich set of the participial data argued from in this section of the chapter, the reader is referred to Appendix A, paradigm G (II), (39v) following, cf. especially Appendix A, footnote 44.

618
(178) \( H \) stems, stem-\( \sigma_2 \) depressor: apparent depression-induced shift overlap

\[ \{x\} \]

If HD fusion succeeded, we would not expect any shift effect from the depressed prefix onto the prefix+stem boundary; but there is not.

(a) \( \text{gi}-\text{tshééga} \)
me buying

\[\{x\} \]-\{tshéé\} \{ga\} \]

(b) \( \text{gi}-\text{tshégiísa} \)
me selling

\[\{x\} \]-\{tshégi\} \{i\} \{sa\} \]

(c) \( \text{gi}-\text{tshégiísíisa} \)
me buying intensively

\[\{x\} \]-\{tshégi\} \{sí\} \{isa\} \]

(d) \( \text{gi}-\text{tshégiísíisi} \)
me selling intensively

\[\{x\} \]-\{tshégi\} \{sí\} \{siisa\} \]

(179) \( H \) stems, stem \( \sigma_3 \) depressor: apparent depression-induced shift overlap

\[ \{x\} \]

Again, the overlap question does not arise where the SP is non-depressed 3ps (179a-f).

(a) \( \text{ki}-\text{tshééga} \)
him/her buying

\[\{ká\} \]-\{tshéé\} \{ga\} \]

(b) \( \text{ki}-\text{tshégiísa} \)
him/her selling

\[\{ká\} \]-\{tshégi\} \{í\} \{sa\} \]

(c) \( \text{ki}-\text{tshégiísíisa} \)
him/her buying intensively

\[\{ká\} \]-\{tshégi\} \{sí\} \{isa\} \]

(d) \( \text{ki}-\text{tshégiísíisi} \)
him/her selling intensively

\[\{ká\} \]-\{tshégi\} \{sí\} \{siisa\} \]

(e) \( \text{ki}-\text{bulugiísíisa} \)
him/her saving intensively

\[\{ká\} \]-\{bulugi\} \{sí\} \{siisa\} \]

(f) \( \text{ki}-\text{bulugiísíisi} \)
h/h helping save intensively

\[\{ká\} \]-\{bulugi\} \{sí\} \{siis\} \]

\footnote{The data in (178c-f) supplies evidence that HD fusion does \textit{not} operate in this paradigm. If HD fusion succeeded, we would not expect any shift effect from the depressed prefix onto stem \( \sigma_1 \). Rather, (178c) should be \( \text{gi}-\text{tshégiísíisa} \) \{x\} \{gi\} \{tshégi\} \{sí\} \{isa\}, with just a single \( H \) syllable. In other words, fusion would eliminate the need for unincorporation.}

\footnote{(179b-f) offers further evidence for the failure of fusion in this paradigm—but distinct from (178c-f) in the previous footnote. If the prefix HD and stem HD fused here, the prefix should be eligible for depression anticipation; in other words, we would expect (179b) to be \{x\} \{ka-\text{tshégi} \} \{í\} \{sa\}, which is not what occurs. Yet there is a problem that cannot be resolved here: if the domaining of (179a) is as given \{ká\} \{tshéé\} \{ga\}, there should be a downstep at the prefix+stem boundary; but there is not.}
Now we could try to maintain that the data in (178a-f) reveals true instances of feature domain overlap, and that the strict universal *OVERLAP ban must be violated to save the highly valued segment/tone resolution that is manifest through EXPRESS_L >> EXPRESS_H. In other words, the need for depressor-induced shift on the depressed H prefix outweighs the impenetrability of the left edge of the stem’s H domain.

We would have to say that this overlapping configuration needs to be signalled as distributionally rare, that is, highly marked, in the phonology of any language. Overlap could be simply be considered a highly undesirable and marked configuration, but tolerated in a rare case such as this, as repeated in (180a). This might be argued to be superior to an autosegmental representation (180b) in a derivation account that could easily extend the first HD into the segmental space of what ‘was’ the second HD (before it got lowered by depression anticipation). Further reflection would quickly lead one to conclude that *OVERLAP is truly a non-negotiable requirement for the proper construction and implementation of domain structure: (180a) is incoherent. If this were to be the solution, all analysis in the entire grammar is called into question, as the nearest left- or right-edgemate of any given domain might in fact belong to some other domain entirely.

Instead, a far more coherent (albeit still marked) analytic route is open: unincorporation of the stem H-sponsor, that is, the stem-initial sponsor syllable fails to be parsed inside its own parsing domain, as given in (180c).

(180) Maintaining ‘overlap’ vs. unincorporation
a. [\{gi\}-\{tshé\},\{gi\},\{si\}]isa    domain overlap \{\ldots\}, would be incoherent in ODT
b. [\{gi\}-\{tshé\},\{gi\},\{si\},\{\ldots\}]isa  -tshé- would easily ‘receive’ H from depressed SP \{gi\}-

\begin{center}
\begin{tikzpicture}
  \node at (0,0) {H};
  \node at (1,0) {H};
  \draw [dashed] (0.5,0.5) -- (0.5,-0.5);
\end{tikzpicture}
\end{center}

\textit{-tshe-} would easily ‘receive’ H from depressed SP \{gi\}-
in a derivational autosegmental account

c. [\{\ldots\}-\{tshé\},\{\ldots\},\{\ldots\}]isa    no HD overlap; H sponsor -tshé- parses stem HD \{\ldots\}

Whereas the overlapping domained configurations in (178)—reflected by the configuration in (180a)—are certainly computationally incoherent in that a second H feature cannot begin its execution before a first H feature is complete, as this would result in the very
gapped configuration that was rejected much earlier in §7.2.2.1 (13), the unincorporation analysis in (180c) is promising.

Indeed it is not incoherent to claim that the H domain parsed from the normal trigger position for a stem HD—the leftmost syllable in the stem—is misaligned a single position to the right, to the stem peninital. Similarly, the syllables leftwards of the depressor that should be anticipated as depressed—here, only -tshé —do not commence at the stem-initial position, but at the peninital; that is, depression anticipation fails to reach as far leftwards as -tshé.

The analysis places this single instance of the Phuthi domain structure into a very marked category for a Nguni language, where the sponsor and parse domain are mismatched, albeit minimally. But it is a mismatch that Optimal Domains Theory allows for, even anticipates. Specifically, while the ODT principle of Incorporation is one of the four that govern the normal proper parsing and expressing of tone domains (C&K (1998:43-45); Chapter 3 §3.3.3), there can be circumstances under which this principle is violated. In the present case, it is only to satisfy the very highly valued Express_L >> Express_H ranking that governs the competition between L and H domains. In this light, the data in (178) can be recast such that the prefix HD and stem HD do not overlap, preserving the linear integrity of H tokens, after the unincorporation configuration in (180c).

This empirical prefix/stem phenomenon obtains in both verbs and nouns (but is to some extent context-dependent). Thus, apparent HD overlap between two HDs is likewise manifest in noun copulatives, where the morphological noun prefix is phonologically depressed to signal grammatical copula: copulative prefix H and stem-initial anticipated LD syllable.

Non-copula (181a-f) are noun citation forms (thus, lacking the unincorporation—apparent overlap—phenomenon); (181a,c,e), are underived nouns, (181b,d,f) are derived diminutives. In (181g-l), however, unincorporation is displayed in the derived copulas: the copula prefix is depressed, triggering depressor shift; in each case, the first HD appears to have two sponsors in it, the second contains none—in fact, the sponsor of the second domain is unincorporated. In (181h,j,k,l), the stem-initial syllable is H as a result of depressor shift off the

\[ \text{115} \quad \text{This principle of Incorporation has been introduced and discussed in Chapter 3 §3.3.3, Chapter 5 §5.2.2 (36-37), the principles of Incorporation and Uniqueness—first presented coherently in Cassimjee (1998)—are reviewed in Chapter 8 §8.3.7, in light of the data in §7.7.1-§7.7.2.} \]

\[ \text{116} \quad \text{In fact, the phenomenon obtains in principle for any word category, but is most robustly attested in nouns and verbs, because they are the most readily productive and lengthenable forms.} \]
copula, displaying the unincorporation clearly. In (181g,i), the first mora of the long penult must carry the depressor-shifted H from the prefix, with unincorporation of the stem-initial H sponsor being merely to the second mora of that penult syllable, as dominated on the right.

**Copula**

(181) **Non-copula H stems**\(^{117}\): no unincorporation (no apparent overlap)

a. mú-tshéégi  
   buyer  
   [mú]-[tshé]-gi

b. mú-tshégi -nyáana  
   small buyer  
   [mú]-[{tshegi}]-nyáana

c. mú-qéédzi  
   decider  
   [mú]-[qé]-dzi

d. mú-qedzi -nyáana  
   small decider  
   [mú]-[{qedzi}]-nyáana

e. mú-búlúúgi  
   saviour (saver)\(^{118}\)  
   [mú]-[búlúú]-gi

f. mú-bulugi -nyáana  
   small saviour (saver)  
   [mú]-[{bulugi}]-nyáana

g. mú-tshéégi  
   s/he is a buyer  
   [{mú}-tshé]-é-gi

h. mú-tshégi -nyáana  
   s/he is a small buyer  
   [{mú}-tshé]-{gi}-nyáana

i. mú-qéédzi  
   s/he is a decider  
   [{mú}-qé]-é-dzi

j. mú-qedzi -nyáana  
   s/he is a small decider  
   [{mú}-qé]-é-{dzi}-nyáana

k. mú-búlúúgi  
   s/he is a saviour  
   [{mú}-bú]-úú-{gi}

l. mú-bulugi -nyáana  
   s/he is a small saviour  
   [{mú}-bú]-úú-{lugi}-nyáana

---

\(^{117}\) (181) contains only H stems, because, as with the verbs in (177a-f), toneless (low) stems are inherently unable to display overlap effects with a depressed copula prefix, since there is only one H tone present (no stem H). Instead, these toneless/low copula forms will display disjoint H properties (analysis in §7.7.2 below). In (181g,i, 182g,j), there is a single stem-internal sponsor on the word-penult (stem-initial) syllable. Even though each mora of the penult is dominated in a distinct HD, this has no implications for execution of a single high (non-contour) pitch. But cf. Appendix A, paradigm I (footnote 60) for data that could threaten this unincorporation analysis.

\(^{118}\) This derived form literally means ‘saver’, that is, ‘one who saves’. It can also refer to the redeemer in Christianity: the ‘Saviour’. The form more commonly occurs with the stem-initial consonant assimilated to the prefix (after vowel syncope): mú-mulúúgi instead of mú-búlúúgi.
Corresponding to the shift data for verbs in (178a-f) above, and for nouns in (181g-l), there is a set of depressor block data, where unincorporation is predicted to take place, but fails to, as the first syllable of the verb/noun stem is itself depressed (180-181); thus due to the failure of the otherwise expected depressor shift.

The blocking of the unincorporation effect is again not manifested in toneless/low stems (182a-f)—where there could be no unincorporation because there is only one H sponsor (on the prefix); but unincorporation is manifested in H stems, where there are the two H tokens necessary for the effect to reveal itself, and only when the prefix is depressed (182g-i), not when the prefix is H but non-depressed (182j-l).

**Present participial**

(182) **Toneless/low stems, stem-σ1 depressor: no blocking (and no unincorporation)**

1ps

a. gí-vuula me opening [[gí]-{vu}u]la
b. gí-vuléela me opening for [[gí]-{vu}lé]ela
c. gí-vulísíisa me opening intensively [[gí]-{vu}lí]siisa
d. ká-vuula him/her opening [ká]-{vu}u]la
e. ká-vuléela him/her opening for [ká-{vu}lé]ela
f. ká-vulísíisa him/her opening intensively [ká-{vu}lí]siisa

H stems, stem σ1 depressor: blocking (unincorporation actively avoided)

1ps

g. gí-vuúna me harvesting [[gí]-{vu}ú]na
h. gí-vuníísa me helping harvest [[gí]-{vu}níí]sa
i. gí-vunísíisa me harvesting intensively [[gí]-{vu}níí]siisa

3ps

j. ká-vuúna him/her harvesting [ká-{vu}ú]na
k. ká-vuníísa him/her harvesting [ká-{vu}níí]sa
l. ká-vunísíisa him/her harvesting intensively [ká-{vu}níí]siisa
Similarly, as with the nouns in (181) above, non-copula H stem nouns (183a-d) contain no would-be unincorporation (‘overlap’) because there is no depressed H prefix to force depressor shift. But the nouns in (183e-h), however, do demonstrate would-be unincorporation of the stem-initial H sponsor, though unincorporation is blocked because that stem-initial syllable is depressed.

As before, non-copula (183a-d) form the morphological basis for the copula forms (183e-h); all can be divided into underived forms (183a,c,e,g), and diminutive (derived) forms (183b,d,f,h).

Noun copula

(183) Non-copula H stems

a. mú-vuúńi  
   harvester  
   [mú]-[vuúńi]

b. mú-vunį-nyaana  
   small harvester  
   [mú]-[vunį]-nyaana

c. mú-geéńi  
   one who enters  
   [mú]-[geéńi]

d. mú-genį-nyaana  
   small one who enters  
   [mú]-[geńi]-nyaana

Copula, H stems: depression block-induced failure of unincorporation (non-overlap)

e. mú-vuúńi  
   s/he is a harvester  
   [mú]-[vuúńi]

f. mú-vunį-nyaana  
   s/he is a small harvester  
   [mú]-[vunį]-nyaana

g. mú-geéńi  
   s/he is one who enters  
   [mú]-[geéńi]

h. mú-genį-nyaana  
   s/he is a small one who enters  
   [mú]-[genį]-nyaana

For the unincorporated and non-unincorporated HD/LD configurations that have been demonstrated to be parsed correctly—for example, (181k-l), repeated as (184a-b)—the complex of depressor shift and block requirements must outweigh depression anticipation and the principle of incorporation (185a-d): the right edge of the depressed prefix HD must be expressed at all costs. This requirement on right-edge expression has already been motivated for HDs

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119 As before, toneless (low) stems cannot manifest unincorporation. They will, however, be seen in §7.7.2 to display disjoint domain properties under both shift and block conditions.

120 I will suggest in the discussion on disjoint domains to follow in §7.7.2 that there is a
We see from the present discussion that obligatory right-edge expression applies to prefixes as well.

(184) **Unincorporation induced by depressor copula**

a. *mù*-búlúúgi s/he is a saviour
   \[\{mù\}-bú,\{lúú\}\]

b. *mù*-búlugi-nyáana s/he is a small saviour
   \[\{mù\}-bú,\{lugi\}-nyá\]

(185) **Incorporation violation and related L/H rankings**

a. Express_Edge >> Incorporate: parsing the right edge of a HD violates INCORPORATE
   \[(184a-b): \ldots-bú,\ldots,\ldots-bú,\ldots,\ldots\]

b. Contrast_HD >> Incorporate: the requirement to express at least *some* element in
   the HD can violate INCORPORATE:
   \[(184a-b): \ldots,\{mù\},\ldots\]\n
c. Express_Edge >> Express_L: right edge of HD outweighs expressing Lf edge of
   the expanded LD.

d. Max H, Max L >> Incorporate: H and L cannot be underparsed to prevent
   incorporation.

e. Max-L >> *L-in-H: no L underparse to prevent worse L/H overlap
   (multiple nesting).

f. Express_Edge >> *L-in-H >> Express_L >> WSA-Lf (L)
   : *L-in-H ranking from §7.4.3.4 (123,124)

g. Express_Edge, Max L >> *L-in-H >> Express_L >> WSA-Lf (L) >> Incorporate
   : by transitivity: (185a-f)

(185e-f) were indicated in §7.4 above: they ensure depressor blocking; (185c,g) form the
ranking complex which guarantees that rightwards expansion of the prefix HD is preferred, in
order that the HD right edge actually be expressed, rather than favouring a shrunken
(depressorless) HD.

Tableau 13 (186) demonstrates the set of interactions for 3-σ stems: INCORPORATE, which
evaluates the second HD sponsor, must fail in order to satisfy prefix HD parse and expression.
The *OVERLAP constraint has been inserted into Tableau 13 (186) as an undominated constraint in
an ODT grammar.

deepen requirement on expressing the left edge of a HD, which will fall out of the interaction of
the prefix+stem boundary with a depression feature (L) on the prefix, resulting in a disjoint HD.
It could be proposed—alternative to unincorporation—that proper anchoring of the stem sponsor
is overridden, but I do not explore that here.
Tableau 13: Abstract HD overlap rescues prefix expression

\[ \text{\textit{mubilúúgi}} \text{'s/he is a saviour (saver)'} \]

<table>
<thead>
<tr>
<th>/ \text{\textit{mu}-} + -\text{bulug-i} /</th>
<th>*Overlap</th>
<th>Express Edge</th>
<th>Max L</th>
<th>*L-in-H</th>
<th>Express L</th>
<th>WSA-Lf (LD)</th>
<th>Max H</th>
<th>Incorporate</th>
<th>Express H</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) \text{\textit{[\text{x,\text{\textit{mu}}]}-\text{búl}, \text{xlúú}{\text{\textit{gi}}}}}</td>
<td>*</td>
<td>0, ***</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) \text{\textit{[\text{x,\text{\textit{mu}}]}-\text{búl}, luu{\text{\textit{gi}}}}}</td>
<td>*</td>
<td>0, ***</td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) \text{\textit{[\text{x,\text{\textit{mú}}]}-\text{búlúú}{\text{\textit{gi}}}}}</td>
<td>*</td>
<td>0, ***</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) \text{\textit{[\text{x,mú}]-\text{búlúú}{\text{\textit{gi}}}}}</td>
<td>*!</td>
<td>0, ***</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) \text{\textit{[\text{x,\text{\textit{mu}}]}-\text{búlúú}{\text{\textit{gi}}}}}</td>
<td>*!</td>
<td>0, ***</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) \text{\textit{[\text{x,\text{\textit{mu}}]}-\text{búl}, luu{\text{\textit{gi}}}}}</td>
<td>*!</td>
<td>0, ***</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- *L-IN-H is irrelevant for all candidates with this word length: (i) the LD on the ultima is too far to the right to affect H expression; (ii) the HD, sponsor is depressed and obligatorily domained inside a HD, by virtue of its (sponsor) position;
- (b) fails on MAX-H for the second HD; (c) respects the domain integrity of the second HD, and fails to extend into it, at the cost of failing to adhere to depressor shift principles; (d) fails to parse the L (copula) feature on the prefix; (e) fails to express the right edge of the first HD (also fails to express at least one member of the HD, that is, fails to satisfy CONTRAST_HD); (f) parses both H domains, but parses and expresses the verb root lexical H only on the first syllable of the stem thus fatally violating *OVERLAP (unlike the fusion cases in Chapter 5 §5.2.3, the two sets of HD edges do not perfectly coincide here, and thus do not instantiate the HD coincidence requirement for structural coextension, that is, fusion-driven perfect overlap).

Tableau 14 displays copula-triggered unincorporation (187), which unincorporation rescues the otherwise unparsed or unexpressed or clashed first HD in the sequence of two HDs. The ‘overlapped’ HD is more salient in this example than in (186), because it surfaces inside what should be a left-extended LD driven leftwards by depression anticipation; there are now two quite distinct H pitch excursions.
Tableau 14: Salient HD unincorporation for longer (4+σ) stems

*mutuluginyáana ‘s/he is a small saviour (saver)’

<table>
<thead>
<tr>
<th>/ mu- + -bulug-i-nyá-ana /</th>
<th>*Overlap</th>
<th>Express Edge</th>
<th>Max L</th>
<th>*L-in-H Express L</th>
<th>Max H</th>
<th>Incorporate</th>
<th>WSA-Lf (LD)</th>
<th>Express H</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) [x, {mu}-bú], [y, {lugi}-nyá], ana</td>
<td>* *</td>
<td>*</td>
<td>*</td>
<td>0, **</td>
<td>* *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) [x, {mú}], [y, {bulugi}-nyá], ana</td>
<td>* *</td>
<td>* !</td>
<td>*</td>
<td>0, *</td>
<td>0, ***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) [x, {mu}]-{bulugi}-nyá], ana</td>
<td><em>!</em></td>
<td>*</td>
<td>0, 0</td>
<td>*</td>
<td>0, ***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) [x, {mu}]-{bulug}, [lugi]-nyá], ana</td>
<td>*!</td>
<td>* *</td>
<td>0, **</td>
<td>*</td>
<td>* *</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- In (a) both HD heads are depressed, and both shift; in (b), non-shift off the H depressed prefix would force failure of either H or L expression (here: L expression); (c) fails because the two HDs attempt to fuse, whereas HD1 contains a depressor and contributes an extra violation of *L-in-H (to each of the two fused HDs: HDx and HDy)—(c) is thus not a fusion-candidate (cf. §7.8.1.9 (292) for a typology of fusion opportunities); in (d), the two HDs fatally overlap on the stem-initial syllable.

As already exemplified, HD unincorporation fails to take place if the stem commences with a depressor consonant, resulting in depression blocking at the prefix+stem HD interface, as in the two candidates in Tableau 15 (188a-d,e-g).

Tableau 15: Depressor blocking in a potentially unincorporating stem

*muvuńi ‘s/he is a harvester’

<table>
<thead>
<tr>
<th>/ mu- + -vun- /</th>
<th>*Overlap</th>
<th>Express Edge</th>
<th>Max L</th>
<th>*L-in-H Express L</th>
<th>Max H</th>
<th>Incorporate</th>
<th>WSA-Lf (LD)</th>
<th>Express H</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) [x, {mu}]-{vu}, ni</td>
<td>* *</td>
<td>*</td>
<td>0</td>
<td>*</td>
<td>0, *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) [x, {mu}]-{vú}, [y, {ú}], ni</td>
<td><em>!</em></td>
<td>0, *</td>
<td>*</td>
<td>*</td>
<td>* *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) [x, {mu}]-{vu}, [y, {ú}], ni</td>
<td>*!</td>
<td>* *</td>
<td>0, 0</td>
<td>*</td>
<td>* *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) [x, {mu}]-{vů}, [y, {ú}], ni</td>
<td>*!</td>
<td>**</td>
<td>0, *</td>
<td>*</td>
<td>* *</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- (188a) expresses a rising H tone on the prefix, that is, a phonetic sequence of L and H (but evaluated as the failure of EXPRESS_L, since the prefix syllable is not uniformly L);
(188b) is the unincorporation candidate, but unincorporation only works by worsening the first HD in terms of number of embedded LDs; (188c) successfully expresses L on the prefix but at the expense of fatally failing to express the edge of the first domain at all; (188d) ‘solves’ the L/H prefix clash with depressor shift, but shift entails additional *L-IN-H violation, as well as a *OVERLAP violation.

**(múvunínyaana**  ‘s/he is a small harvester’

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(e)</strong> [s{mú}] {vú} -nyaana</td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>0</td>
<td>*</td>
</tr>
<tr>
<td><strong>(f)</strong> [s{mú}] -{vú} {nʃ} -nyaana</td>
<td>*! *</td>
<td>*</td>
<td>*</td>
<td>0</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td><strong>(g)</strong> [s{mú}] -{vú} {nʃ} -nyaana</td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

- (188e) tolerates partially failed L-ness on the prefix; (188f) attempts unincorporation but adds another depressor domain into the first HD; (188g) fails to express the first HD at all.

We have now seen the full range of shift and block patterns in High noun and High verb stems. We have seen that Phuthi tolerates minimal misalignment of the domain parsed by a H stem sponsor, just in order to allow a prefix HD to be expressed, without violating the inviolable structural architectural constraint *OVERLAP. This misalignment of the domain left-edge to stem σ2—to µ2, in the case of 2-σ stems—is the first time that the grammar is seeking to interfere with the in situ local parse that happens with Basic Alignment for sponsors (BA-Lf, BA-Rt), other than in the special case of HD fusion (where one edge of each sponsor parses non-locally, but only under condition of perfect edge coincidence, that is, of perfect domain coextensiveness, as argued in Chapter 5 §5.2.2).

7. 7. 1. 2. Non-alternatives: fusion; shift violation (and contrast loss)

It is worth noting that two further analytic alternatives to unincorporation are not viable in accounting for the data just adduced in §7.7.1.1.

First, a fusion response to domain unincorporation might fuse the SP HD and the stem HD, in which case no talk of H shift appears necessary initially: the first syllable of a fused domain is simply depressed, and expressed L (189b,d,f,h,j). Given my observation that nouns do
not fuse across the NPref-Stem boundary (cf. footnotes 113-114 above), even though this would seem plausible in (189b,d,f) if we ignore the fusion properties of nouns (which we cannot do!), then this strategy is only firmly possible for verbs (189h,j). More than this, it is not clear what to do with longer items such as (189d): the status of stem $\sigma_2$ remains unaccounted for; if fusion is the only response (as reflected here), then stem $\sigma_2$ should be H (but it is typically not).

(189) **HD fusion: shift/unincorporation vs. fusion**

a. \[ \text{\underline{mu-búlúúgi}} \quad [s\{\text{\underline{mu}}\}-\text{bú},[\underline{lúú}],[\text{\underline{gi}}]} \quad \text{unincorporation, no fusion} \]

b. \[ *\{s,\text{\underline{xy}}\}-\text{búlúú}x_{\text{xy}},[\text{\underline{gi}}]} \quad \text{no unincorporation, fusion} \]

(c. \[ \text{\underline{Mu-búlugi-nyáana}} \quad [s\{\text{\underline{mu}}\}-\text{bú},[\text{\underline{lugi}}]-\text{nyá}]}_{\text{ana}} \quad \text{unincorporation, no fusion} \]

(d. \[ (*\text{\underline{Mu-bulugi-nyáana}}) \quad *\{s,\text{\underline{xy}}\}-\text{bulugi}-\text{nyá}]}_{\text{ana}} \quad \text{no unincorporation, fusion} \]

(e. \[ \text{\underline{Mu-tshéégi}} \quad [s\{\text{\underline{mu}}\}-\text{tshé},[\underline{g}]}_{\text{Gi}} \quad \text{unincorporation, no fusion} \]

(f. \[ *\{s,\text{\underline{xy}}\}-\text{tshéé}x_{\text{xy}},[\text{\underline{gi}}]} \quad \text{fusion, no unincorporation} \]

\[ \text{(but NPref and stem are unfusable)} \]

(g. \[ \text{\underline{Gi-tshééga}} \quad [s\{\text{\underline{gi}}\}-\text{tshé},[\underline{g}]}_{\text{Gi}} \quad \text{unincorporation, no fusion} \]

(h. \[ *\{s,\text{\underline{xy}}\}-\text{tshéé}x_{\text{xy}},[\text{\underline{gi}}]} \quad \text{fusion, no unincorporation} \]

(i. \[ \text{\underline{Gi-tshégiísa}} \quad [s\{\text{\underline{gi}}\}-\text{tshé},[\text{\underline{gi}}]-\text{í}]}_{\text{sa}} \quad \text{unincorporation, no fusion} \]

(j. \[ (*\text{\underline{Gi-tshegiísa}}) \quad *\{s,\text{\underline{xy}}\}-\text{tshégií}x_{\text{xy}},[\text{\underline{gi}}]} \quad \text{fusion, no unincorporation} \]

Finally, we might anticipate that a solution where no shift is needed, for some reason, might lead us to correctly identify the optimal surface candidates, while also avoiding unincorporation violations. But even without pursuing such a strategy in domained configurations, it is clear that, without further constraints being added to prevent WSA-Lf(L) from extending leftwards to the stem edge, the same outputs would be arrived at as identified in (189b,d,f,h,j) above, that is, in (189d,j) the stem $\sigma_1$ is incorrectly predicted to be low, not high, if
there is no shift off the depressed prefix. In other words, an analysis where the first (prefix) HD must shift off the depressed H prefix cannot be circumvented.

In addition to the failure of the fusion explanation, it is not possible to not depressor shift—for some reason—and to somehow allow the prefix domain to simply surface as L anyway. Besides the problem of how to force the post-prefix stem σ-1 to surface-H, the surface-low prefix would violate the inviolable CONTRAST_HD, as the failed tableau candidates in (186e) and (188c,f) have shown.

Thus, we can now conclude analytically, firstly, that fusion is not a solution to this prefix-shift phenomenon, and secondly, that shift must take place, so that the tone status of stem σ-1 (after shift off the prefix) can be correctly predicted as H in all cases; thirdly, unincorporation is a satisfactory analytic strategy, while an overlapping domains configuration is not.

7. 7. 2. DISJOINTED HDs: SALIENT STEM EDGES

We turn in this section to a property of depressor syllables—unattested elsewhere in Nguni121—that would be identical to the overlap violation seen in the previous section, were it not for the fact that the forms to follow here have only one H sponsor. It seems like a single H tone can be fissioned into two pieces.

I first provide an account which follows from an expression requirement on the morphological prefix domain when the prefix is lexically H: the leftwards realignment of a stem L is inhibited by obligatory (but minimally misalignable) prefix expression; this inhibiting will be seen to fall out of a pre-existing constraint ranking. This account will point to the symmetry of the two HD edges, left and right, subject to the presence of the morphological prefix+stem complex. In the process of building this strategy, I reject an account that is observationally parallel to the ‘overlap’ (unincorporation) effects seen in §7.7.1, but that would try to analyse the problem as a ‘double reflex’ of a single sponsor feature, even though this approach would eliminate the typological language-internal oddity of a single morphological domain with two disjoint excursions of H.

121 Disjoint reflexes seem unattested elsewhere in Nguni either because this pattern does not apply to the pre-stem H sponsor, or the language is a not a whole-domain-H language (including the standard dialects of Swati, Xhosa, Zulu), in which case we do not anticipate any pre-head syllables being surface-H under normal conditions (depressed or not).
7. 7. 2. 1. HD disjointness is a function of prefix expression (not of shift, block)

A depressed H prefix sponsor syllable can trigger two disjunctive surface manifestations of H from the left of the stem, but where these two H pitch excursions both occur inside the stem domain. I illustrate the would-be ‘shift’ phenomenon in (190a,b), from the present participial verb paradigm (noun paradigm to follow in (192)), with two stems morphologically elongated (by means of reduplication), and crucially with a depressor consonant in the head position (antepenult). There are two salient excursions of H intonation, but a single underlying H sponsor.

Present participial

(190)  Single H sponsor surfaces in disjoint stem domain

a. ...gi-límálimagíśísa  me intensively cultivating indiscriminately now & then
b. ...gi-pátápalagíśísa  me intensively paying indiscriminately now & then

Now, it is tempting to consider that the disjoint H domain reflects a kind of double shift phenomenon: there are, literally, two sequences of LH, which is the classic Nguni response to a depressed H clash configuration. Thus, it is as if a single H sponsor (a pre-stem H prefix) can trigger two instances of depressor shift: one at the stem left-edge; the other on (or right after) the Head position inside the stem (that is, at the right-edge of the HD). Yet this would be a very strange structural proposition: there would be two right-edge reflexes of a single H sponsor.

If this were truly a double reflex of a single H, then the domain structure would need to be as in (191a,b), where the H sponsor, σ₁, has two right edges (both marked j₁): the first after stem σ₁, the second after the first mora of the penult (in these particular examples), that is, after the post-head mora.

For some speakers, it is slightly more complex than this data set reveals. There appear to be optional degrees of penetration into the stem by the shifted H from the prefix domain: one syllable, two syllables, or all syllables up to the syllable preceding the depressed stem syllable, i.e. gi-límálimagíśísa, as in (190a); gi-límálimagíśísa (two H syllables; perhaps a post-depressor binary foot); or gi-límálimágíśísa (all pre-depressor syllables H). Note that *gi-límálimagíśísa is always ill-formed and does not occur (it has just three H stem syllables). This illformedness is important: the left-alignment pattern, however potentially realignable the stem LD left-edge appears to be, is still constrained in some way. The details of these alternative forms await further work.
Would-be ‘double reflex’ domain structure

The ‘double shift’ or ‘double reflex’ proposal assumes that WSA-Lf(L)—the leftwards realignment constraint that effects depression anticipation (cf. §7.3)—is dependent on the position of the first ‘shift’ instance of the disjoint H (now found on stem σ-1) for its own left boundary. In other words, in (190a/191a), H appears on -li- although sponsored by -gi-; the left edge of the following LD (triggered by the second (stem) instance of -gi-) is then aligned not to the stem left-edge, as it would normally be, but to the (bold) right-edge of -li-:

But, given the domain structure motivated throughout this dissertation, and the basic operating principles of ODT, it would be completely untenable to have a single feature domain with one left edge and two right edges. This is not an interpretable representation. Locality, in general, could be easily and multiply violated in this way. All potential predictivity of the ODT constraint grammar would be undone. Surrendering domain edge-pairing would lead to fundamental analytic incoherence: we could not be sure, for any particular domain edge, whether it corresponded to one or two (or more) edgemates.

One may concede that this flawed line of thinking may follow from the observation that, for the first time, we have now encountered data where a single morphological domain (the stem) contains two excursions of H. In all previous data, any surface disjointness of H was distributed across two morphemes—to the left on the prefix complex; to the right in the stem. (In the case of unincorporated H in §7.7.1 (178c-f), there were two excursions of H in the stem, but the stem itself was also lexically H). To be sure, this configuration is a marked one; yet the central issue remains how to achieve the correct output, while not violating basic domain structure principles.

The solution, simply, will entail formalising the requirement that a prefix be expressed as H (and allowing the prefix expression to minimally misalign to stem σ-1). Before pursuing this analysis (in §7.7.2.2 below), I provide further examples of this disjoint H phenomenon: the noun copula examples in (192) confirm the disjoint patterns from the verb depressor shift data (190).
**Noun copula**

(192) Misaligning prefix expression from disjoint H (nouns)

<table>
<thead>
<tr>
<th>Citation</th>
<th>Copula 1</th>
<th>Optional Copula 2</th>
<th>copula gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. mú-nyaago</td>
<td>mu-nyaago</td>
<td>mu-nyaago</td>
<td>it is a doorway</td>
</tr>
<tr>
<td>b. mú-nyaago-nyáana</td>
<td>mu-nyaago-nyáana</td>
<td>mu-nyaago-nyáana</td>
<td>it is a little doorway</td>
</tr>
<tr>
<td>c. lí-laaga</td>
<td>li-láaga</td>
<td>n/a</td>
<td>it is a day</td>
</tr>
<tr>
<td>d. lí-laga-nyáana</td>
<td>li-lága-nyáana</td>
<td>li-lága-nyáana</td>
<td>it is a short day</td>
</tr>
</tbody>
</table>

By the constraints motivated to this point, there is no reason for shift to occur off a depressed prefix onto the following syllable. Thus far, for the copula (192b,d), the only form predicted to occur is Copula 2: the first three syllables of the word (that is, prefix + two stem syllables) should be inside two LDs, with the first mora of the penult as the only locus for expression of H.\(^{124}\)

In (193-194) I provide verb and noun data from the same constructions just instantiated in (191-192) that indicates the presence of a depressor block\(^{125}\) analog: H fails to shift off the depressed prefix (= H sponsor) if it is followed by a lexically depressed syllable, even

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123 There are two surface forms manifest in each row of (192), distinct only in (192b,d): Copula 1 contains two H syllables (a disjoint reflex of H); optional Copula 2 has a single H surface syllable (that is, a single reflex). (192a,c) only appear not to reflect a disjoint (double) reflex under Copula 1 because post-sponsor shift target and Head syllable are coexpressed by the penult (which in this case requires no shift). The sociolinguistic parameters of the two copula forms are not fully understood. Copula 2 is given by some informants as the default form, a form that feels to them ‘more relaxed’, whereas Copula 1 is felt to be a more emphatic form. Others have less secure intuitions about which form matches which pragmatic context. What is important here is that both patterns occur.

124 In fact, Copula 1, the ‘non-default’ form for some speakers, is quite common; factors of dialect, speaker, register and style are not yet properly understood. For at least some speakers, this non-default Copula 1 is most definitely the default form; for them, Copula 2 form exists, but mostly as a pragmatically emphatic utterance.

125 I omit any present indicative verb data with disjoint (double) H reflexes that demonstrate blocking, for now; blocking effects with OPs can be elicited, but with greater difficulty; these are reported by native speakers to be less comfortable configurations in lexical paradigms—e.g. present indicative long form, cf. Appendix A, paradigm A—than the shift examples (190a-b). This is unsurprising, given that a blocked H on the OP preceding the stem would entail the OP being expressed as surface-H, which OPs in lexical paradigms in the ‘long’ form explicitly avoid (cf. *EXPRESS_OP in Chapter 5 §5.3). But also cf. Appendix A, paradigm C: present indicative short form, cf. (19g,i,k) and footnote 27): the depressed 1psOP offers disjoint and blocked forms.
though—again—there has been, up to now, no obvious reason for depression block earlier in the HD than at its Head position.

**Present participial**

(193) *Blocking disjoint H from misaligning off prefix into verb stem*

a. *... gí-vúlé|la*  
   me opening on behalf of  
   H blocked on prefix

b. *... gí-vúlé|la*  
   (shift into depressed stem σ-1 is bad)

c. *... gí-dzakadzakáliisa*  
   me injuring now and then  
   H blocked on prefix

d. *... gí-dzákadzakáliisa*  
   (shift into depressed stem σ-1 is bad)

**Noun copula**

(194) *Blocking disjoint H from misaligning off prefix into noun stem*

<table>
<thead>
<tr>
<th>Citation</th>
<th>Copula 1</th>
<th>Optional Copula 2</th>
<th>Copula gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. má-dvoolo</td>
<td>má-dvoolo</td>
<td>—</td>
<td>they are knees</td>
</tr>
<tr>
<td>b. má-dvoló-nyaana</td>
<td>má-dvoló-nyaana</td>
<td>—</td>
<td>they are little knees</td>
</tr>
<tr>
<td>c. tí-dzaaba</td>
<td>tí-dzaaba</td>
<td>—</td>
<td>it is news</td>
</tr>
<tr>
<td>d. tí-dzabá-nyaana</td>
<td>tí-dzabá-nyaana</td>
<td>—</td>
<td>it is small news</td>
</tr>
<tr>
<td>e. tí-dlu</td>
<td>yí-dlu</td>
<td>—</td>
<td>it is a house</td>
</tr>
<tr>
<td>f. fí-dlu-nyáana</td>
<td>yí-dlu-nyáana</td>
<td>—</td>
<td>it is a little house</td>
</tr>
</tbody>
</table>

The noun copula pattern confirms what was suspected for verbs in (191) above: shift *seems* to happen twice, e.g. (192b) [*mu{-nyá}lgo-nya]ana: the first shift ‘edge’ is *mu{-nyá}....* but the *real* HD right edge in this example is *go-nya*. Even in the block environment, two edges appear to be referred to, e.g. (194b) [*má]-*dvoló{-nyaana*, where H fails to shift off.

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126 I have intentionally selected the ‘non-default’ form of these nouns, i.e. without the effects of LD-Mn included; this makes evaluation simpler (and has no impact on the analysis of what will turn out to be ALIGNPREFIX below).

127 Nothing follows from the choice of gloss as ‘they are’ or ‘it is’; these both attempt to adequately translate the same morphological copula construction.
depressed $má$- before lexically depressed $-dvo$, but the right-edge HD head is $-lo$-, which must be inside the same HD.

I now attempt to explain this shift and blocking data in disjoint H words, beginning with the most insightful analysis (§7.7.2.2), then mentioning, but not substantively exploring, alternative approaches (§7.7.2.3).

7.7.2.2. Resolving disjointness: expressing the prefix+stem edge

Although we must admit that the patterns above present what appears to be an insuperable analytic problem for the tonological grammar constructed for Phuthi so far, there is a more coherent solution, that builds off several key insights (195), which will provide an explanation for disjointness.

(195) Characteristics of the disjoint Hs
a. If a H-sponsor lies outside (before) the stem domain of a word, that pre-stem locus must be realised as H (even if misaligned into the stem through shift);

b. If that pre-stem syllable is depressed, there must still be surface expression of H at the prefix+stem boundary (shift to the first stem syllable preserves this morphological edge-adjacency in a minimally relativised fashion);

c. Depression on the post-sponsor syllable (that is, stem $σ1$) overrides the depressor shift requirement, preserving edge-adjacency in situ (amounting to the depressor block effect);

d. The further insight which emerges from these ‘shifted’ and ‘blocked’ forms: wherever a ‘shifted’ H is tolerated at the left edge of the stem, it is because the leftwards realigning L domain (triggered by the presence of a depressor syllable inside the stem domain), via WSA-LF(L), fails to realign as far as the stem left-edge. The widescope L-realignment stops one syllable short;

e. Leftward realignment of the pre-stem sponsor (to an even earlier pre-stem syllable, if earlier toneless material is available) is never possible;

f. Shifted realignment into the stem beyond stem $σ1$ is never possible.

The analysis has one core function: identifying and expressing a Prefix Head position, and—in accordance with the possibilities provided by the ODT framework—allowing the prefix expression to minimally misalign where necessary.

635
I propose that as the morphological stem domain contrives to locate a prosodic Head at a particular phonological boundary\(^\text{128}\) for nouns and verbs (and all parts of speech), so too prefixes form a morphological domain, and they too conspire to realise H on the rightmost syllable of that morphological sequence, which we may call a `PREFIXHEAD` position (196). The implementing of this `PREFIXHEAD` will be achieved by an Express constraint (197), given that we cannot utilise an Align formalism (there being no phonological tone domain to align at the prefix edge).

\[(196) \text{PREFIXHEAD} \]
\[
\text{Head}^{\text{PREFIX}(x^*)} = (\text{Align } \sigma, \text{ Rt}, \text{ Prefix}_{x^*}, \text{ Rt})
\]

The Head of a prefix sequence \(x^*\) is the rightmost syllable in the prefix sequence.

\[(197) \text{EXPRESS_PREFIXHEAD} \quad (= \text{Express}_{\text{Prefix}})\]
\[
\text{Express} (\text{Prefix}, \text{Head})
\]

Express the Head of the Prefix.

The express constraint in (197) has the status of an intonation phonology requirement, similar to `ENDLOW` (Chapter §5.3.1.1): it overrides other considerations, potentially even overriding phonological domain structure (though that remains unnecessary in the present instance). Similar also to `*EXPRESS_OP` (Chapter 5 §5.4), `EXPRESS_PREFIX` requires a phonological relationship (H expression) on a morphological category (prefix). Similar, finally, to `EXPRESS_EDGE`, it is undominated, but may be minimally misaligned with reference to the original phonological or morphological reference point (here: the prefix edge).

The `EXPRESS` constraint will apply vacuously in the absence of a HD on a prefix sequence. The tone domain / prefix alignment in (197) will, thus, not incorrectly instantiate a HD, rather only fail to apply if there is no HD to align. The assumption, however, is that the `PREFIXHEAD` constraint in (196) is undominated, so `EXPRESS_PREFIX` will also at least attempt to apply (without gratuitously inserting the expressed H).

`EXPRESS_PREFIX` will fail to properly express on a depressed H prefix, under ‘shift’ conditions (190,192), and will misalign rightwards, once, to stem \(\sigma\). Under ‘block’ conditions

\(^{128}\) For example, the default boundary for phrase-final present indicative verbs (and for nouns) is the antepenult/penult edge. The boundary in many grammatical verb paradigms is the penult or ultima. This phonological right edge coincides with the Head position, except for shift configurations (§7.4.3.2); further reflection is offered in Chapter 8 §8.2.3.
(193, 194), *EXPRESSION_PREFIX* will succeed *in situ*, since misaligning would not improve the clash output at all. This proposal is reconfiguring what has been presented earlier (§7.4) as a domain align conflict (shift, block) as an *EXPRESSION* conflict. This opens up the analysis to the fact that the same empirical pattern (a LH tone sequence, to avoid a L/H clash) can be gotten at in at least two different ways. The relevant set of constraints interacting with *EXPRESSION_PREFIX* is given in (198).

(198)  **PrefixHead expression ranking**  
  b.  *EXPRESSION_L >> EXPRESSION_PREFIX* the prefix prefers to be surface-true to its depression status (whatever the source), than to surface as H.  
  c.  *EXPRESSION_PREFIX >> WSA-Lf (L)* better to express the prefix (even if misaligned, that is, shifted) than extend the L domain leftwards to the stem edge fully successfully.  
  d.  *L-in-H >> EXPRESSION_L* previously established, cf. §7.4.3.3, constraint summary (123e)  
  e.  *EXPRESSION_EDGE, Contrast_HD >> *L-in-H >> EXPRESSION_L >> EXPRESSION_PREFIX >> WSA-Lf(L)* transitivity: (a-d) above; (185).  

Disjoint ‘shift’ and ‘block’ candidates from (190-194) above are schematised in (199) and domained in (200-201).

(199)  **Disjoint prefix ‘shift’ and prefix ‘block’**  
  a.  [[σ]-σ[... σ] ...σ] σσ  
  ‘shift’: *EXPRESSION_PREFIX* is misaligned to stem σ-1  
  b.  [[σ]-{σ} ... σ] σσ  
  ‘block’: *EXPRESSION_PREFIX* succeeds *in situ* (on prefix)  

---

129 In each case, the hiatus dots may represent no syllables at all, or one or more syllables.  
130 It may be suggested that an OCP effect on the alignment of L domains is needed, so that the leftwards wide-aligning LD triggered in a depressor-bearing stem does not align all the way onto stem σ1; rather stem σ-1 will remain *non*-L in the case of the ‘shift’ environment (this schema in 199a), and therefore available to *EXPRESSION_PREFIX*. The OCP effect on L already exists, in effect, given the broad constraint proposed in Chapter 5 §5.1.1 (17): *ADJACENT_EDGES: * ]h[ij ‘The right edge of a feature domain may not be directly adjacent to the left edge of a distinct parse of the same feature type’. The constraint would be instantiated here with the feature, L. But this constraint will do no work for this data set (but cf. §7.8.1 for the introduction of the OCP constraint on L), given that this OCP effect here will be seen to fall out of pre-existing constraints (crucially, *EXPRESSION_L*) interacting with *EXPRESSION_PREFIX*. Not only that, but an OCP constraint actively at work here might prevent the non-depressed syllable in a reduplicative stem.
(200) Disjoint H domain structure: misaligned prefix expression

a. ...[{gi}]-lí{malimagi}sílisa  EXPRESS_PREFIX succeeds, misaligns H to stem σ-1

b. ...[{gi}]-{limalimagi}sílisa  alternative: EXPRESS_PREFIX fails

c. [mú]-{nyago}-nyá]ana  noun citation form

d. *[má]-{nyágo}-nyá]ana  ill-formed citation form: no reason for stem σ-1 to be H

e. [{mú}-nyá{go}-nyá]ana  Copula 1: EXPRESS_PREFIX succeeds, misaligns H to stem σ-1

f. [{má}-nyago]-nyá]ana  Copula 2 alternative: EXPRESS_PREFIX fails

(201) Disjoint H domain structure: non-misaligned prefix expression in situ

a. ... [[gí]}]-{dzhakada}ká]liisa  EXPRESS_PREFIX succeeds in situ (no misalign)

b. ... [{gí}]-{dzhakada}ká]liisa  alternative: EXPRESS_PREFIX fails; LD fusion

c. [má]-{dvo}ló]-nyaana  noun citation form

d. *[má]-{dvo}ló]-nyaana  ill-formed citation form (no reason for prefix not to be H)

e. [{má}]-{dvo}ló]-nyaana  Copula 1: EXPRESS_PREFIX succeeds in situ (no misalign)

f. [{má}]-{dvoló}-nyaana  Copula 2 alternative: EXPRESS_PREFIX fails

Tableau 16 (202)\(^{131}\) lays out the constraint interactions that optimally select the disjoint forms (both misaligned and the expected right-edge H) from (200a).

(131) The constraint ranking in Tableau 16 is sufficient, though there may be some possible rerankings; not all sequenced constraints are explicitly ranked relative to each other. But the chart adequately reflects all tone/voice dominance orderings argued for so far in this chapter.
Tableau 16: Expressing PREFIXHEAD by misaligning onto stem σ1

...gilimalimagisii sa ‘me cultivating intensively and indiscriminately’

<table>
<thead>
<tr>
<th></th>
<th>/ gi- + -lima-lim-ag-isis-a /</th>
<th>*L-in-H</th>
<th>Express L</th>
<th>Express Prefix</th>
<th>WSA-Lf (LD)</th>
<th>Express H</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>...[(gi)-]lf{malimagi}sf]isa</td>
<td>**</td>
<td>*</td>
<td>0, **</td>
<td>*****</td>
<td></td>
</tr>
<tr>
<td>(b)</td>
<td>...[(gi]-límálímá{gi}sf]isa</td>
<td>**</td>
<td>*</td>
<td>0, <em>†</em>***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c)</td>
<td>...[(gi]-{limalimagi}sf]isa</td>
<td>**</td>
<td>†*****</td>
<td>0, *</td>
<td>*****</td>
<td></td>
</tr>
<tr>
<td>(d)</td>
<td>...[(gí]-{limalimagi}sf]isa</td>
<td>**</td>
<td>†</td>
<td>0, *</td>
<td>*****</td>
<td></td>
</tr>
<tr>
<td>(e)</td>
<td>...[(gi]-{límalimagi}sf]isa</td>
<td>**</td>
<td>†</td>
<td>0, *</td>
<td>*****</td>
<td></td>
</tr>
</tbody>
</table>

- (a) is optimal, even though the PREFIXHEAD is misaligned by one syllable; it does not violate L expression; (b) fails on grossly insufficient depression anticipation;
- we have to assume that in (c) both Head edges (Prefix and HD) occur at the antepenult/penult boundary; it is not that the prefix head alignment fails completely, but that it is so egregiously misaligned (I suggested above that PREFIXHEAD never fails—that is, it is inviolable);
- (d) fails by not shifting the HD off the depressed copula prefix which sponsors the H, and EXPRESS_L is inviolate in this candidate set (the ‘shift’ or misaligning data);
- (e) overextends (or, perfectly extends) the leftwards realignment of LD, again at the cost of an EXPRESS_L violation (the EXPRESS_L >> WSA-Lf (L) ranking ensures that HD and LD avoid overlapping);
- *L-in-H does no work in this data set, but it will in the following tableau.

Similarly, Tableau 17 (203) lays out the constraint interactions that optimally select the disjoint—and non-misaligned (that is, depression ‘blocked’)—H forms from (201a).

---

132 The verb -lim-a ‘cultivate’ is an ‘optimal’ candidate for 2-σ, non-depressor-bearing, toneless transitive verbs; it serves as a useful base for reduplication, and for the semantics of the extensive suffix (‘indiscriminately’), with a semantically human grammatical subject, even though it produces curious meaning for the predicate as a whole. Nevertheless, words such as (202) are accepted as phonologically and morphologically well-formed, even when the 1ps OP is used, such as: ‘X cultivates me’. In (202) here, ‘me’ is an oblique subject in the non-finite participial clause. An alternative exemplar for this verb type is -hlab-a ‘stab’, which I use, but sparingly because of the semantic unpleasantness it denotes, especially in reduplicative forms.
Tableau 17: Expressing PrefixHead by not misaligning onto stem σ1

... gidzakadzakáliisa ‘me injuring here and there’

<table>
<thead>
<tr>
<th></th>
<th>/ gi- + -dzakadzakal-is-a /</th>
<th>*L-in-H</th>
<th>Express L</th>
<th>Express Prefix</th>
<th>WSA- Lf (LD)</th>
<th>Express H</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>(a) ...[{gi}]-dzakadza{ká}liisa</td>
<td>**</td>
<td>*</td>
<td></td>
<td>0, *</td>
<td>***</td>
</tr>
<tr>
<td>b</td>
<td>(b) ...[{gi}]-dzákadza{ká}liisa</td>
<td>**</td>
<td>*</td>
<td>*!</td>
<td>0, *</td>
<td>***</td>
</tr>
<tr>
<td>c</td>
<td>(c) ...[{gi}]-dzakadza{ká}liisa</td>
<td>**</td>
<td>****</td>
<td></td>
<td>0, *</td>
<td>****</td>
</tr>
<tr>
<td>d</td>
<td>(d) ...[{gi}]-dzá{ká}dz{a}káliisa</td>
<td>**<em>!</em></td>
<td>**</td>
<td></td>
<td>0, *, **</td>
<td>***</td>
</tr>
<tr>
<td>e</td>
<td>(e) ...[{gi}]-dzá{ká}dz{a}káliisa</td>
<td>**<em>!</em></td>
<td>*</td>
<td></td>
<td>0, *, **</td>
<td>***</td>
</tr>
</tbody>
</table>

- The set of interactions is similar to (202), except that here *L-in-H is called into service to separate optimal (a) from non-optimal (d-e), where WSA-Lf has improperly left-aligned the depressed L domain in (d), and (e) contains an LD with a syllable expressed as H.
- There is a problem with candidate (c): it appears to be more optimal than optimal (a), because it fails to violate Express_L, if we accept that the prefix is indeed being expressed, but as far right as the -ká- syllable coexpressing the right edge (the Head) of the HD. We may require some kind of expression window (e.g. a two syllable foot) within which Express_Prefix must be satisfied. This could extend to other (re)alignable Express constraints, to eliminate technically eligible, but highly implausible, candidates such as this one. If a candidate such as (c) truly fulfilled Express_Prefix (as well as Express_Edge), there would be significant dislocation between prefix site and expression site, so as to render successful prefix expression as relatively meaningless. A further alternative is that optimal (a) does not properly violate Express_L, and that this Express failure has to be reconsidered.
- (c) also illustrates the Copula 2 pattern (returned to below) where no H surfaces on the prefix domain at all; in Copula 2, there is no such thing as a 2-σ window within which to implement the Prefix H, in which case this will be the most optimal candidate.
- (d) is an interesting candidate that tries to circumvent the blocking obstacles by realigning to an available potentially non-depressed syllable between consonant depressors -ká-, but this necessitates more LDs than needed.
- (e) is very similar, though worse: HD and LD overlap.
- Both (d) and (e) fail mainly due to disjoint LD structure internal to the stem domain; challenger candidate (c) and optimal (a) both contain a single LD domain in the stem, which assumes that stem depressors fuse to create a single stem LD domain for all contiguous syllables. We return to LD fusion in §7.7.2.4, and then §7.8.1.8 below.
I make two final observations relating to disjoint Hs. First, in the case of shorter 2-σ stems where H is sponsored on the prefix, EXPRESS_PREFIX is always redundantly satisfied: the two express constraints—EXPRESS_EDGE and EXPRESS_PREFIX—and the HD right edge alignment constraint in this instance all target the same prosodic site, whether shifted or blocked, as illustrated in Tableau 18 (204)\textsuperscript{133}.

(204) \textbf{Tableau 18: EXPRESS_PREFIX and EXPRESS_EDGE can coincide}

\textit{tilïmo} ‘it is years’ (COPULA)

<table>
<thead>
<tr>
<th>/ tì- + -lim-o /</th>
<th>*L-in-H</th>
<th>Express L</th>
<th>Express Prefix</th>
<th>WSA-Lf (LD)</th>
<th>Express H</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{a)}) {tì}-líimo</td>
<td>*</td>
<td></td>
<td>*</td>
<td>0</td>
<td>*</td>
</tr>
<tr>
<td>(\text{b)}) {tì}-liimo</td>
<td>*</td>
<td>*!</td>
<td></td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

\textit{tidzaaba} ‘it is news’ (COPULA)

<table>
<thead>
<tr>
<th>/ tì- + -dzaba /</th>
<th>*L-in-H</th>
<th>Express L</th>
<th>Express Prefix</th>
<th>WSA-Lf (LD)</th>
<th>Express H</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{c)}) {tì}-{dzaa}ba</td>
<td>*</td>
<td>*</td>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>(\text{d)}) {tì}-{dzá}a)ba</td>
<td><em>!</em></td>
<td>*</td>
<td>*</td>
<td>0, *</td>
<td>*</td>
</tr>
</tbody>
</table>

Second, an important aspect to the way I have set up EXPRESS_PREFIX is that the depression pattern observed in §7.2.2.1, repeated as (205), remains satisfied by the ALIGN_PREFIX conditions.

(205) \textbf{Depression Pattern 1d: HD Lf-edge} (repeated)
The left edge [=sponsor] of a HD is not necessarily surface-expressed as H.

\textsuperscript{133} These two-syllable stems have no alternative Copula 2 surface form: *{tì}liimo, *{tì}dzaba. Such forms would entail no H surfacing on the prefix, which would leave the words toneless, violating MAX_H or CONTRAST_HD. More importantly, this would never happen, because even if the prefix domain failed to reveal the H contrast (or the prefix LD was fused with the stem LD, in (204c-d), cf. §7.7.2.4 below), the ‘basic’ HD always expresses H at its right edge. It just so happens in these examples that the two expression sites coincide. The basic HD never underexpresses altogether.
Not all HDs need to be H at their left edge; rather, only pre-stem material that sponsors a H must retain a surface trace of that H tone peak position. Examples from §7.2.2.1 are re-presented in (206a-b). While alternative EXPRESS-based conceptualisations of disjoint H might be along the lines of EXPRESSSPONSOR, or EXPRESSELFEDGE—both of which would appear to predict the disjoint H data seen in this section so far—both of which would also have directly contradicted (205), requiring not the surface forms in (206a-b), but the non-occurring forms in (206c-d).

(206) Predictions of obligatory left-edge expression of HD

a. si-ya-tshegeláana si-ya-[{tshege}lá]ana we buy for one another

b. si-ya-gadzagišélaana si-ya-[gadzagisé]laana we help stamp indiscriminately for e.o.

c. * si-ya-tshégeláana si-ya-[{tshe}g]lé]ana

d. * si-ya-gádzagišélaana * si-ya-[gádzagisé]laana

7. 7. 2. 3. Alternative approaches

Alternatives to the proposed EXPRESS_PREFIX approach may be ventured but none will be explored in any detail here; I briefly enumerate three.

First, we might posit a kind of intonational or tone shape approach (207) for the disjoint H misalignment examples.

(207) Expression of disjoint H left-edge falls out of intonational requirements (hypothetical)
A depressed syllable seeks to return from below-median (low) pitch to non-low pitch, by expressing the post-depressed syllable with above-median pitch (high).

That is, a depressed (Low) syllable must be followed—where possible—by a High syllable. If the depressed syllable is not a H sponsor, then DEPH would prevent gratuitous insertion of H; but where the depressed syllable is a H sponsor, then local shift must occur, irrespective of the ultimate right-edge target of H expansion. This LH shape—that is, local
shift—is conditional on the depressed syllable not being followed by a second breathy voiced (LD) syllable.

(207) can be rephrased as the need for a contour of the type [L,H] to obtain, wherever the first part of the contour condition (that is, depressed L inside a HD) is met. This may be formalised as (208).

(208) **LH Contour** (hypothetical)

[µ] must be followed by [ú].

There is additional evidence that may support such a generalisation. Data from the present indicative reduplicative (first seen in Chapter 4 §4.1ff., but not with the full range of surface possibilities), with depressor consonants in various stem positions, shows that a single H sponsor may instantiate multiply at the surface\(^{134}\): it appears that a LH contour corresponds to every depressor site.

(209) **Present indicative reduplicative: multiple H-expression sites**

a. bá-yá-dzakádzakálíisa they cause injury bit by bit

b. bá-yá-dzakádzakálísaana they cause each other injury bit by bit

Such an approach is highly stipulative, however: it does not explain the pattern. In addition, it obscures the fact that the H of LH is closely linked to the sponsor status of the L syllable, and to the antagonism of H and depressed L. While there may be some yet to be

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\(^{134}\) The conditioning of the multiple H-expression sites optional surface patterns is not fully understood. Not all stem lengths that should be able to support such multiple loci for the expression of H actually do so for all permutations. So, bá-yá-dzakáala ‘they become injured’ reduplicates as bá-yá-dzakadzakáala ‘they become injured bit by bit’, and not with the alternative *bá-yá-dzakádzakáala*, where the first -ka- would also be H. There are several variants that were offered as surface options related to speaker emphasis. For example, the underlyingly H object prefix in the present indicative long form, which is itself always surface-low (aside from an exceptional form with short stems), was also offered as H, under speaker emphasis. I have not included all such options in the present work. Unexpected forms such as the ones under consideration here, with multiple H loci, may indeed function as emphatic alternative forms, but robust verification of such data is awaited.
proposed articulatory account for the necessity of a LH sequence in response to a depressed H-sponsor, it is far preferable to let the necessary LH pattern fall out of constraints that are more explanatory, as have been proposed in the previous section.

And yet the LH shape requirement is not as far-fetched as it may seem. Comparative data from Xhosa (Cassimjee 1998:60-65) shows that a HD is surprisingly expressed entirely as H in that language (depending on dialect), when a depressed prefix (underlyingly H) immediately precedes the HD of a H stem (210a-b), as opposed to the general case, where only the head syllable (that is, right edgemost) is expressed as H (210c-d). It is as if the presence of the depressed H is sufficient to invoke a return to ‘full’ H status (that is, whole domain H) in successive syllables. This is analysed by Cassimjee as the interaction of an OCP-cum-fusion effect on adjacent Register Domains, which effectively plateaus HLH (that is, H0H) sequences into HHH. In intonation phonology terms, the LH contour would be anchored at the left edge of the depressor sponsor, and the H edge would be stretched rightwards (the H span in fact incorporates two merged non-downstepped H features).

(210) Xhosa LH triggered by depressed L preceding a HD-bearing stem

a. zi-yá-békísiisa they (Cl. 10) lay thoroughly
b. zi-yá-bónákíliisa they (Cl. 10) cause to be visible
c. bá-ya-békísiisa they (Cl. 2) lay thoroughly
d. bá-ya-bonakíliisa they (Cl. 2) cause to be visible

Second, we could make the observation for disjoint H prefix examples which minimally misalign (that is, which express prefix H on stem σ-1) that there are two loci in the HD that are prominent; we might hypothesise that both edge loci need expression as H, whatever the domain structure that underlies such expression (much as ENDLOW in Chapters 5 and 6 simply requires right-edge lowness, whatever the domain configuration). Equally stipulative to the LH proposal, this expression-based approach mandates two H peaks (at left and right edge of the HD), clearly subject to the presence of a H sponsor on the (depressed) prefix. This surface shape may be distributionally accurate, but such an approach explains nothing. It also suggests that this surface
phenomenon is genuinely an instance of H tone fission. The \texttt{EXPRESS\_PREFIX} strategy followed above avoids suggesting there has properly been tone fission.

Third, we could pursue an approach where a single UR H sponsor parses two discrete HDs (HD$_x$, HD$_y$); such domains could be triggered by the L sponsor in its sponsor position, where the HD prefix head or regular right head position overlaps with the LD sponsor (211).^{135}

(211) **Disjoint Hs indicate two discrete HDs** (hypothetical)

- a. $\left[x\{gi\}\text{-}lf\right]_x\{malima[gi]sf\}_y\text{isa}$ shift from SP into stem $\sigma 1$
- b. $\left[x\{mu\}\text{-}ny\text{á}\right]_x\{go\}\text{-}ny\text{á}\}_y\text{ana}$ copula 1: shift from prefix into stem $\sigma 1$
  (and also from antepenult onto penult)
- c. $\ldots\left[x\{gi\}\right]_x\text{-}\{dzakadza\}_y\{ká\}_y\text{si\text{sa}}$ block between SP and stem $\sigma 1$
- d. $\left[x\{má\}\right]_x\text{-}\{dvo\}_y\{ló\}_y\text{nyaana}$ copula 1: block between prefix and stem $\sigma 1$

This approach promises certain fruits, such as well-formed HDs where each left and right edge have a unique edgemate, and where expression as a property distinct from HD alignment need not be invoked. But, at the same time, a single UR H sponsoring two truly discrete (disjunctive) surface-H domains conflicts with basic ODT architecture (violating UNIQUE, and indeed any two-level phonology); the location of the left edge (or ‘sponsor’) of the second (rightmost) HD in such a configuration is highly problematic.

On the basis of the outlined weaknesses, I reject these three putative alternative strategies, retaining the disjointness analysis presented in §7.7.2.2.

7.7.2.4. Non-default non-disjoint HD outputs reflect LD fusion

It was shown in (192b,194b) above, repeated as (212a,b) that an alternative, non-default copula is available for the disjoint H forms: a single reflex of sponsor H, where H surfaces only in the expected HD right-edge position.

\footnote{Examples (211a-d) = (190a), (192b), (193c), (194b), but with slightly reconfigured HD structure.}
(212) **Non-default Copula 2: no disjointness**

a. \[\{m\}a\{nyag\}a\{nyá\}]ana \hspace{1cm} \text{copula 2: no prefix expression (misalign to stem } \sigma-1)\]

b. \[\{m\}a\{dvo\}l\{nya\}a\]ana \hspace{1cm} \text{copula 2: no prefix expression (in situ)\]

Similarly, for the verb data given in (190a, 193c), repeated as (213a,b), there is an alternative form where the depressed prefix has no prefix-aligned expression.

(213) **Non-default disjoint H verb data as non-disjoint**

a. \[\{g\}i\{limali\}m\{sí\}isa\] no prefix expression misaligned to stem } \sigma-1\]

b. \[\{g\}i\{dza\}ka\{ká\}liisa\] no prefix expression in situ

These surface forms are explicitly predicted not to be optimal, given the high ranking of *L-IN-H*, first proposed to trigger depression block. By the constraint, given the configurations in (212a,b, 213a,b), prefix expression should be guaranteed, as shift to the right (even though to the HD head position) worsens the *L-IN-H* violations in each case (from one, to two).

Rather, these *non*-disjoint H forms appear to result from an operation which has not been considered up to this point for LDs, but which is certainly required for adjacent HDs (Chapter 5 §5.2): domain fusion\(^{136}\). Just as HD fusion was argued to be triggered by an OCP instantiation, so it is for adjacent L domains; *AE(L)*\(^{137}\) (214). This constraint is the exact analog of *AE(H)* for adjacent HDs, itself a particular instantiation of : *ADJACENT_EDGES* (*AE*), first considered in Chapter 5 §5.1.1. Just as HD fusion emerges from banning the adjacency of identical H features, so it does with the OCP effect on L tokens in (214).

\(^{136}\) Such a move to fuse the two LDs would explain an otherwise unexplained asymmetry in non-default forms which I have not commented on: while the ‘blocking’ (that is, *in situ* expression) forms among disjoint H words commonly have this effectively toneless copula prefix due to LD fusion (215c,g), the shift examples (215a,e) among disjoint H words typically reveal this non-default form less often. Since there are no *lexically* adjacent LDs to fuse in the shift examples, this makes a certain analytic sense; it also calls for more careful account of gradient LD fusion effects, depending on whether a particular LD is lexically triggered *in situ*, or whether the fusible LD edge in question is a result of widescope realignment.

\(^{137}\) The structural conditions under which *AE(L)* applies are refined in §7.8.1 (where two distinct types of L emerge: \(L_{GRAM}\) and \(L_{LEX}\)): §7.8.1.6 (275), §7.8.1.8 (288).
The right edge of a L domain ($L_x$) may not be directly adjacent to the left edge of a distinct parse of $L$ ($L_y$).

Non-default fusion forms respecting $^{*AE(L)}$ are given in (215a,c,e,g). Unfused (non-default) domains are given in (215b,d,f,h), ill-formed by excessive $^{*L-IN-H}$ violation.

Clearly, the ODT style grammar or dialect grammar that allows or prefers the non-default forms must value LD fusion more highly than the parsing of LDs in situ. This would be reflected as in (216): highly ranked $^{*L-IN-H}$ is undominated in either case. The new $^{*AE(L)}$ is inserted either below $\text{EXPRESS\_PREFIX}$ (216a) to allow no LD fusion to take place in the case of Copula 1, and hence allow the disjoint H to surface in two places, obeying $\text{EXPRESS\_PREFIX}$; or $^{*AE(L)}$ is
inserted above Express_Prefix (216b) to achieve LD fusion in the Copula 2 cases. The choice of *AE(L) vs. Express_Prefix ranking is style-dependent (marked below with ζ).

(216) Selection of disjoint H or non-disjoint H (no prefix expression)
   a. *L-in-H >> Express_Prefix >> *AE(L)ζ
      Copula 1: prefix expression; no LD fusion; disjoint reflex
   b. *L-in-H >> *AE(L)ζ >> Express_Prefix
      Copula 2: no prefix expression; LD fusion; single (non-disjoint) reflex

7.7.3. Conclusion

This section has made two important theoretical (but also empirically significant) points: the universally assumed non-overlap of distinct feature tokens is demonstrably violable in the case of depressor-bearing HDs containing a pre-depressor widescope realigned LD; such a HD, whose left edge is L (but not breathy) can receive a distinct H token depressor-shifted into it, resulting in what appeared to be abstract initially to be domain overlap but was resolved as sponsor/domain misalignment, in the form of unincorporation (§7.7.1). Further, a single HD sponsor can result in the disjoint surface expression of that feature at the left and right edges of a single stem (§7.7.2); this is the only time that Phuthi allows a single HD to be non-contiguously expressed within a single morpheme. Yet there remains the fundamental observation that—barring the special instance of perfect fusion in the merging of adjacent HDs or LDs (as discussed in §7.7.1.1 above)—overlap of discrete feature tokens of the same feature type is incoherent, and thus banned above everything; hence the reranking of *OVERLAP,—now a general feature constraint—in (217-219) to the topmost position of the constraint hierarchy.

7.7.4. Constraint Summary

I summarise the new rankings (217), and the entire tone/voice constraint set up to this point (218), with the dominance relations visually sketched in (219).

(217) Constraint set (tone/voice), version 6: new rankings
   • Unincorporation rankings
     a. Express_Edge >> Incorporate (from 185)
     b. Contrast_HD >> Incorporate (from 185)
     c. Express_Edge >> Express_L (from 185)
d. Max H, Max L >> Incorporate (from 185)
e. Max-L >> *L-in-H (from 185)
f. Express_Edge, Max L >> *L-in-H >> Express_L >> WSA-Lf (L) >> Incorporate (from 185)

• Disjoint H rankings
a. Express_Edge >> Express_L (from 198)
b. Express_L >> Express_Prefix (from 198)
c. Express_Prefix >> WSA-Lf (L) (from 198)
d. Contrast_HD >> Express_Prefix (from 198)
e. Express_Edge vs. Contrast_HD (from 198)
f. Contrast_HD >> Express_L (from 198)
g. Express_Edge, Contrast_HD >> Express_L >> Express_Prefix >> WSA-Lf (L)

• Selecting disjoint H or non-disjoint H
a. *L-in-H >> *AE(L) >> Express_Prefix (ζ) (from 216) ζ = style-dependent
b. *L-in-H >> Express_Prefix >> *AE(L) (ζ) (from 216) ζ = style-dependent

• Reranking of *OVERLAP
a. *Overlap, >> everything (x = H, L, any other feature)

(218) Total constraint summary (tone/voice, partial): version 6
• Resolving CLASH
a. BA-Lf (L), BA-Rt (L)
b. Express_L >> Express_H
c. Max-H, Max-L >> Express_L >> Express_H >> *Rise

• Anticipating L
a. Crisp(L) >> WSA-Lf (L) >> BA-Lf (L)
b. BA-Rt (L) >> WSA-Rt (L)

• Shift
a. Head, = (*AE, >> NonFin (π), >> HD-Min, >> AvoidProm(π), >> WSA-Rt(π), >> BA-Rt,)
b. Express_Edge >> Head_H >> Express_L >> Express_H

• Block
a. Express_Edge, Max-L, Head_H >> *L-in-H >> Express_L, WSA-Lf (L)

• L Minimality
a. NonFin, AvoidProm >> LD-Min
b. LD-Min >> Express_H
c. *Overlap(L) >> LD-Min
d. *Overlap(L), NonFin, AvoidProm >> LD-Min >> Express_H >> NonFin, AvoidProm
• **Masked and quasi-depression**
  a. *Max-L (π) >> Max-L  
     \( \pi = \text{past subjunctive} \)
  b. (Express_H >> Express_L) (\( \pi \))  
     \( \pi = \text{past subjunctive} \)

• **Unincorporation**
  a. Express_Edge >> Incorporate
  b. Contrast_HD >> Incorporate
  c. Express_Edge >> Express_L
  d. Max H, Max L >> Incorporate
  e. Max-L >> *L-in-H
  f. Express_Edge, Max L >> *L-in-H >> Express_L >> WSA-Lf (L) >> Incorporate

• **Disjoint H**
  a. Express_Edge >> Express_L
  b. Express_L >> Express_Prefix
  c. Express_Prefix >> WSA-Lf (L)
  d. Contrast_HD >> Express_Prefix
  e. Express_Edge vs. Contrast_HD
  f. Contrast_HD >> Express_L
  g. Express_Edge, Contrast_HD >> Express_L >> Express_Prefix >> WSA-Lf (L)

• **Selecting disjoint H or non-disjoint H**
  a. *L-in-H >> *AE (L) >> Express_Prefix (\( \zeta \))
  b. *L-in-H >> Express_Prefix >> *AE (L) (\( \zeta \))

• **Reranking of *OVERLAP**
  a. *Overlap_x >> everything (x = H, L, any other feature)

[turn to the next page for (219) ‘Constraint rankings (tone/voice), version 6:  
  dominance orderings’]
the re-rankability of *AE(L) and EXPRESS_PREFIX is a choice conditioned by style (ζ), achieving either Copula 1 (misaligned prefix expression) or Copula 2 (in situ prefix expression).
7. 8. Lexical and Grammatical Depression without Segmental Triggers

In the previous sections of this chapter, we have established the following points relating to voice/tone interactions (220).

(220) Voice / tone interactions
a. Depression and breathiness are not coterminous: tonal depression occurs on certain syllables (stem edge to pre-breathy syllable) which do not manifest breathy voicing;
b. An independent tone feature (L) has been proposed, appearing to enable the capture of this asymmetry (breathiness entails L-ness; but L-ness does not entail breathiness).
c. Except for a surprising paradigm-specific suspension of depressor shift (the depressed SP in the past subjunctive, cf. §7.6.3), the L feature forces the depressor shift/block phenomenon at the right edge of any HD (the head position), in order to resolve the H/L clash.

In this final section on tone/voice, we examine the full set of Phuthi depression data not triggered by consonantal breathiness. In §7.8.1, we consider all possible configurations of tone and voice interactions for a single grammatical paradigm: the present indicative negative. We see new evidence for the independence of depression (analysed as the L feature) from breathiness. But we also see new wrinkles in the deployment of L. First, L can be used grammatically: it is inserted on the penult of toneless stems in certain grammatical paradigms (here: the present negative); second, this grammatical L has properties partially distinct from lexical L: it is unrealignable leftwards; its parsing is subject to an OCP constraint on adjacent L features. Third, HD and LD can co-occur, both structurally and in terms of surface expression (that is, without an LD-embedded head H being rising). Fourth, the grammatical L blocks tone shift into its domain, as lexical Ls do.

In §7.8.2, I consider a small, but diverse, set of lexical and morphological forms that require lexical parsing of non-consonant-triggered (breathy) depression, also on the penult, or on a grammatical prefix, where the insertion process is sensitive to the tone category of the penult, and to a segmental property of the syllable onset at the potential insertion site (sonorancy). We see, then, that non-consonant-triggered L can be either lexical or grammatical, but that both types target the same prosodic prominence site.
7.8.1. **Tonelessness and Depression: Positional Insertion of Grammatical L**

There is a set of Phuthi verb paradigms whose penult syllables, in toneless stems, are depressed. These include the present negative and the remote past\(^{138}\). The process of grammatical depression (L) insertion (and the targeting of the penult locus) is further examined in §7.8.2. In the present section, the tone/voice properties of the present negative are examined, in detail, as it is a paradigm that displays a very wide range of tone/voice interactions. Specifically, I examine the paradigm in these sections: the basic pattern of the present negative (§7.8.1.1); hypotheses concerning the location of the depressed syllable: stem-initial or stem-final (§7.8.1.2); the claim of an unrealigned grammatical L on the penult of toneless stems (§7.8.1.3); distinct behaviour between lexical and grammatical L tone (§7.8.1.4); the insertion of grammatical L exclusively on toneless/low stems (§7.8.1.5); the OCP effect on grammatical L-insertion (§7.8.1.6); the typology of fusible H domains, relative to L features: fusion and anti-fusion (§7.8.1.7); lexical tone category conflation by LD fusion (§7.8.1.8); LD minimality, including the important typology of fusible HD structures (292) (§7.8.1.9); depressed prefix-triggered shift and anti-fusion (and pseudo-anti-fusion) (§7.8.1.10); the possibility of reinterpreting the lexical stem contrast as H vs. L (§7.8.1.11).

### 7.8.1. Present negative

The present tense indicative negative is a grammatical paradigm which instantiates the ‘stem-σ2-to-penult’ grammatical H pattern (cf. the chart in Chapter 6 §6.1, Tableau 1 (3)): in all stems longer than two syllables, all syllables from σ2 to the penult surface as H (providing no depression). Thus, in 3+σ toneless stems (223-225), stem σ1 is empty, reserved for the lexical H which appears in 3+σ H stems (228-230). All non-depressed negative SP prefix morphology displays essentially the same surface tone behaviour: σσ... (except for the particular pattern of 1-σ and 2-σ stems, which I comment on following the exposition of data below).

\(^{138}\) The present negative and remote past have distinct phonological and tonal properties, which are relevant in the selection of distinct analytic approaches here: (1) the remote past contains a lengthened tense/aspect (pre-stem) morpheme -a:-, which the present negative lacks; (2) the remote past also forbids in all cases tone-shift off a depressed prefix into its penult syllable; we will see that the present negative only forbids such shift for verbs in the toneless/low category. Finally, the present negative has a very short vestigial mid-to-low falling tone on its prefix a- (the only instance of its kind), which I have uniformly represented as toneless.
Present negative: H NegSP + toneless (low) stems

(221) 1-σ stem
   a. akáa-tí s/he doesn’t come
   b. akáa-nyí s/he doesn’t excrete

(222) 2-σ stem
   a. aká-líími s/he doesn’t cultivate
   b. aká-báási s/he doesn’t light a fire

(223) 3-σ stem
   a. aká-li’bááli s/he doesn’t forget
   b. aká-pa tááli s/he doesn’t pay

(224) 4-σ stem
   a. aká-li’bátíísi s/he doesn’t delay
   b. aká-li’mísíísi s/he doesn’t cultivate intensively

(225) 5-σ stem
   a. aká-li’bátíísií s/he doesn’t delay intensively
   b. aká-te’pé|líísi s/he doesn’t make (smn) do (sth) slowly

Present negative: H NegSP + High stems

(226) 1-σ stem
   a. akáa-phí s/he doesn’t give
   b. akáa-khí s/he doesn’t draw (water)

(227) 2-σ stem
   a. aká-bóiíni s/he doesn’t see
   b. aká-méémi s/he doesn’t invite

(228) 3-σ stem
   a. aká-sébééti s/he doesn’t work
   b. aká-bóníísi s/he doesn’t show

(229) 4-σ stem
   a. aká-sébééísi s/he doesn’t use
   b. aká-khúúmíísi s/he doesn’t help speak

---

Gloss conventions: ‘smn’ = ‘someone’; ‘sth’ = ‘something’. The downstep is given for all the toneless/low stems, because the step is often more noticeable than it is in other paradigms, even though it is only crucially contrastive for the 2-σ stems (222). The downstep in (221) is ultima (cf. Chapter 5 §5.5.4), whereas for (223-225) it is regular general downstep (§5.5.2).
Thus the H tone domain structure of this paradigm is uncontroversially assigned as in (231), with the exception of 1-σ and 2-σ stems.

The 1-σ High and toneless (low) stems above (221, 226) display the grammatical H on their only stem syllable, and it is downstepped relative to the H prefix—as one expects based on the claims made about downstep (and Register Domains)—at the penult/ultima boundary of the two H syllables (Chapter 5 §5.5.4).

But the surprise lies in the 2-σ toneless (low) stems, which carry an obligatory downstep at their antepenult/penult juncture. This might appear unsurprising at first, since it was argued in Chapter 5 §5.5 that this very juncture is marked by downstep (Cr i s pSTEM & AvoidP ret >> *AE), that is, the conjoined anti-antialign constraint repels the OCP instantiation which otherwise causes fusion at the HDx-HDy interface). But by this reasoning the 2-σ H stem *aká-bóóni should also contain a downstep, and it does not. Either (a) this paradigm tolerates HD-fusion at the antepenult/penult, and the toneless (low) stems suspend this for some reason; or (b) no fusion is tolerated at this juncture (in L stems, at least), and a particular constraint must override anti-fusion and enforce it for High stems alone.

7. 8. 1. 2. Stem-initial or stem-penult depression, or neither

Before settling on an account of this wrinkle, additional information from the same paradigm is supplied (232), but with the (depressed) 1ps as SP (and H, as all SPs are in this

The matter of whether the SP and the stem H domains are fused or not in (231b) is treated in §7.8.1.7 below.
paradigm): two toneless stems with a surprise rising H (not low) on the depressed second syllable SP (232a,d), each with two non-occurring but potentially expected surface forms (232b-c,e-f); contrasted with two H stems, each with no rise on the depressed SP syllable (232g,i), each with one\textsuperscript{141} non-occurring alternative (232h,j).

(232) 2-\(\sigma\) present negative stems

Toneless/low stems

a. agí-\textsuperscript{1}límí I don’t cultivate

b. *agí-\textsuperscript{1}límí \textit{this reflects HD\textsubscript{2}-HD, unincorporation, cf. participial \(\text{\textit{gi}}\)-tšééga, ‘me buying’; and (g, i) below}

c. *agí-\textsuperscript{1}límí \textit{this reflects depressor shift, cf. \(\text{\textit{gi}}\)-lááda ‘me fetching’, where the penult is lexically and grammatically toneless/low}

d. agí-\textsuperscript{1}báási I don’t light a fire

e. *agí-\textsuperscript{1}báási \textit{this reflects HD\textsubscript{2}-HD, unincorporation, cf. participial \(\text{\textit{gi}}\)-tšééga, and (g, i) below}

f. *agí-\textsuperscript{1}báasi \textit{this reflects depressor shift, cf. \(\text{\textit{gi}}\)-lááda ‘me fetching’, where the penult is lexically and grammatically toneless/low}

H stems

g. agí- bóóni I don’t see

h. *agí-\textsuperscript{1}bóóni \textit{this would reflect shift failure (block), as in (a,d) above}

i. agí- méémi I don’t invite

j. *agí-\textsuperscript{1}méémi \textit{this would reflect shift failure (block), as in (a,d) above}

The refusal of (232a,d) to accept a H shifted off depressed, H -\(\text{\textit{gi}}\)- is parallel to what was seen at the SP-OP interface in §7.6.3: no shift off a clearly depressed (and breathy voiced)

\textsuperscript{141} We do not expect depressor \textit{shift} with H stems, e.g. *agí-bóóni, because the penult is already (level) H: agí-bóóni.
syrillable. This phenomenon is highly marked in Phuthi: almost no non-depressed syllable refuses to receive a shifted H off the preceding depressed syllable.

Up to this point in the grammar we have seen that a H tone generally fails to shift under only two conditions (233).

(233) **Shift failure conditions**
a. Depressed H fails to shift to an immediately following syllable if that successive syllable is also depressed;
b. Depressed H phrasal penult fails to shift to the phrasal ultima.

In all other cases that we have seen that shift occurs if its structural description is met. Assuming, broadly, that there are no conditions for shift failure besides block (233)—and the occasional paradigm-specific condition\(^{142}\)—then in the present indicative negative, penults in the toneless (low) paradigm must be depressed (the first condition for shift failure, in 233), given that they are not in ultima position (the second condition, 233b).

But the problem we need to face is as follows: toneless stem penults in this paradigm are not apparently breathy (even though are markedly lower in pitch), or, at least, certainly not breathy in the same way that lexically depressed (breathy) syllables are. This appears to be the case from the spectrographic and pitch footprints: there is less F2 reflecting early onset of breathy perturbation and no rising F0 intonation on the lowered penult.

Breathiness in Phuthi has been argued to be mediated by a Low feature (L). Most of the data in this chapter has involved overt breathiness, and L has been a convenient feature to represent this breathiness. Not only lexical L but also what I have called grammatical L (in fact, grammatically triggered L) have been exemplified, where both kinds of syllable are breathy (e.g. the grammatical insertion of L in noun copula prefixes has also invoked a breathy syllable).

We have also seen that L domains can be extended from the sponsor syllable, both leftwards, under depression anticipation, achieved by WSA-L\(_F\) (L), and rightwards, under L minimality, achieved by LD-Min. These extended LD syllables, in all cases, have been seen *not* to be breathy.

\(^{142}\) In the past subjunctive (§7.6.3.2), we saw a stipulation on shift opacity between the SP and the OP: shift fails in this paradigm, under this morphological sequence.
I propose the same for the present negative: the initial, or the penult, in the 2-σ stems above is tonally depressed (but not breathy). The question is whether all initial syllables, or perhaps all penults, in this paradigm can be considered depressed.

We will see below that one version of this hypothesis can be maintained (depressed penults), although only with modification. The current Phuthi paradigm would then, however, be different from all others thus far, in that grammatical pitch depression is being instantiated without audible breathiness, and in a prosodically defined stem position.

The domain structure in (234) exemplifies (222a) and (232a).

(234) Proposed LD for toneless (low) stem initial / penult syllable

a. a[ká]-[līí]mi s/he doesn’t cultivate (= 222a)

b. a[ǵf]-[līí]mi I don’t cultivate (= 232a)

I observe that even though this LD-proposal for the stem initial / stem penult is motivated by the non-shift of H off the (consonantal-triggered) depressed SP, -ǵf-, the intonationally depressed (though surface H) pitch on the penult -lī- also receives an explanation under this analysis.

Before a final analysis can be reached, we need to see the full range of stem lengths with the consonantally depressed 1ps prefix. In (235-244), the present negative paradigm is repeated, but this time with the depressed (breathy) H 1ps prefix. We see here that toneless/low stems longer than two syllables (235-237) do not block shift off the depressed SP into their stem σ1 slot. This requires an explanation.

Present negative: H 1ps NegSP + toneless/low stems

(235) 1-σ stem

a. agīi-’Brien I don’t come

b. agīi-'nyī I don’t excrete

There is some auditory ambiguity, and without a systematic quantitative acoustic study (which I do not provide here), there can be no firm characterisation of the depression footprint.
(236) **2-σ stem**

a. agí-‘lí̱mí I don’t cultivate

b. agí-‘báási I don’t light a fire

(237) **3-σ stem**

a. agí-‘ḻbááli I don’t forget

b. agí-pá’tááli I don’t pay

(238) **4-σ stem**

a. agí-‘ḻbátíísi I don’t delay

b. agí-‘ḻmísíísi I don’t cultivate intensively

(239) **5-σ stem**

a. agí-‘ḻbátíísí I don’t delay intensively

b. agí-‘ṯpélíísi I don’t make (smn) do (sth) slowly

**Present negative: H 1ps NegSP + H stems**

(240) **1-σ stem**

a. agíi-phí I don’t give

b. agíi-khí I don’t draw (water)

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The subset of this data set (236-237) that contains a pre-antepenult (or earlier) downstep is important evidence for (non-)fusion, to be examined in §7.8.1.10 below. This is the first time in this work that data encoding pre-antepenult downstep has been advanced. Contra the general claim made in Chapter 5 §5.5, downstep earlier in a word than the antepenult-penult boundary is encodable in Phuth, but only in grammatical paradigms such as the present negative, and usually only in response to depression-induced patterns, such as the shift instantiated here. This does not fall under general, positional or ultima downstep (§5.2-§5.4). Downstep in (235a,b) and (240a,b), by contrast, is neither depression-related, nor positional, but simply ultima downstep (§5.4).
(241) 2-σ stem
   a. agí-bóóni I don’t see
   b. agí-méémi I don’t invite
(242) 3-σ stem
   a. agí-sébééti I don’t work
   b. agí-bóníísi I don’t show
(243) 4-σ stem
   a. agí-sébéétíísi I don’t use
   b. agí-khúlúmíísi I don’t help speak
(244) 5-σ stem
   a. agí-sébéétíísií I don’t work intensively
   b. agí-khúlúmélííli I don’t speak on behalf of

The shift of H off -gi- into toneless/low stems longer than two syllables cannot be straightforwardly explained by the structure proposed in (234), if the proposed depression is linked to the stem-initial syllable. If stem-initial were the insertion site for grammatical L, we would predict depressor block for 3-σ to 5-σ stems (245) in addition to the attested 2-σ stems (236), according to the depressor blocking patterns seen in this chapter thus far.

(245) Predicted depressor blocking in toneless/low present negative stems
   a. *a[{gí}]-{li}[báá]li vs. 237a
   b. *a[{gí}]-{li}[bátí]si vs. 238a
   c. *a[{gí}]-{li}[bátí]sií vs. 239a

We are faced, then, with the three representational choices in (246a-c) if stem σ1 is generally the grammatical depression site for all stem lengths.
(246) Choices in solving shift into present negative stems longer than 2-\(\sigma\)
   a. Toneless stem \(\sigma 1\) does not parse a LD; therefore, shift can occur into it;
   b. Stem \(\sigma 1\) parses a LD, and shift occurs into it nevertheless;
   c. Shift into stem \(\sigma 1\) (for the 2-\(\sigma\) stems) must be accounted for by some mechanism other than depressor shift.

(246c) is without merit. The shift in the present negative is not in any obvious way qualitatively different from shift in any other paradigm, and there is no reason why such shift should receive a distinct theoretical treatment. Both (a) and (b) are problematic, but for different reasons: (a) implies that a LD is parsed in stem \(\sigma 1\) only for 2-\(\sigma\) stems (where the downstep, and shift/block, are in evidence); (b) implies that the presence of a LD is insufficient to ensure depression blocking. Interestingly, after all paradigms have been considered in this dissertation, (b) is the only truly uncontested fact about depression: a depressed (or any other) H in head position absolutely never shifts into a second depressed syllable under any conditions. It would be a major analytic weakness to concede that LD only intermittently blocks depressor shift. In such a case, blocking would exit the realm of phonological predictability and enter some other (perhaps paradigm-specific) terrain.

The solution is clearly (246a) above: stem \(\sigma 1\) does not parse a depression domain. But it must then parse a L feature on the penult, given that depressor shift off the 1ps depressed negative SP is blocked onto the first syllable of the 2-\(\sigma\) stems in (236a-b).

The obvious hypothesis, then, is that not just 2-\(\sigma\) stems but all toneless/low stems parse a L feature on the penult. Yet this immediately runs into an analytic and empirical paradox: if the penult is depressed, why are the pre-penult stem syllables not also depressed as they should be according to depression anticipation (§7.3)?

Comparatively, this grammatically ‘imposed’ depression is also argued for on some paradigm penults in certain toneless/low paradigms in closely related Swati: present negative (as here), perfective negative, and imperative (Rycroft 1980b:10-14). But the Swati pattern is not evidence for the Phuthi pattern per se; it is merely suggestive of a penult tone/voice distribution that may be expected in Phuthi. Further, the Phuthi data is crucially testable for domain properties that the Swati data is not: since Swati is a Head-high language, only the Head (rightmost element) of a H domain surfaces as H. In Phuthi, however, all domain members strive to be surface-H. Since pre-penult (but non-initial) syllables are H for toneless stems in the
present negative, the default hypothesis is that they are not part of a L domain. If they are not part of a L domain, then L may not be being parsed on the penult. We have come full circle.

Three possibilities for toneless stems in the present negative now exist\(^{145}\): (a) the penult is depressed, but no pre-penult syllables are depressed, completely violating WSA-L\(_F\) (L), and contradicting the general facts of anticipated depression (248a, 249 below); (b) the penult is depressed, and WSA-L\(_F\) (L) does cause pre-penult syllables to be depressed too, but these pre-penult (non-initial) L syllables can also simultaneously express H (248b, 250 below), contradicting the general claims of L/H antagonism; (c) a conjoined constraint prevents a HD from extending across the antepenult/penult (that is, prefix/stem) boundary, even if that HD extension is triggered by depressor shift, and it occurs in a particular paradigm—the present negative.

Analysis (c) can be rejected immediately; although it is technically accurate, it does no more than restate the observed facts: under this set of conditions, a HD does, indeed, not extend across the antepenult/penult boundary. But nothing is explained. Worse, it is clear that a HD can extend across the antepenult/penult boundary for non-toneless/low stems, that is, for H stems: in (247a-b), the two HDs surely fuse, contra the anti-fusion conjoined constraint proposed in Chapter 5 §5.5. It may be a paradigm-specific condition that overrides the general anti-fusion condition at this prosodic boundary. But the evidence for fusion is clear: non-downstep of the

\(^{145}\) There is a fourth possibility that is suggestive of an analytic direction, but which is ultimately insufficient: toneless/low stems in this paradigm could require presence of a Low (or, at least, toneless) syllable somewhere in the toneless/low stem. This would be uncontroversially satisfied in all stems longer than two syllables by the \(\sigma_1\) position, since \(\sigma_1\) is lexically empty for toneless/low stems (unless bearing a shifted H from pre-stem \(\sigma_1\)). But in short 2\(\sigma\) stems, such a Low requirement would remain unsatisfied, unless the presence of L were manifest in obligatory downstep (as occurs), which downstep might be triggered by the obligatory but prosodically empty Low domain: \(aká-\lií\mi\) (222 above), that is \(a[ká-\{\}]\[^{\_}\lií\mi\), where the presence of the empty LD is sufficient to force downstep. This would be an ODT analogue to the floating L proposed as the downstep trigger in Pulleyblank (1988), and in other pre-OT works. This could also account for the failure of depressor shift at the left edge of a short stem: \(agi-\lií\mi\) (232a=236 above), that is \(a[\{gij\}-\{]\[^{\_}\lií\mi\). Where this ‘empty LD’ approach would be inadequate is in its failure to account for the well-formedness of shift into stem \(\sigma_1\) for all toneless stems longer than two syllables (235-237 above); for these stems, the L requirement in toneless/low stems would have to be suspended, hence the overall insufficiency of this analysis. But even if there were feature-bearing units inside a domain which simply remained unexpressed (that is, fatal expression, cf. Chapter 3 §3.3.4)—that is, unlike the empty configuration mooted here—the status of an empty feature domain is theoretically troubling, possibly ill-formed.
penult, relative to the antepenult (247b-e), implies HD fusion. Thus, the data in (247) must cause hypothesis (c) to be rejected.

(247) **HD can extend across antepenult/penult boundary**

a. agi-bóóni \(a[x_1 \{g_i x\}-bó_y x_2 \{y \}_1 n_1\) I don’t see

b. aká-bóóni \(a[x_y ká-bóó]\_x_3 n_1\) s/he doesn’t see

c. aká-sébééti \(a[x_y ká-sébéé]\_x_5 t_2 \) s/he doesn’t work

d. aká-sébéétiši \(a[x_y ká-sébéé\_t_5]\_x_3 s_1\) s/he doesn’t use

e. aká-sébéétišiši \(a[x_y ká-sébéé\_t_5 s_1]\_x_3 s_1\) s/he doesn’t work intensively

It is worth considering the (a) and (b) analytic strategies outlined above, for examining the distribution of H/depression/shift/block in toneless stems: the general schema for toneless stems (e.g. 5-σ stems) is predicted by strategy (a) to be as in (248a), exemplified in (249), where WSA-L\(_F\)(L) fails to apply at all; strategy (b) predicts (248b), exemplified in (250), where **EXPRESS** _H and EXPRESS_ _L_ are satisfied simultaneously throughout both domains.

(248) **Depression in present negative toneless stems**

a. no anticipated depression \(σ[\_]- σ[σ σ(\_)]σ\)

b. depression anticipation, \(σ[\_]- σ[\{σ σσ\}]σ\)

H expression

(249) **Present negative: no anticipated depression**

a. a[ká]-li[\{báti{s}f\}_1]s\_1 s/he doesn’t delay intensively

b. a[ká]-te[\{pě\_lîf\}_1]s\_1 s/he doesn’t make (smn) do (sth) slowly

(250) **Present negative: H and L co-expression**

a. a[ká]-li[\{báti{s}f\}_1]s\_1 s/he doesn’t delay intensively

b. a[ká]-te[\{pě\_lîf\}_1]s\_1 s/he doesn’t make (smn) do (sth) slowly

7. 8. 1. 3. Toneless stems contain an unrealigned grammatical L on the penult

There are obvious problems with both strategies, but fewer with strategy (a)—the failure of anticipated depression (‘unrealigned L’). Two conditions must apply with the unrealigned L
(L-on-penult-only) strategy (a), in (248a, 249): (1) WSA-LF (L) is reranked lower, so that it fails to realign a L leftwards; (2) the left edge of the LD, on the penult, fails to suddenly lower pitch at that point, but rather lowers the entire HD pitch contour that begins (typically) on stem σ2 (that is, the microadjustments on the tone register are extended from the L penult sponsor leftwards to σ2).

Strategy (b) in (248b, 250), on the other hand, would require suspension of the basic observations about CLASH that lie at the heart of the L/H antagonism in Phuthi. Based on previous comments about interpretation of domain structure, we would expect from such configurations that every [(σ)] syllable be both depressed (L) and H, that is, a short rising H. This is not surface-true.

 Strengthening the argument for the unrealigned L strategy ((a) above), it is very difficult to decide whether the post-stem-initial pre-penult syllables are indeed H or not, for some speakers, such is the general level of audible and observable tone depression across the domain. In other words, even though WSA-LF(L) may not be properly realigning left for some speakers, for others there does appear to be realignment, and (partial) expression of the resulting widescope LD as L. But even with strategy (a), there are analytic problems.

7. 8. 1. 4. Grammatical L vs. lexical (consonantal) L

There are three obstacles (though none is insurmountable) to the unrealigned L analysis. First, although post-initial pre-penult syllables are H (or H-ish)—or at least not properly toneless/low when there is a depressor on the penult—the otherwise typical WSA-LF (L) effect is properly manifested when the penult (or pre-penult) contains a consonantal depressor; this is exemplified with depressors in the stem σ2, σ3 and σ4 positions (251-253)\(^{146}\).

(251)  σ2 depressor: 3σ stem

a. aká-ladzeéli s/he doesn’t follow
b. aká-mabheéli s/he doesn’t forgive

\(^{146}\) The effect is not unambiguously visible when the depressor occurs in σ2 position, because σ1 is guaranteed to be toneless with these toneless/low stems; σ3+ depression makes it clearer.
We have to conclude that the domain structure for these forms reflects successful WSA-L_F(L), as in (254c-d), *contra* the proposed structure for the unrealigned L strategy to handle grammatical L (254a-b). Competing examples are provided in (254b,d).

(254) Competing (non)realignment of L

**no realignment:** grammatical L on penult (unsuccessful WSA-L_F(L))\(^{147}\)

a. σ[ό]- σ[ό σ[ό]]σ
b. a[κά]-li[bátí[σí]í]si

**realignment:** lexical (consonantal) L on penult (successful WSA-L_F(L))

c. σ[ό]- σ[σ σ σ]σ
d. a[κά]-pa[θalageéli]

This appears to be a serious analytic impasse: WSA-L_F(L) as it stands cannot select among which input feature configurations it seeks to be surface-true for. Either all L features are input to this realignment, or none are. The solution to this impasse will address the remaining two empirical problems: (1) the long H penult syllable in the present negative paradigm surfaces as -VV-, that is, *not* as rising -VV- (255), which is unexpected given the established nature of phonetically depressed syllables sponsored on the penult: they are always rising; (2) in phrase-medial position, penult depressed syllables from the present negative paradigm do not shift H to the ultima (256), as otherwise predicted in §7.4.1 above.

\(^{147}\) This form could also be a[ká]-li[bátí[σí]í]si, with the grammatical L aligned to the right edge of the penult (since there is no rising pitch in these examples). Structure addressing the non-rise is proposed in (255) below.
Depressed penults: level vs. rising H

a. σ[ʃ]- σ[ʃ ʃ{ʃʃ}]σ  
   *level penult H* (grammatical L on penult)

b. a[kά]-li[báltí{sí}]si

c. [ʃ]- σ[σ ʃ {ʃ}]σ  
   *rising penult H* (lexical L on penult)

d. aká-pa[{talage}é]li

L/H clash on penult: non-shift vs. shift

a. σ[ʃ]- σ[ʃ ʃ{ʃ}]σ ...

b. a[kά]-li[báltí{sí}]si  ka[kgúulú]  
   *no shift* from grammatical L penult to ultima

c. σ[ʃ]- σ[ʃ ʃ{ʃ}]σ ...

d. aká-pa[{talage}lí]  ka[kgúulú]  
   *shift* from lexical L penult to ultima

There is a possible resolution to all three types of unexpected behaviour: it is clear from (254-256) that the two L feature instantiations behave distinctly from one another. This would appear to constitute evidence for a second instantiation of L; in other words, there exists L_{lex} and L_{gram}, just as in Chapter 6 there was evidence that lexical and grammatical Hs (H_{lex} and H_{gram}) behave distinctly. If this is the case here with L tones too, then we can indicate distinct behaviour of the two L tones (lexical consonant-triggered L vs. grammatical L), as given in Tableau 19 (257).

<table>
<thead>
<tr>
<th>LD reflects these properties</th>
<th>Lexical L (L_{lex})</th>
<th>Grammatical L (L_{gram})</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSA-LF (L) (depression anticipation)</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>L causes depressor shift</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>EXPRESS_L &gt;&gt; EXPRESS_H(µ) (rising tone on the penult)</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>depressor block (from left)</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>L creates pitch downstep</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>LD Head expressed H</td>
<td>no (unless penult rising H)</td>
<td>yes</td>
</tr>
<tr>
<td>L triggered by consonant</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>L triggered by grammatical paradigm requirements</td>
<td>no</td>
<td>yes</td>
</tr>
</tbody>
</table>
All constraints proposed prior to the present negative paradigm which involve L can be rewritten as $L_{LEX}$; the basic alignment and expression of $L_{GRAM}$ outranks these constraints (258).

\[
\text{(258) } L_{LEX} \text{ vs. } L_{GRAM} \text{ ranking }
\]
\[
\text{BA-Lf (} L_{GRAM} \text{)}, \text{Express}_{L_{GRAM}} \gg \text{Express}_{Edge} \gg \text{Head}_H \gg \text{Express}_{L_{LEX}} \gg \text{WSA-Lf (} L_{LEX} \text{)}
\]

7. 8. 1. 5. L insertion only on toneless/low stems

I propose, thus, that the toneless/low class stems (in paradigms such as the present negative) require presence of a grammatical L in their outputs (259). Triggering this grammatical LD constitutes an instantiation of grounding-initiated grammatical enhancement (cf. discussion to follow in §7.8.2), since the grammatical L domain enhances the morphological category of low (argued here as tonelessness).

\[
\text{(259) } L_{-INSERTION} (\pi) \quad \text{(first version)}
\]
\[
(\text{Low stem})_{\pi} \Rightarrow L_{GRAM}
\]
A toneless/low stem($\pi$) invokes a grammatical L feature.

Either this constraint exists demonstrably for paradigms where it is visibly active, such as in the present case (present negative), or it is reranked in other paradigms such that it has no visible PR effect.

The first option for this L manifestation is reflected in (259) above, according to paradigm-specific requirements; this is not possible in a strict, classical OT architecture, since all constraints are always present and uniquely ranked in a single grammar. Rather, the tone-insertion constraint is specified only for certain paradigms ($\pi$)\textsuperscript{148}.

But we also need to identify why the $L_{GRAM}$-insertion fails for H stems in paradigms where it is demonstrably active in non-H stems. The principled solution is fundamentally clear, even if the mechanism is not: L-insertion in H stems would never enhance the stem tone category. That is, the operation of (259) in H stems would be an ungrounded constraint. And yet the most

\textsuperscript{148} This is the first usage of paradigm-specific ($\pi$) subcategorisation in a constraint, but not the first use of $\pi$ to indicate paradigm-specific rankings (Chapter 6 §6.2.2.1, §6.2.2.2, §6.2.2.3, §6.3.3.1); also cf. Chapter 5 §5.6.2 for level $\lambda$-specific rankings.
unmarked form of the insertion constraint would attempt to redundantly insert $L_{\text{gram}}$ in all $\pi$-stems, both toneless/low and H. The insertion constraint can be brought in line with other parse constraints by the reconfiguration in (260).

(260) **L-INSERTION (\pi)**  
\[ \text{Max } L_{\text{gram}} (\pi) \]  
Parse a grammatical L tone (in $\pi$ paradigms where it is invoked)\textsuperscript{149}.

The conditional insertion of L subject to the general grounding conditions rejecting a L/H combination, is articulated here as a ban on the cooccurrence of lexical H with grammatical L in the same stem (261)\textsuperscript{150}.

(261) **\text{*StemClash****  
\[ *(H_{\text{lex}} \cdot L_{\text{gram}})_{\text{stem}} \]  
Do not parse a lexical H and grammatical L in the same stem domain.

This amounts to a DEP effect, forcing the unparsing of grammatical L, if the potential parse (MAX) domain already contains lexical H. The constraint interaction must be as in (262), with a notional DEP_L constraint providing the general counterpoint to gratuitous $L_{\text{gram}}$ insertion.

(262) **\text{*StemClash} >> \text{Max } L_{\text{gram}} (\pi) >> \text{Dep L}**

It would be preferable to avoid the ungrounded configuration contraindicated in (261) through ranking the full set of MAX and EXPRESS constraints which refer to tone features H and L (262), rather than through yet another cooccurrence restriction constraint (261); but this is not possible, since the parsing of grammatical L, as construed in this section, never forces

\textsuperscript{149} The parse site for $L_{\text{gram}}$—the penult—is further considered in §7.8.2, to be presented as a right-aligned DAP (depression accent projection) foot.

\textsuperscript{150} There is an alternative: $L_{\text{gram}}$ is inherent in every toneless/low stem. The problem, of course, is that this would only be evident in certain paradigms (e.g. present negative), and would need suppression everywhere else. This does not appear to offer any analytic advantage (although a richness-of-the-base line of analysis would assume $L_{\text{gram}}$ comes with all stems, ‘H’ or ‘L’). The general discussion—alluded to in respect of quasi-depressed OPs in §7.6.3.2—is resumed in the conclusion to this chapter, §7.10, and in Chapter 8 §8.3.8.
underparsing or underexpression of grammatical or lexical H. If \( L_{\text{gram}} \) merely achieves tonal depression of the entire H domain in which it is located (and blocks H shift at its left edge), without the other cluster of depression effects, as I have argued, then the failure of \( \text{MAX } L_{\text{gram}} \) cannot be achieved through any ranking of parse and express constraints.

This is made clear in (263): \( H_{\text{gram}} \) and \( L_{\text{gram}} \) both parse in (263a)\(^{151}\); only \( H_{\text{gram}} \) parses in the structurally nearly identical—but categorically distinct—(263b)\(^{152}\); similarly, \( H_{\text{gram}} \) and \( L_{\text{gram}} \) both parse in (263c); \( H_{\text{lex}} \) and \( H_{\text{gram}} \) parse in (263d), but not (\( L_{\text{gram}} \)).

\((263)\) \( L_{\text{gram}} \) never forces underparsing or underexpression of another H or L

a. aká-\( \text{lí}^{\circ} \)mi  
\hspace{1cm} a[ká]-\{\( \text{lí}^{\circ} \)\}_{L_{\text{gram}}}H_{\text{gram}}mi  
\hspace{1cm} s/he doesn’t cultivate  
\hspace{1cm} *a[ká]-[\( \text{lí}^{\circ} \)\]_{H_{\text{gram}}}mi  
\hspace{1cm} \( L_{\text{gram}} \) must parse in low stem

b. aká-bóó ni  
\hspace{1cm} a[ká]-bóó\]_{H_{\text{gram}}}ni  
\hspace{1cm} s/he doesn’t see  
\hspace{1cm} *a[ká]-\{bóó\}_{H_{\text{gram}}}ni  
\hspace{1cm} \( L_{\text{gram}} \) must not parse in H stem

c. aká-\( \text{bá}^{\circ} \text{tísíí}^{\circ} \)si  
\hspace{1cm} a[ká]-\{\( \text{bá}^{\circ} \text{tísíí}^{\circ} \)\}_{L_{\text{gram}}}H_{\text{gram}}si  
\hspace{1cm} s/he doesn’t help delay  
\hspace{1cm} *a[ká]-\{\( \text{bá}^{\circ} \text{tísíí}^{\circ} \)\}_{H_{\text{gram}}}si  
\hspace{1cm} \( L_{\text{gram}} \) must parse in Low stem

d. aká-\( \text{sé}^{\circ} \text{bétísíí}^{\circ} \)si  
\hspace{1cm} a[ká]-\{\( \text{sé}^{\circ} \text{bétísíí}^{\circ} \)\}_{L_{\text{gram}}}H_{\text{gram}}si  
\hspace{1cm} s/he doesn’t work intensively  
\hspace{1cm} *a[ká]-\{\( \text{sé}^{\circ} \text{bétísíí}^{\circ} \)\}_{H_{\text{gram}}}si  
\hspace{1cm} \( L_{\text{gram}} \) must not parse in H stem

The clash configuration of lexical H and grammatical L cannot be demonstrated to fall out of the independent ranking of constraints. Rather, this shows that the *L/H clash effect (anti-expression reflecting gestural antagonism) is manifest in yet another variation through this morphologically specified phonological ban\(^{153}\).

The only impossibly H/L lexical/grammatical feature cooccurrence that emerges here is *(H\(_{\text{lex}}\), L\(_{\text{gram}}\)), that is, as already articulated by *STEMCLASH. All other combinations occur.

---

\(^{151}\) It is certainly \( H_{\text{gram}} \) and not \( H_{\text{lex}} \) that parses, given the rankings argued for in Chapter 6 §6.2.1.1 (20a), also demonstrated in §6.2.2.1 (28).

\(^{152}\) Not even \( H_{\text{lex}} \) parses here; see previous footnote.

\(^{153}\) Final discussion on the range of L/H clash patterns is provided in Chapter 8 §8.3.4.
7. 8. 1. 6. OCP effect on L insertion

The insertion of grammatical L in the present negative for toneless/low stems is further subject to an OCP effect: if the target toneless/low stem already contains an instance of lexical L inside the maximum potential scope of H for this paradigm, then grammatical L insertion fails (there is no audible depression on the penult), as in (265, 266, 269, 270, 272, 274); in other cases, grammatical L insertion succeeds vacuously (masked by lexical depression on the penult), as in (264, 268, 271).

Present negative: toneless (low) stems, lexical depression in σ1

(264) 2σ stem
a. aká-vááli  s/he doesn’t close  penult is lexically depressed
b. aká-vuúli  s/he doesn’t open  penult is lexically depressed

(265) 3σ stem
a. aká-vuˈlééli  s/he doesn’t open for  penult is not grammatically depressed (stem σ1 is lexically depressed)
b. aká-dziˈtěéli  s/he doesn’t bury  penult is not grammatically depressed (stem σ1 is lexically depressed)

(266) 4σ stem
a. aká-dzaˈkáliísí  s/he doesn’t injure  penult is not depressed (stem σ1 lexically depressed)
b. aká-dziˈtúːįːli  s/he doesn’t dig up  penult is not depressed (stem σ1 lexically depressed)

Toneless (low) stems: lexical depression in σ2

1σ stems: no examples

(267) 2σ stem
a. aká-ˈlāádzi  s/he doesn’t fetch  penult is grammatically depressed; (ultima is lexically depressed)
b. aká-máábhi

s/he doesn’t hold penult is grammatically depressed; (ultima is lexically depressed)

(268) 3σ stem

a. aká-ladżééli

s/he doesn’t follow penult is depressed (lexical)

b. aká-mabheééli

s/he doesn’t forgive penult is depressed (lexical)

(269) 4σ stem

a. aká-ladżééli

s/he doesn’t pursue penult is *not* grammatically depressed (stem σ2 is lexically depressed)

b. aká-mabheééli

s/he doesn’t delay (smn) penult is *not* grammatically depressed (stem σ2 is lexically depressed)

(270) 5σ stem

a. aká-ladżééliíísí

s/he doesn’t line (sth) up penult is *not* grammatically depressed (stem σ2 is lexically depressed)

b. aká-yadžulúúki

s/he doesn’t become larger penult is *not* depressed (stem σ2 is lexically depressed)

**Toneless (low) stems: lexical depression in σ3**

(271) 4σ stem

a. aká-limageééli

s/he doesn’t cultivate indiscriminately for penult is lexically depressed

b. aká-hlabageééli

s/he doesn’t stab indiscriminately for penult is lexically depressed
(272) \(5\sigma\) stem

a. akā-limagelíisi  s/he doesn’t help cultivate
    indiscriminately for  penult is not depressed
    (stem \(\sigma 2\) is lexically
depressed)

b. akā-hlabagelíisi  s/he doesn’t help stab
    indiscriminately for  penult is not depressed
    (stem \(\sigma 2\) is lexically
depressed)

Toneless (low) stems: lexical depression in \(\sigma 4\)

(273) \(5\sigma\) stem

a. akā-patalageéli  s/he doesn’t pay
    indiscriminately for  penult is lexically depressed

b. akā-tamisageéli  s/he doesn’t stir
    indiscriminately for  penult is lexically depressed

(274) \(6\sigma\) stem

a. akā-patalagelíisi  s/he doesn’t help pay
    indiscriminately for  penult is not grammatically
depressed (stem \(\sigma 4\) is
lexically depressed)

b. akā-tamisagelíisi  s/he doesn’t help stir
    indiscriminately for  penult is not grammatically
depressed (stem \(\sigma 4\) is
lexically depressed)

The penult syllables in (265, 266, 269, 270, 272, 274) should all be depressed. Since none
are, and since these stems each contain a lexically depressed syllable preceding the penult inside
the stem domain, we are led to conclude that the correlation is significant: no toneless/low stem
seems capable of supporting both \(L_{\text{gram}}\) and \(L_{\text{lex}}\) simultaneously.

The OCP constraint instantiated in (275) covers this condition on successful parsing of
grammatical L.

(275) \(^{*}AE\ (L_{\text{lex}}, L_{\text{gram}})\ (\pi)\quad (*AE\ (L_{L/G}))\)

\(^{*}AE\ [H_{\text{gram}}\alpha... (L_{\text{lex}}, L_{\text{gram}})...]_{H_{\text{gram}}\alpha, \pi}

\(L_{\text{lex}}\) and \(L_{\text{gram}}\) cannot cooccur inside a grammatical H domain of paradigm \(\pi\).
(Up to this point, π refers only to the present negative; the convention of interpretation for this particular constraint, *AE (L_{L,G}) π, is that the offending adjacency refers to (L_{LEX} + L_{GRAM}), that is, one of each of the two L tone types).

This is exactly parallel to Swati, which grammatically depresses the penult in certain paradigms (present negative, perfective negative, imperative; cf. Rycroft (1980b:10-14)), but fails to do so if there is a pre-penult stem syllable which is depressed.

But the *AE (L_{L,G}) constraint in (275) is apparently different than the *AE(H) constraint motivated in Chapter 5 §5.1—and the analogous *AE(L) constraint proposed in §7.7.2.4 to account for non-default disjoint H verb data being implemented as non-disjoint—because the offending configuration does not necessarily involve strict syllable adjacency. Rather, the configuration violates *AE (L_{L,G}) if the two Ls are anywhere adjacent inside H_{GRAM} domain. Yet, the constraint is only apparently different from *AE(H): non-locally adjacent L syllables are still adjacent on the L tone tier, assuming a version of autosegmental feature tiers, and assuming underspecification of L (and H) on segments for which these tones are not defined (e.g. most consonants), and for which they are not active (e.g. on toneless vowels).\(^{154}\)

It is necessary to stipulate the H\_GRAM domain as relevant to the application of *AE (L_{L,G}) in (275), because thus far the *AE (L_{L,G}) effect is attested only in this environment.

It is necessary in (275) to stipulate that the *AE (L_{L,G}) constraint applies to the specific L subtypes, L_{LEX} and L_{GRAM}, because there is no such underparsing OCP effect on the cooccurrence of two lexical Ls inside a grammatical HD, as demonstrated in (276).

\(\text{(276) No underparsing OCP effect on two L}_{L,\text{LEX}} (L)\) tokens

\[
\begin{align*}
\text{a. } & \text{ aká-vuúgi} & a[\text{ká}]-[\{\text{vu}\}_{L,\text{LEX}}\{\text{ú}\}_{H}\{\text{gi}\}_{L}]_{L} & \text{s/he doesn’t agree} \\
\text{b. } & \text{ aká-vugisí} & a[\text{ká}]-[\{\text{vu}\}_{L,\text{LEX}}\{\text{gí}\}_{L}\{\text{i}\}_{S,\text{H}}} & \text{s/he doesn’t cause to agree} \\
\text{c. } & \text{ aká-vugelísí} & a[\text{ká}]-[\{\text{vu}\}_{L,\text{LEX}}\{\text{ge}\}_{L}\{\text{íf\text{-}}\text{í}\}_{S,\text{H}}} & \text{s/he doesn’t cause to allow} \\
\text{d. } & \text{ aká-vuláági} & a[\text{ká}]-[\{\text{vu}\}_{L,\text{LEX}}\{\text{láá}\}_{H}\{\text{gi}\}_{L}]_{L} & \text{s/he doesn’t open indiscriminately}
\end{align*}
\]

\(^{154}\) I also assume, as indicated in footnotes 22 and 23, that L and H are privative features.
e. akâ-vulagiši  
a[kâ]-{vu}_{L},la{gi}_{L},i]_{HE,si}  
s/he doesn’t help open indiscriminately

In none of these examples can there be underparsing of either of the two $L_{\text{LEX}}$ tokens which are parsed inside the grammatical H domain, neither when the two $L_{\text{LEX}}$ tokens are adjacent (276b,c) —which one might argue indicates fusion—nor when they are non-adjacent (276e). This is reflected in (277a). Further, the anti-insertion OCP constraint in (275) must outweigh the parse-requiring MAX constraint motivated in (257) above—given again in (277b)—in order to force underparsing.

(277) OCP rankings
a. Max $L_{\text{LEX}}$ >> *AE ($L_{\text{LEX}}, L_{\text{GRAM}}$) ($\pi$)

b. *AE ($L_{\text{LEX}}, L_{\text{GRAM}}$) ($\pi$) >> Max $L_{\text{GRAM}}$ ($\pi$)

There is a second possible response to *AE ($L_{\text{LEX}}, L_{\text{GRAM}}$) ($\pi$), that is, to the OCP effect on L domains (275): fusion (this option is explored in §7.8.1.7).

7.8.1.7. Fusion and anti-fusion: a typology of fusion inhibition

It is clear from the data provided at the beginning of this section (§7.8.1) in (227-230, 247) that H stems demonstrate fusion of adjacent HDs. In two distinct instances, H stems display fusion effects through absence of downstep, whereas toneless/low stems do not fuse (and do display downstep effects): (a) the NegSP H fuses with the lexical H in stem $\sigma_1$, schematised in (278a-b); this only apparently fails in (278c), due to ultima downstep invoked by a Register Domain on the ultima (cf. Chapter 5 §5.5.4). Fusion is exemplified in (278c-f, 279); (b) the same NegSP will fuse with the OP in the present negative paradigm (283).

(278) Prefix+stem-$\sigma_1$ fusion: H stems (vs. toneless/low stems)

{SP} - {stem}

a. $\sigma | [\sigma] | [\sigma..\sigma]$ $\sigma$  
   default (conservative) unfused structure, repeated from (231)
   $H_{\text{LEX}} H_{\text{GRAM}} H$

b. $\sigma | [\sigma - \sigma \sigma..\sigma]$ $\sigma$
   proposed configuration: all adjacent HDs are fused
   $H_{\text{LEX}} H_{\text{GRAM}} H$

674
c. akáa-phi s/he doesn’t give (fusion; ultima downstep assigned by *akáa-phi Register Domain Principle C)

d. aká-bóóni s/he doesn’t see (no downstep at antepenult-penult) *aká-á-bóóni

e. aká-sébëéti s/he doesn’t work (no downstep evident *aká-á-sébëéti

f. aká-sébëtíísi s/he doesn’t use (no downstep evident) *aká-á-sébëtíísi

The crucial datum above is 2-σ (278d), where we expect to see downstep if there is no fusion. Yet fused aká-bóóni contrasts with unfused, downstepped aká-ílíími, suggesting that the entire set of SP+stem data (that is, H-H, for H stems) in the present negative is fused.

This fusion/downstep distribution is most surprising in light of fusion (or downstep failure) that occurs elsewhere only in phrase-medial forms such as the present indicative (‘short’) form (Mpapa dialect), and the present indicative reduplicative short form (Mpapa). Phrase-mediality has been shown to remove penult length, thus precluding the trigger conditions for the conjoined constraint (AvoidProm & CrispStem) to apply, thus failing to allow downstep to be implemented at the antepenult-penult boundary.

We can safely assume that there truly is no downstep here, because even though pre-antepenult downsteps are rare, they are visible, e.g. in the unfused post-shift effect to be seen in (299b-e) below. It may be that pre-antepenult downstep is visible only in the unfused post-shift environment; but no further light can be shed on such a claim, because it is presently untestable.

This pattern where the short H stem fails to express as toneless/low on the surface (repeating (226) above)—despite Chapter 5 §5.4, where the 1-σ H stem surfaces as toneless/low in the OP+Stem sequence—confirms the present negative is a grammatical paradigm, and that the ultima tone is H_GRAM, not the stem H_LEX, as shown by the toneless/low stem in (221): akáa-tí. Cf. discussion of Register Domains in Chapter 5 §5.5.6, and to follow in §7.9 (here: (326)).

We can safely assume that there truly is no downstep here, because even though pre-antepenult downsteps are rare, they are visible, e.g. in the unfused post-shift effect to be seen in (299b-e) below. It may be that pre-antepenult downstep is visible only in the unfused post-shift environment; but no further light can be shed on such a claim, because it is presently untestable.

The fusion failure in aká-bóóni is only marginally less surprising given that there are other phrase-final forms that also fail to fuse at the antepenult-penult boundary (e.g. perfective long form, infinitive long form, both given in Chapter 5 §5.2.1). Such paradigm-specific suspension of the antepenult-penult downstep requirement is deeply problematic. It would appear to reduce the predictability of downstep to zero, but as long as it is maintained that these cases are exceptional, the downstep hypothesis can continue. And whatever problems there may be elsewhere, they apply to all tone classes in the paradigm, unlike the present negative, where only the H stems are affected by fusion (downstep failure).
Phrase-finally, according to the present negative phrase-final forms just cited, the SP and stem domains should fail to fuse, thus *aká’-bóóni, aká’-líími, which is incorrect for H stems; phrase-medially, SP and stem domains should unproblematically fuse, thus aká-bóóni..., *aká’-líími..., which is also incorrect, this time for toneless/low stems. Fusion and anti-fusion across this SP+stem boundary (including antepenult-penult forms) takes place, for all H stems, regardless of phrase-mediality or -finality, and never takes place, for toneless/low stems (at least for toneless/low 2-σ stems). In these 2-σ stems, there is never fusion; but then the penult of such stems (which in the 2-σ forms in (278d) occurs at the SP+stem boundary) is depressed; and depression interrupts fusion.

Generally, we can observe that fusion occurs between (strictly) adjacent H domains (279a) unless a depressed syllable commences at the downstep site^158, as with toneless/low stems, cf. L_gram in (279b), L_les in (279c). A test for the H stem fusion domain comes in the form of H stems with a depressor consonant in stem σ1 (or later in the stem). We expect the H SP and H stem not to fuse, if the fusion site contains a depressor; this is born out (279c,e), for two reasons:
(1) the H SP is never expressed low; if there were fusion across a depressed stem σ1, we might expect that the SP would express as L, since it would anticipate the depression of stem σ1 (279d,f), via the implementation of WSA-LF(L)^159; (2) the post-depressor stem H is downstepped relative to the SP H^160.

---

^158 This condition on fusion occurring unless an instance of depression *commences* at the fusion site is crucial to understanding why fusion is tolerated in §7.8.1.9 below (where there are depressed prefixes, but their left edges precede the fusion site).

^159 I proposed in §7.3.2 of this chapter that WSA-LF(L)—the leftward realignment of the L domain left-edge—is sensitive to the stem boundary; I achieved incomplete realignment (that is, failure to reach the word left-edge), in the general case, by CRISP(L), which bans the intrusion of a morphological (macro)stem boundary inside a (realigned) L domain. I assumed in §7.3.1 that HDs do fuse at the prefix+stem boundary even if L realignment does not align with the newly fused left-edge. I did not relate depression anticipation to the location of the HD left-edge. Although this matter is not entirely resolved, the evidence for non-fusion related to the presence of L seems sufficient, based on (279b). The fusion typology presented in (292) below will confirm that the two HDs in (279b) are never expected to fuse, due to the anti-fuse effect of *L-IN-H (which evaluates LD tokens in HDs). For the current grammatical paradigm, we will see immediately below that optional fusion of SP and OP does occur, suggesting that L realignment can ignore certain (non-stem) morphological boundaries. In addition, we will see that adjacent L domains (depressed negative prefix, followed by depressed stem σ1) do provide evidence of SP+Stem fusion.

^160 A depressed H (short rising), or post-depression H, is always expressed lower than the
Fusion and non-fusion: the role of depressors

a. aká-bóóni a[ká-bóó]ni s/he doesn’t see fusion btw SP & OP
b. aká-líími a[ká]-{líí}mi s/he doesn’t cultivate no fusion with stem σ1
c. aká-vuúni a[ká]-{vuú}ni s/he doesn’t harvest no fusion (stem σ1 depressed)
d. *aka-vuúni *a[ká]-{vuú}ni  (fusion)
e. aká-lagaáti a[ká]-{laga}áti s/he doesn’t wish no fusion (σ2 depressed)
f. *aka-lagaáti *a[ká]-{laga}áti  (fusion)

The fuller set of data reflecting the unfused SP+stem H domains (where stem σ1 is depressed) is provided in (280).

Present negative: NegSP + H stems, σ1 = depressor

Prefix+stem-σ1 fusion: H stems; depressor syllables = σ1

a. aká-a’dlí a[ká]-{dlí}] s/he doesn’t eat
b. aká-vuúni a[ká]-{vuú}ni s/he doesn’t harvest162
c. aká-vu’níísi a[ká]-{vuú}níísi s/he doesn’t help harvest
d. aká-vi’ísíísi a[ká]-{vi}ísíísi s/he doesn’t understand
e. aká-vu’séllíísi a[ká]-{vuú}séllíísi s/he doesn’t help renew

The second instance of fusion in this paradigm concerns the SP and OP, the two pre-verb stem prefixes: a fused domain structure is proposed in (281b), reflecting the absence of downstep at the SP-OP boundary, which downstep would crucially fall out of the non-fused domain preceding HD, although there is some variability in the expression of a H that has been depressor-shifted, which typically expresses ‘extra H’ (cf. discussion in §7.9, under Register Domains).

Sigxodo Phuthi reveals optionally alternative patterns to Mpapa Phuthi, where the structures in (279d, f) are also legitimate surface forms, suggesting that Sigxodo Phuthi tolerates optional fusion and then L realignment across the negative SP.

This rising H tone on a lexically depressed penult contrasts clearly with the level H grammatically depressed penult in aká-’lúúmi.

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structure in (281a). The short stem in (282a) is fused, but this is only evident from the SP-OP boundary (not the OP+stem boundary, which succumbs to the word-final anti-expression constraint); Fusion operates for all (pre-stem) morpheme boundaries, as anticipated, attested to by (282b-d).

\[(281) \text{ SP-OP fusion: High stems (vs. toneless/low stems)} \]
\[
a. \sigma[\sigma]\text{SP-[\sigma]}\text{OP-[\sigma]|\sigma...\sigma}\sigma \quad \text{default (conservative) structure}^{163} \]
\[
\begin{array}{ccc}
H & H & H_{\text{LEX}} H_{\text{GRAM}}
\end{array}
\]
\[
b. \sigma[\sigma_{\text{SP}} - \sigma_{\text{OP}} - \sigma...\sigma]\sigma \quad \text{revised configuration: adjacent HDs are fused} \]
\[
\begin{array}{ccc}
H & H & H_{\text{LEX}} H_{\text{GRAM}}
\end{array}
\]

\textbf{Present negative: H NegSP + H OP + H stems}

\[(282) \text{ SP-OP fusion: H stems} \]
\[
a. \text{akā-bāá-phi} \quad \text{a}[kā-bāá-phi] \quad \text{s/he doesn’t give them}^{164} \\
\begin{array}{c}
\text{b. akā-bā-bóóni} \quad \text{a}[kā-bā-bóóni] \quad \text{s/he doesn’t see them} \\
\text{c. akā-bā-bóńúśi} \quad \text{a}[kā-bā-bóńúśi] \quad \text{s/he doesn’t show them} \\
\text{d. akā-bā-bóńísíśi} \quad \text{a}[kā-bā-bóńísíśi] \quad \text{s/he doesn’t see them clearly}
\end{array}
\]

All things being equal, we expect the OP to be underlyingly H but surface-L, as shown in Chapter 5 §5.4. But I note for the forms in (282) that the OP here is remarkably surface-H, as found only in certain limited other paradigms (e.g. present indicative phrase-medial short form, cf. Chapter 5 §5.4; past subjunctive, cf. §7.6.3.2), which surface-H expression contrasts with the lexical tenses where the OP systematically sponsors a H, but fails to surface as H in all but the monosyllabic H stems (and the 1-σ and 2-σ toneless/low stems). The OP anti-express constraint *EXPRESS\_OP must thus be cophonologically reranked below EXPRESS\_H(σ) in this present negative paradigm (but only if the surface forms are from non-depressor-bearing prefixes and stems, as we will see in §7.8.1.9 below), suggested in (283a), vs. general OP underexpression (or anti-expression), as in (283b).

163 (279a,b) above do not display all available HD tokens: their stems are too short to contain both lexical and grammatical stem Hs (the lexical H is ‘missing’).

164 Throughout the examples in (282), ‘them’ is represented by the Class 2 OP, -bār-.
Reranking of *EXPRESS_OP

a. Express_H(\(\sigma\)) >> \*Express_OP (\(\pi\)) better to express every syllable in a HD as H rather than to underexpress the OP as H (\(\pi\) includes the \{present negative\})

b. \*Express_OP (\(\pi\)) >> Express_H(\(\sigma\)) general OP anti-expression (Chapter 5 §5.4)

Alternatively, *EXPRESS_OP must be redefined to apply to a narrower range of morphological paradigms than before.

This fusion data from H stems in (282) above contrasts with the equivalent non-fused toneless/low stems (284), where non-fusion is saliently signalled by the downstep in (284a-b), and, by hypothesis of paradigmatic uniformity, in (284c-d).

Present negative: H NegSP + H OP + toneless/low stems

(284) SP-OP fusion: toneless/low stems

a. aká-búú-nyi  
a[ká]-[búú]-nyi  s/he doesn’t excrete it

(284a-b) fail to fuse the SP-OP H and OP+stem H, respectively, not because of the conjoint constraint (AVOIDPROM_&_CRISPSTEM), which is now ranked too low, but because two HDs do not fuse where the second HD contains a depression domain, as we will see in (292d),

b. aká-tí-liími  
a[ká]-tí-{{líí}}mi  s/he doesn’t cultivate them

c. aká-bá-li’múísi  
a[ká-bá]-li-{{múú}}si  s/he doesn’t help them cultivate

d. aká-bá-li’bátííssi  
a[ká-bá]-li[ba{tíí}]si  s/he doesn’t delay them

(284a-b) fail to fuse the SP-OP H and OP+stem H, respectively, not because of the conjoint constraint (AVOIDPROM_&_CRISPSTEM), which is now ranked too low, but because two HDs do not fuse where the second HD contains a depression domain, as we will see in (292d),

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165 Two alternative domain encodings for the monosyllabic stem appear possible in (284a): the first achieves downstep between the two unfused H domains simply by failing to fuse, as predicted by the conjoined constraint (AVOIDPROM_&_CRISPSTEM), motivated in §4.3.3); the second analyses -búú- as depressed, in other words, penult depression in toneless/low stems is thus defined across the macrostem—that is, \{OP+stem\}—in which case the penult is the OP itself. There is clear evidence to follow in (290e) that the OP with a toneless/low stem is optionally truly depressed, as it blocks rightwards depressor shift off the depressed 1ps SP -gi-.

166 Downstep is (redundantly) marked preceding σ2 in these 2+σ stems (284c-d), to emphasise that these HDs are lower than the prefix HD, contra H stems which lack downstep.

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thanks to the anti-fusion effect of the anti-nesting *L-IN-H constraint. (284c-d) fail to fuse because the two HDs are not adjacent, and hence not eligible candidates for fusion.

7. 8. 1. 8. Lexical tone category conflation by LD fusion: depressor-bearing stems

I will proceed to lay out fusion data from several configurational combinations in the present negative paradigm, then propose a constraint that prevents LD adjacency (288), then present a fusion typology for HD and LD interaction, in (292).

In the present negative {OP+stem} configurations in (282-284) where the stem is non-depressor-bearing, and in earlier simple SP+stem configurations (279a-b), where the stem is also non-depressor-bearing, the lexical H and toneless/low stem categories remain distinct from each other, maintained—it has been shown—by the invocation of L\text{GRAM} in L stems. CONTRAST between stem tone paradigms (toneless/low vs. H) continues to be highly valued. But we are about to see that where the H stem or the toneless stem contains a lexically depressed σ1, the tone category distinction is conflated (285-286), and paradigmatic contrast is lost.

Just as we have seen a depressed stem σ1 interrupting the fusion of adjacent HDs in toneless/low stems, so a depressed OP (the only candidate is 1ps -gi-) can have the same anti-fusion effect for H stems\footnote{There is, as yet, insufficiently documented variation across dialects, registers and styles.} : a HD is not fused with a successive HD whose left edge coincides with a LD left edge (to be confirmed in 292d). In this case, however, there is additionally depression anticipation from the depressed OP leftwards to its preceding SP, suggesting that the lexically triggered L on the OP realigns leftwards via WSA-L\text{F} (L). This phenomenon is limited to the Sigxodo Phuthi dialect (285b,d,f); in Mpapa Phuthi (285a,c,e) there is no such lowering of the SP H.

One important implication of the absence of surface H on the depressed 1ps OP is that this OP must be fusing its HD and LD with the lexically depressed stem σ1, resulting in ...

\[ \text{OP-σ}_1\text{σ}_2...\sigma \]. If there were no LD fusion, then HD fusion could not occur (cf. 292d, below); if no HD fusion occurs, then the surface-L OP would violate highly ranked CONTRAST_HD as ...

\[ \{\text{OP}\}-\{\sigma_1/\sigma_2... \text{ (for 2-σ stems)} \text{ or } \{\text{OP}\}\{-\sigma_1/\sigma_2... \text{ (in the case of 3+σ stems)} \}; \text{I have argued earlier (Chapter 5 §5.4.1.5) that CONTRAST_HD is essentially undominated throughout the language.}\]
Present negative: H NegSP + 1ps OP (depressed) + H stems (depressor-bearing)

(285) Depressed OP triggers LD fusion, interrupts HD fusion in H stems (Sgx Phuthi)\textsuperscript{168}

\begin{itemize}
  \item[a.] aká-gi-vuúsí a[ká]-\{Lx,Ly-gi-vu\}_Lx,Ly ú
    \begin{itemize}
      \item Mp s/he doesn’t wake me up
    \end{itemize}
  \item[b.] aka-gi-vuúsí a[Lx,Ly-ka-gi-vu]_Lx,Ly ú
    \begin{itemize}
      \item Sgx s/he doesn’t wake me up
    \end{itemize}
  \item[c.] aká-gi-vunúísí a[ká]-\{Lx,Ly-gi-vu\}_Lx,Ly nú
    \begin{itemize}
      \item Mp s/he doesn’t help me harvest
    \end{itemize}
  \item[d.] aka-gi-vunúísí a[Lx,Ly-ka-gi-vu]_Lx,Ly nú
    \begin{itemize}
      \item Sgx s/he doesn’t help me harvest
    \end{itemize}
  \item[e.] aká-gi-visísísí a[ká]-\{Lx,Ly-gi-vi\}_Lx,Ly sísí
    \begin{itemize}
      \item Mp s/he doesn’t understand me
    \end{itemize}
  \item[f.] aka-gi-visísísí a[Lx,Ly-ka-gi-vi]_Lx,Ly sísí
    \begin{itemize}
      \item Sgx s/he doesn’t understand me
    \end{itemize}
\end{itemize}

Significantly, this H stem data (285) will pattern identically with the toneless/low stems to follow in (286), with reference to LD fusion: the SP will remain H (both Mpapa and Sigxodo dialects)\textsuperscript{169}, and the LD from the depressed OP crucially fuses with the stem LD, conflating the toneless/low \{OP+stem\} pattern with that of the H stems just seen in (285). The fusion analysis is provoked by the complete absence of surface H on the OP, even in the 2σ form (286a vs. non-existent 286b)\textsuperscript{170}; this contrasts with the present indicative (i.e. lexical paradigm), where the OP is H before a toneless 2-σ stem, as opposed to all longer forms (cf. Chapter 5 §5.4.1.1 (90a-b), repeated as (286g-h)).

LD fusion between the lexical LDs on the OP and in stem σ1 in (285)—and (286) to follow—is crucial because we do not otherwise expect the OP HD to fuse with the depressed stem σ1: as will be confirmed in (292d), a HD does not fuse with a successive HD that contains a nested LD. While this works just fine for (286a), it produces a slightly strange effect in (286c,e),

\textsuperscript{168} The subscript diacritics used in this section are as follows: H\textsubscript{x} or H\textsubscript{y} indicates a distinct HD (without distinguishing lexical from grammatical H); L (or L\textsubscript{x} or L\textsubscript{y}) indicates a lexical LD; ‘G’ indicates a grammatical LD. Where space permits, L\textsubscript{LEX} and L\textsubscript{GRAM} are used for lexical and grammatical LDs, respectively.

\textsuperscript{169} Speculating, the pattern seems to be that at least either the SP or OP should be surface-H.

\textsuperscript{170} As might be expected, it is possible to elicit an alternatively H depressed 1ps OP, in both dialects, but often only under contrastive emphasis (and in both dialects only for stems longer than 2σ). The social and stylistic distribution of these varying possible surface patterns is not properly resolved.

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where HD₁ (H₁) and HD₂ (H₂) fuse across the stem σ₁, which syllable is not ‘supposed’ to be inside a HD at all. For the first time, here, we see a domain plateau effect abstractly forced by the requirements for LD and HD fusion.

**Present negative: H NegSP + H OP + toneless stems (depressor-bearing)**

(286) Depressed OP triggers LD fusion, interrupts HD fusion in toneless/low stems (SgxPhuthi)

a. aká-ți-bheéki 
   a[ká]-[Hₓ,Hᵧ{Lₓ,Lᵧ,gì-bheh}_Lₓ,Lᵧ,Lᵧ]Hₓ,Hᵧ,ki s/he doesn’t look at me
b. *aká-ți-bheéki 
   *a[ká]-[Hₓ{Lₓ,gì}_Lₓ,Hₓ,Lᵧ{bheh}_Lᵧ]Hₓ,Hᵧ,ki

c. aká-ți-vulééli 
   a[ká]-[Hₓ,Hᵧ{yì-vu}_Lₓ,Lᵧ,Lᵧ,Lᵧ]Hₓ,Hᵧ,li s/he doesn’t open for me₁⁷¹

d. *aká-ți-vulééli 
   *a[ká]-[Hₓ{Lₓ,gì}_Lₓ,Hₓ,1{vu}_Lₓ,Lᵧ,Lᵧ,Lᵧ]Hₓ,Hᵧ,li

e. aká-ți-dzakálíísi 
   a[ká]-[Hₓ,Hᵧ{Lₓ,Lᵧ,zialfa}_Lₓ,Lᵧ,Lᵧ,Lᵧ,kálií]Hₓ,Hᵧ,si s/he doesn’t injure me

f. *aká-ți-dzakálíísi 
   *a[ká]-[Hₓ{Lₓ,gì}_Lₓ,Hₓ,1{dz}_Lₓ,Lᵧ,kálií]Hₓ,Hᵧ,si

g. si-ya-tí-liima 
   si-ya-[tı]-liima we cultivate them (Cl. 10)

h. si-ya-yí-yeeta 
   si-ya-[yí]-yeeta we make it (Cl. 9)

Similarly, a non-depressor 2-σ toneless/low stem with depressed 1ps OP typically does not have a surface-H OP (287b), suggesting that this requires OP+stem LD fusion in order to facilitate OP+stem HD fusion, so that very highly ranked CONTRAST_HD (argued for the OP with present indicative (and other) stems in Chapter 5 §5.4) will not be violated for the OP. A non-depressor 2σ High stem with depressed 1ps OP behaves identically on the surface, but reflects a structurally distinct overlapping HD configuration, resolved into a single fused HD (287f).

₁⁷¹ (286a-c) contains odd-looking configurations because the stem HD and LD are coextensive; the first two lexical LDs have fused { -gì-vu- }; there is no evidence for or against fusing these lexical LDs to the grammatically depressed penult LD, which LD tolerates both depression and simultaneous surface H-ness.
Present negative: H NegSP + H OP + toneless stems (depressor-bearing)

(287) OP+stem LD and HD fusion

a. aká-gí-nyí  a[ká]-[HxHy{gi}]-nyíHy s/he doesn’t excrete me

b. aká-gí-hláábi  a[ká]-[HxHy{gi}]-hláábi s/he doesn’t stab me

c. aká-gí-lífááli  a[ká]-[HxHy{gi}]-lífááli s/he doesn’t forget me

d. aká-gí-lífáatíísi  a[ká]-[HxHy{gi}]-lífáatíísi s/he doesn’t delay me

e. aká-gí-í-phi  a[ká]-[HxHy{gi}]-í-phi s/he doesn’t give me

f. aká-gí-bóóni  a[ká]-[HxHy{gi}]-bóóni s/he doesn’t see me

g. aká-gí-bónúíísi  a[ká]-[HxHy,Hy{gi}]-bónúíísi s/he doesn’t show me

h. aká-gí-sébétíísi  a[ká]-[HxHy,Hy{gi}]-sébétíísi s/he doesn’t use me

The data in (287) confirms the constraint proposed in (275), that is, that there is a ban on
the sequence of L_{LEX} (L) and L_{GRAM} (G), which ban causes L_{GRAM} to be fused with L_{LEX} in the case of
toneless/low stems (287a-d), and causes L_{GRAM} to be underparsed in the case of H stems (287e-h).

The LD fusion data in (286-287) has suggested that adjacent LDs are fused in response to
a general OCP constraint on adjacent lexical L tokens (288)—as already proposed in its general
schema in §7.7.2.4 (214).

(288) *AE (L_{LEX}, L_{LEX})       *AE(L_{LEX})

σx   σx+1

|(   |

*(L_{LEX}α  L_{LEX}β)_{MStem}

There cannot be two adjacent L_{LEX} tokens within a macrostem (OP+stem) domain.

---

172 As semantically unlikely as this may seem, in a literary world of fairytales, this phrase is elicited as plausible.

173 There is a second option for successful domaining of this data: a[ká]·{gi}·{bá}·{ái}·ni, where the depressed 1ps OP causes shift onto the H stem penult syllable, which in turn can only parse its stem H sponsor on the 2nd mora (unincorporation). While there is no surface difference between the fusion and H shift approaches here, there is no reason for fusion not to take place, as will be confirmed in the typology presented in (292) below, obviating any need to appeal to the unincorporation strategy.
This OCP constraint refers explicitly to *lexical* \( L \), since the OCP effect on grammatical \( L \) (275) serves only to prevent insertion where lexical \( L \) is already present anywhere in the same stem. Thus, \( L_{\text{GRAM}} \) is sensitive to any cooccurrence within a stem domain, whereas \( L_{\text{LEX}} \) is sensitive only to strict tone adjacency (indicated by syllables \( x, x+1 \) in 288). As with HD adjacency, the response to the \( L_{\text{LEX}} \) OCP effect is fusion; deletion (underparsing) of a \( L_{\text{LEX}} \) is never a possibility, hence the ranking in (289).

(289) **LD fusion ranking**
\[
\text{Max } L_{\text{LEX}} >> *AE (L_{\text{LEX}})
\]

This ranking articulates precisely the opposite of the OCP effect on grammatical \( L \) given in (277) above, where underparsing of \( L_{\text{GRAM}} \) does occur (that is, failure to insert \( L_{\text{GRAM}} \) in the toneless/low stem).

7. 8. 1. 9. LD Minimality

The present negative offers a second instance of \( L \) domain minimality (the first was in the copulative, cf. §7.5). This new LD minimality—again, a single extension of a LD rightwards—will appear to contradict the evidence just presented in §7.8.1.7 (282, 284) where the OP has just been shown to surface \( H \) in the present negative paradigm; in the present negative data to follow, on the other hand, the OP surfaces predictably as \( H \) in the toneless/low stems in (290) (failure of successful LD-MIN) but as toneless/low in the \( H \) stems in (291) (successful LD-MIN).

Nevertheless, the OP can be shown to remain lexically (that is, domain-configurationally \( H \) throughout these examples, thus confirming that the OP is indeed \( H \) in the present negative paradigm.

In (290a-e) there are three distinct surface forms with the 1-\( \sigma \) stem\(^{174} \), reflecting five analytic possibilities. First, in (290a) the OP \(-búú-\) is \( H \) both underlyingly and on the surface (both penult moras are \( H \)); it serves to tolerate a rightwards unincorporated HD from the preceding depressed 1ps SP. Second, in (290b-d)—the same surface form with varying underlying representations—the OP displays only the first mora as \( H \), meaning that the OP is

\(^{174} \text{It is a given that the 1-}\( \sigma \) stems are notoriously variable, and somewhat unstable, but there is no reason to assume that the full range of HD and LD constraints are suspended here. Indeed, they appear not to be.}
underlyingly H, but would be surface-toneless because the HD is fused rightwards with the H-expressing stem ultima, except that the H shifted off the depressed 1ps SP now occupies (only) the first surface mora of the penult; in (290c) the OP is still lexically H, unfused with the ultima, but only realising the first mora as H, because of the Register Domains effect on the penult-ultima sequence (cf. Chapter 5 §5.5); in (290d) the OP is toneless, thus easily allowing the depressed 1ps SP to shift its H rightwards onto the first mora of the non-H penult. Given the consistency of analysis being pursued here, (290d) seems uninsightful because the OP would have to be reassessed as lexically toneless; rather, (b) is adequate\textsuperscript{175}, and (c) might be a possible alternative. Third, in (290e), the penult (here = OP) must be depressed, because the H on the depressed 1ps SP displays the blocking effect: it fails to shift its H rightwards onto the OP. Of the three alternatives here, (290a,e) are the commonest; (290b=c=d) is an alternative, under certain discourse conditions.

**Preseng negative: 1ps NegSP + OP + toneless/low stems**

(290) Toneless/low stems: OP is surface H

\begin{align*}
a. \text{agi-búú-nyi} & \quad a_{\text{[}\text{i-gi}\text{]-búú}\text{][y,z-nyi]}}_{y,z} \quad \text{I don’t excrete it}\textsuperscript{176} \\
\end{align*}

OP is lexically H, expressed as H inside fused OP+Stem HD, on penult 2nd mora; stem is expressed toneless, since CONTRAST_HD is satisfied.

\textsuperscript{175} There is just one analytic wrinkle that presents itself with (290c): fusion across the penult-ultima was used (Chapter 5 §5.4.1.6) to explain why a short H 1-σ stem can surface as toneless, when preceded by a H OP: CONTRAST_HD is not violated for the now fused penult-ultima HD; there, the failure to express the 1-σ stem ultima was motivated by a register domain constraint: *EXPRESSULTIMA. Here, however, it is the ultima that surfaces H, and the penult which fails to. Some additional constraint would need to create the conditions for this. It may well have to do with register and style: ultima H syllables in short stems are rare, and typically only occur under discourse conditions of contrastive emphasis.

\textsuperscript{176} The reader is reminded that the OP used here is -búú- (and not, say, -báá-) purely for subcategorisation and semantic reasons (the object of the 1-σ stem ‘excrete’ cannot typically be animate, such as the OP -báá- entails).
b. agi-búu-nyí  \[a_{\text{x,y}}[\text{gi}-búu],[\text{nyí}]_{\text{y,z}}\]  
\text{OP is lexically H, expressed toneless (on penult 2nd mora) because of ultima downstep; depressed SP H forces shift onto OP, and unincorporation of OP, which fuses with stem (ultima) HD.}

c.  \[a_{\text{x,y}}[\text{gi}-búu],[\text{nyí}]_{\text{y,z}}\]  
\text{OP is lexically H; OP is not grammatically depressed; penult-ultima is contoured by Register Domains requirement}

d.  \[a_{\text{x,y}}[\text{gi}-búu],[\text{nyí}]_{\text{y,z}}\]  
\text{OP is lexically toneless; OP is not grammatically depressed}

e. agi-búú-nyi  \[a_{\text{x,y}}[\text{gi}],[\text{búú}],[\text{nyí}]_{\text{y,z}}\]  
\text{penult (= OP) is depressed}

f. agi-tí-liími  \[a_{\text{x,y}}[\text{gi}]-tí-][\text{lií}][\text{mi}]\]  
\text{I don’t cultivate them}

g. agi-bá-li’músi  \[a_{\text{x,y}}[\text{gi}]-bá][\text{mú}][\text{si}]\]  
\text{I don’t help them cultivate}

h. agi-bá-li’bátíísi  \[a_{\text{x,y}}[\text{gi}]-bá][\text{tí}][\text{si}]\]  
\text{I don’t delay them}

One possibility is that the OPs in (290f-h) are lexically H (as configured in the middle column), either where the H shifted off the depressed 1ps prefix is expressed as H on the OP (and the OP H is parsed in the first mora of the penult in (290f) through unincorporation, as motivated for other paradigms in §7.7.1)\textsuperscript{177}, or where the SP and OP HD are simply fused, in (290g-h).

Another possibility is that the OPs in (290f-h) are lexically toneless, where the OP is only surface H through depressor shift off the depressed 1ps SP.

It would, however, be analytically incoherent to claim that the OPs are lexically toneless here, given that they are H in the non-depressed SP data seen above (282, 284). Consistency of

\textsuperscript{177} Because the SP and OP uncontroversially fuse in (290f-h), unincorporation in (290f) is less transparent in terms of domain structure (and could in fact be avoided altogether). What has been configured as HD\textsubscript{x} could be subsumed into a fused HD\textsubscript{x,y} even in (290f) as:

\[a_{\text{x,y}}[\text{gi}]-tí-][\text{lií}][\text{mi}]\]  
\text{where post-fusion -tí- coexpresses the SP H and its own H. But in (290g-h) unincorporation cannot succeed because stem σ1 is toneless, and is thus unable to fulfil the domain-parsing requirement of the OP (there would be a locality violation of the OP sponsor tried to parse its unincorporated HD commencing on stem σ2). In these cases, SP-OP fusion is crucial.}
analysis suggests that the first strategy is correct: OPs are lexically H throughout this paradigm. That is, LD-MIN fails (for OCP reasons, cf. (297) below), and the SP-OP HDs fuse.

In the longer toneless/low 3-σ to 4-σ stems (290g-h), there is no question of HD fusion, because the HDs are not adjacent. But in the 2-σ stem (290f), the OP and stem σ1 are adjacent, yet fail to fuse; if they did, we would expect *agi-ti-lijim a_{xyz}(gi-ti-lij)_{xyz}mi , where the right edge of HD_{xyz} reflects the right edge of the single fused HD (fused from HD_x, HD_y, and HD_z). The obvious cause of this failure to fuse across the antepenult/penult boundary is that the stem penult -lii- is (grammatically) depressed; I have already argued that fusion fails if there is a LD left edge at the fusion site, as there is here.

Data from the H stems appears, at first, to contradict the general OP-as-H pattern in this paradigm, since in all but the shortest stems (291a-c), the OP surfaces as toneless (291d-f). The most straightforward analysis of why the OP fails to be surface-H in this data is that the LD on the 1ps SP successfully extends rightwards by one syllable, onto the OP (as configured here in the middle column), in order to satisfy LD minimality (motivated in §7.5 above), unless OP is also the penult (291a).

**Preseng negative: 1ps NegSP + OP + toneless/low stems**

(291)  H stems: OP is (mostly) surface low\(^{178}\)

a. agi-baa-phi  a_{[x{gi}]-ba}_{xyz}phi_{xyz} I don’t give them

b. *agi-baa-phi  *a_{[x,y,z{gi}-ba]phi}_{x,y,z}

c. *agi-baa-phi  *a_{[x,y,z{gi}-baa]phi}_{x,y,z}

d. agi-ba-bono  a_{[gi-ba]-bono}ni I don’t see them

e. agi-ba-bonusi  a_{[gi-ba]-bonus}si I don’t show them

f. agi-ba-bonusi  a_{[gi-ba]-bonusi}si I don’t see them clearly

\(^{178}\) It is worth noting that the surface-low OPs with H stems here (291d-f) cannot be argued to be low (or toneless) for the same reason that OPs are generally surface-toneless for H stems in the lexical paradigms (e.g. present indicative, cf. Chapter 5 §5.4). The anti-expression *EXPRESS_OP constraint is invoked in the general instance, for lexical paradigms; here in the present negative, the distinction between low and high OPs corresponds to lexical tone class, and would be lost by such a blanket anti-express requirement.

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LD minimality (LD-M\textsubscript{IN}) must fail in (291a), where the output is not rising H on the penult—indicative of membership in a L domain (291b)—but level H, and where the output is also not a level low penult, with a H lexical stem tone on the ultima (291c). Given that the LD extended from the SP is not a grammatical L (this is not a toneless/low stem), the OP penult must fail to be parsed as L. This reconfirms the analysis in section §7.5 where LD-M\textsubscript{IN} was argued not to operate over the antepenult-penult boundary (\textsc{AvoidPROM}_{LD} >> \textsc{LD-M\textsubscript{IN}}).

The configured outcomes in these toneless/low and H stems where the 1ps is depressed are now accounted for\textsuperscript{179}. Adjacent SP-OP are both inside the LD, but fail to violate \textsc{Contrast\_HD} because their HD fuses rightwards with the stem HD beginning on stem $\sigma_1$ (cf. 292c below). HD fusion across the OP+Stem boundary still takes place in (290e, 291a,d-f) because in each case the fusing HDs do not contain a fresh instance of LD left-edge at the fusion site (that is, not at the left edge of the fused HD); rather, the LD nested inside the first fusing H domain—HD\textsubscript{x}—is always at the left edge of the fused HD. This is made clear in the fusion typology laid out in (292a-f), where all potentially fusible adjacent HDs are considered.

[turn to the next page for (292) ‘Fusable HD structures (reflecting all possible nested LDs)’]

\textsuperscript{179} There is a further fact to account for: LD minimality generally—but not for monosyllables—forces depression extension from SP to OP for H stems (291b-d), but not for toneless/low stems (290f-h). I return to address this asymmetry after considering the patterns from toneless/low and H stems which bear lexical (consonantal) depressors in (293-296) below.
Fusable HD structures (reflecting all possible nested LDs)

**input**

- **a.** \([x\ldots]_x[y\ldots]_y\) \([x,y\ldots\ldots]_{x,y}\) two adjacent HDs, no depressed syllables (cf. Chapter 5 §5.2): fusion.
- **b.** \([x\ldots\ldots]_x[y\ldots]_y\) \([x,y\ldots\ldots]_{x,y}\) two adjacent HDs, depressed σs at left-edge of HDx (cf. §7.8.1.8 (287)): fusion.
- **c.** \([x\ldots\ldots]_x[y\ldots]_y\) \([x,y\ldots\ldots]_{x,y}\) two adjacent HDs, depressed σs at right edge of HDx; HDx/HDy domain fusion subsumes any form of successful or failed unincorporation (cf. §7.8.1.9, (290f-h)).
- **d.** \([x\ldots]_{x[y\ldots\ldots]}_y\) \([x\ldots]_{x[y\ldots\ldots]}_y\) two adjacent HDs, depressed σs at left-edge of HDy; no fusion (cf. §7.8.1.7, §7.8.1.8, §7.8.1.9, including (290e): SP fails to fuse with depressed OP).
- **e.** \([x\ldots]_{x[y\ldots\ldots]}_y\) \([\ldots]_{x[y\ldots\ldots]}_{x[y\ldots\ldots]}\) or \([\ldots]_{x[y\ldots\ldots]}_{x[y\ldots\ldots]}\) two adjacent HDs, depressed σs at the right edge (head) of HDy (cf. (303)): no fusion.
- **f.** \([x\ldots\ldots]_{x[y\ldots\ldots]}_y\) \([x\ldots\ldots]_{x[y\ldots\ldots]}_y\) or \([x\ldots\ldots]_{x[y\ldots\ldots]}_y\) two adjacent HDs, depressed σs at right of HDx: possible fusion.

Of the five\(^{181}\) possible LD/HD nesting configurations (292b-f), the patterns in (292e-f) have yet to be encountered. (292e,f) have two potential instantiations each: in the case of L\(_{\text{GRAM}}\), there is no realignment of LD to the stem left-edge; otherwise, an L\(_{\text{LEX}}\) always realigns to the left edge of the stem (often the initiation site for a HD too), by depression anticipation (§7.3). The hypothesis here is that just as fusion fails in (292d), so it would in (292e) by virtue of the second HD in the sequence containing a LD (which realigns leftwards in depression anticipation, or which triggers depression of the whole domain in situ in the case of L\(_{\text{GRAM}}\)). Fusion failure in (292e) is illustrated by (293a,294b,295b,296b) immediately below; the fused (perfect overlap) pattern in (292f) has exemplars to come in the following section §7.8.1.10 (308), where the output will be ambiguous for fusion status.

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\(^{180}\) This input notation is informal: domains are in fact regarded not to be part of the phonological underlying representation (cf. Chapter 3 §3.3); they are surface indicators of underlying and ‘spread’ tone location, and the possible scope of (re)alignments. These input ‘domain’ edges merely signal the left and right edges of (a series of adjacent) H tone ([, ]) and L tone (,{}) sponsors. The fusion typology is in part refined in §7.8.1.10 (307) below.

\(^{181}\) There are permutations on the given input patterns that have a toneless syllable between HDx and HDy, including \([\ldots\ldots]_x\sigma[y\ldots\ldots]_y\) and \([\ldots\ldots]_x\sigma[y\ldots\ldots]_y\). It is not clear that data is available to test the potentially distinct outputs of \(_x\sigma[y\ldots\ldots]_y\) vs. \(_y\sigma[y\ldots\ldots]_y\) inputs.
The fundamental observation from the typology summarised in (292) is that a sequence of two High domains—$HD_x$, $HD_y$—does not fuse if the second HD contains a depression domain in any position (292d-e). Conversely, the two HDs do fuse if there is no LD nested at any position inside $HD_y$, regardless of the presence or absence of a LD inside $HD_x$. This distribution is predicted by the $^*L$-IN-H constraint proposed for the depression blocking account given in §7.4.3.3 (91) above. For the present discussion, a fused $HD_{xy}$ domain is worse if fusion entails acquiring the presence of an additional LD inside the fusing HD\textsuperscript{182}.

Turning back to the analysis of the OP as H in (290-291), we see that this is confirmed by data from stems containing lexical depressors where the OP persists in surfacing as H on toneless stems (293-294); even though this H OP could be solely because of the depressor-shifted H off the 1ps SP, the H OP here is certainly coexpressing the ‘shifted’ SP H inside a fused SP-OP HD.

**Present negative: 1ps NegSP + OP + toneless/low stems**

(293) Post-1ps OP surfaces as H in toneless/low stems ($\sigma_1$ = depressed)

a. $\text{agi}$-$\text{tí}$-$\text{vuúli}$  
\[ a[\{\text{gi}\} \text{-tí}-\{\text{vuú}\}\text{li}] \]
I don’t open them

b. $\text{agi}$-$\text{bá}$-$\text{vulééli}$  
\[ a[\{\text{gi}\} \text{-bá}-\{\text{vu}\}\text{[léé]}\text{li}] \]
I don’t open for them

c. $\text{agi}$-$\text{bá}$-$\text{dza’kálíísi}$  
\[ a[\{\text{gi}\} \text{-bá}-\{\text{dza}\}\text{[kálíí]}\text{si}] \]
I don’t help them injure

(294) Post-1ps OP surfaces as H in toneless/low stems ($\sigma_2$ = depressed)

a. $\text{agi}$-$\text{bá}$-$\text{láádzi}$  
\[ a[\{\text{gi}\} \text{-bá}-\{\text{láá}\}\text{[léám]}\text{dzi}] \]
I don’t fetch them

b. $\text{agi}$-$\text{bá}$-$\text{ladeééli}$  
\[ a[\{\text{gi}\} \text{-bá}-\{\text{ladže}\}\text{[éé]}\text{li}] \]
I don’t follow them

\textsuperscript{182} There is a problem, however. The effect derives from fusion being assessed left-to-right: $HD_x$ (with nested LD) can fuse with $HD_y$ (with no nested LD), as if the LD count inside $HD_{xy}$ is not worsened; but $HD_x$ (with no L) cannot fuse with $HD_y$ (with L), because then the LD count inside $HD_{xy}$ \textit{is} worsened. Hence, the LD count inside $HD_x$ carries primacy. And yet, a fused domain $HD_{xy}$ with one HD edge nonlocal to each HD instantiation must count each $^*L$-IN-H violation for each HD, thus failing to achieve the directional fusion effect on its own (cf. footnote 200, for Tableau 20). There must be a higher ranked HD/LD expression constraint forcing a depression-bearing $HD_x$ to extend rightwards (and, thus, fuse) into a non-depression bearing $HD_y$. It is an open question what exactly this higher ranked HD/LD constraint might be; I suggest the following conjoint constraint: ($EXPRESS_L$ \& $EXPRESS_H$). Also see §7.8.1.10 below, footnotes 199 and 200. And cf. comments on this fusion ambiguity for apparent $^*L$-IN-H violation assessment in §7.5.1 footnote 81.
c. agi-bá-mabhe tééli  a[gi]-bá-[mabhe]tééli I don’t delay them

d. agi-bá-mabhe:li  a[gi]-bá-[mabhe]tí[li] I don’t delay for them

L\textsubscript{GRAM} is indicated in (294a) only because this is the sole exemplar of a grammatical L domain in this data set; in all longer stems, the penult is lexically L (294b-c) or not low at all (294d).

It is worth noting again that fusion here between SP and OP domains is crucial. But in (290e-f) earlier (1-\sigma and 2-\sigma stems), I pointed out (footnote 177) that one could still entertain unincorporation as a possible strategy for handling the SP-OP+stem data. In (293-294) above, however, as with the remaining data earlier (290g-h), unincorporation cannot be resorted to, for the simple reason that there is a toneless mora between OP H and stem H. The configuration in (293-294) where a HD is only one syllable long was simply not addressed in the unincorporation treatment of \S 7.7.1.

The present negative 1ps OP persists—apart from the usual exception of 1-\sigma stems (295a)—in surfacing as toneless/low with H stems, because adjacent LDs—SP and OP and stem-initial LD, where applicable—fuse (295-296), as proposed above in (275) and (288); H expression for the fused OP+stem domain HD is rescued by being expressed on at least one mora (295b, 296b) of the post-\sigma1 (pre-ultima) stem HD.

**Present negative: 1ps NegSP + OP + H stems**

(295) Post-1ps OP surfaces as low in H stems (\sigma1 = depressed)

\begin{itemize}
  \item a. agi-tú-dli  a[gi]-tú-{d li} I don’t eat them
  \item b. agi-ba-vúúsi  a[gi-ba-vúú]úsi I don’t wake them up
  \item c. agi-ba-vúúnúúsi  a[gi-ba-vúú]núú[si] I don’t help them harvest
  \item d. agi-ba-všíšíůúsi  a[gi-ba-všíšíůú]ú I don’t understand them
\end{itemize}
(296) Post-1ps OP surfaces as low in H stems ($\sigma_2 = $ depressed)

a. $\text{agi}-\text{ba-tshéégi}$
   $\text{ag}[\text{gi-} \text{ba-tshéé}\{\text{gi}\}]$ I don’t buy them

b. $\text{agi}-\text{ba-tshégi} \text{ísi}$
   $\text{ag}[\text{gi-} \text{ba-tshégi} \{\text{ísi}\}]$ I don’t help them buy

c. $\text{agi}-\text{ba-lagatééli}$
   $\text{ag}[\text{gi-} \text{ba-laga} \{\text{téé}\} \text{li}]$ I don’t wish them

d. $\text{agi}-\text{ba-lagatééli}$
   $\text{ag}[\text{gi-} \text{ba-laga} \{\text{téé}\} \text{li}]$ I don’t wish on their behalf

The LD minimality effect across SP and OP is asymmetrical for toneless/low and H stems: minimality forces depression extension from SP to OP only in the H stems (291d-f), not for toneless/low stems (290f-h). This fact remains hitherto unaccounted for. I propose that the asymmetry reflects an OCP effect on L domains: L on the 1ps SP $\text{gi}$- cannot extend rightwards if that extension would violate an OCP ban on adjacent LDs, that is, if the stem commences with a LD (either in situ, or by depression anticipation). But the nature of this OCP effect is messy (an analysis is suggested, but the effect is not unambiguously resolvable here).

Initially, the effect seems straightforward for lexical depression in (293-294), to be repeated—after the OCP rankings in (297) below—as (298a-d), by $^*\text{AE (L}_{\text{LEX}}$, which bans two adjacent lexical LDs (from 289 above), whether the two lexical LDs are adjacent in situ (293b=298a,b), or whether adjacent by depression anticipation (realigned left-edge), as in (294=298c,d); second, the effect in short 2$\sigma$ non-depressor-bearing toneless/low stems (290f repeated as 298e,f) seems tractable by $^*\text{AE (L}_{\text{GRAM}}$ which bans a $\text{L}_{\text{LEX}}$-$\text{L}_{\text{GRAM}}$ sequence (proposed in (275) above), to prevent insertion of $\text{L}_{\text{GRAM}}$ where a $\text{L}_{\text{LEX}}$ is already contained in the grammatical HD stem domain. Now, the $^*\text{AE (L}_{\text{GRAM}}$ constraint was shown to outrank parsing the grammatical H (277=297a). It must now also outrank LD minimality (297b), but where parsing is preferable to satisfying LD minimality (297c). Similarly, the $^*\text{AE constraint on adjacent lexical LDs outranks LD-Min (297e), but not the underparsing of a lexical L (297f); and LD-MIN cannot force underparsing of a lexical LD (297g)\textsuperscript{183}. The ranking interactions are summarised in (297d,h).

\textsuperscript{183} But see the discussion on fusing adjacent lexical LDs commenced in (288) and continued in §7.8.1.10 below; also the discussion in earlier footnotes 63 (§7.4.3.3), 81 (§7.5.1), 159 (§7.8.1.7), and the previous footnote (182) in this section.
(297) **OCP effect on LD-Min**

a. \*AE \((L_{\text{LEX}}, L_{\text{GRAM}}) (\pi)) \gg \text{Max } L_{\text{GRAM}} (\pi)\) \(\rightarrow\) \(L_{\text{GRAM}}\) OCP forces underparsing of \(L_{\text{GRAM}}\)

b. \*AE \((L_{\text{LEX}}, L_{\text{GRAM}}) (\pi)) \gg \text{LD-Min}\) \(\rightarrow\) \(L_{\text{GRAM}}\) OCP prevents LD extension

c. Max \(L_{\text{GRAM}} (\pi)) \gg \text{LD-Min}\) \(\rightarrow\) \(L_{\text{GRAM}}\) cannot be underparsed by extended LD

d. \*AE \((L_{\text{LEX}}, L_{\text{GRAM}}) (\pi)) \gg \text{Max } L_{\text{GRAM}} (\pi)) \gg \text{LD-Min}\)

e. \*AE \((L_{\text{LEX}}, L_{\text{LEX}}) (\pi)) \gg \text{LD-Min}\) \(\rightarrow\) \(L_{\text{LEX}}\) OCP prevents LD extension

f. Max \(L_{\text{LEX}} (\pi)) \gg \*AE \((L_{\text{LEX}}, L_{\text{LEX}}) (\pi)) \gg \text{LD-Min}\) \(\rightarrow\) \(L_{\text{LEX}}\) cannot be underparsed by extended LD

g. Max \(L_{\text{LEX}} (\pi)) \gg \*AE \((L_{\text{LEX}}, L_{\text{LEX}}) (\pi)) \gg \text{LD-Min}\)

This account is insufficient, however, for longer 3σ-5σ toneless stems (290g-h)—repeated as (298g-j)—because no form of the LD OCP would be violated, even if both 1ps SP and OP were depressed (that is, L). Worse, if \*AE \((L_{\text{LEX}})) does hold, then there should be no LD minimality effect in H stems which commence with a LD, as in (295-296) above, repeated as (298k-n), that is, the depressed 1ps SP should not extend its LD onto the OP preceding a depressor-bearing H stem.

In other words, despite this new clutch of LD OCP constraint variations (297), the OP facts in parts of the present negative (298g-j, k-n) are still incompletely accounted for.

(298) **LD minimality fails only in toneless stems, by an OCP effect on L**

a. \(\text{agí-bá-vu’léléli}\) \(\rightarrow\) \(a[\{gi\}-bá]-\{vu\}[léé]li\) \(*AE \((L_{\text{LEX}})) \) bans /\(L_{\text{LEX}}\)\(L_{\text{LEX}}\)

b. \*agí-ba-vu’lééli \(\rightarrow\) \*a[\{gi-bá\}-\{vu\}[léé]li\) \(*AE \((L_{\text{LEX}})) \) is violated

c. \(\text{agí-bá-ladzeélí}\) \(\rightarrow\) \(a[\{gi\}-bá]-\{ladze]élí\) \(*AE \((L_{\text{LEX}})) \) bans /\(L_{\text{LEX}}\)\(L_{\text{LEX}}\)

d. \*agí-ba-ladzeélí \(\rightarrow\) \*a[\{gi-ba\}]-\{ladze]élí\) \(*AE \((L_{\text{LEX}})) \) is violated

e. \(\text{agí-tí-liími}\) \(\rightarrow\) \(a[\{gi\}-tí]k-[\{lií\}]_{\text{GRAM}}]\)i\(\rightarrow\) \(*AE \((L_{\text{GRAM}})) \) bans /\(L_{\text{LEX}}\)\(L_{\text{GRAM}}\)

f. \*agí-tí-liími \(\rightarrow\) \*a[\{gi-tí\}]k-[\{lií\}]_{\text{GRAM}}]\)i\(\rightarrow\) \(*AE \((L_{\text{GRAM}})) \) is violated
g. agi-bá-li’músi  a[x{gi}-bá]x-li[{mú}LGRAM]si *AE (LGRAM) fails to ban /LEX σ/LEX

h. *agi-ba-limúsi  *a[x{gi}-ba]x-li[{mú}LGRAM]si *AE (LGRAM) is not violated, because the LGRAM is not realigned to the stem Lf edge

i. agi-bá-li’bátíísi  a[x{gi}-bá]x-li[bá{tíí}LGRAM]si *AE (LGRAM) fails to ban /LEX σ/LEX

j. *agi-ba-libátíísi  *a[x{gi}-ba]x-li[bá{tíí}LGRAM]si *AE (LGRAM) is not violated, because the LGRAM is not realigned to the stem Lf edge

k. agi-ba-vunúsi  a[(gi-ba)-{vu}nú]si *AE (LLEX) fails to ban /LLEX/LLEX 184, despite violation

l. *agi-bá-vunúsi  *a[(gi)-bá-{vu}nú]si *AE (LLEX) is not violated

m. agi-ba-lagatééli  a[(gi-ba)-{lag}téé]li *AE (LLEX) fails to ban /LLEX/LLEX, despite violation

n. *agi-bá-lagatééli  *a[(gi)-bá-{lag}téé]li *AE (LLEX) is not violated

What is clear from this data set is that LD minimality across the SP-OP sequence must fail only in toneless/low stems, and in all toneless/low stems, irrespective of any lexical (consonantal) depressors they may bear; on the other hand, LD minimality must succeed for all non-1σ H stems, and even H stems that commence with a depressor consonant, and in the case of a realigned (anticipated) depressor domain.

In an attempt to patch this failure of the constraint grammar as it currently stands, I suggest, first, a controversial edge-projection ‘resolution’ to the toneless/low stem configuration, that will turn out quickly to be unimplementable. Rejecting this, I will concede that the simplest way to handle this data is to assume the operation of some form of paradigm uniformity, and morphological CONTRAST_STEM_TONE constraint.

184 The LD configurations in (298k,m) are given ‘prior’ to LD fusion of the OP+stem domain.
It may seem, at first, that the grammar requires a relativised anticipation effect at the stem left-edge of the $L_{\text{GRAM}}$ that is parsed in toneless/low stems. That is, every toneless/low stem appears to weakly project a LD left-edge coinciding with the toneless/low stem left-edge (even though I have argued above that the grammatical L is unrealigned leftwards off the penult\textsuperscript{185}). This weak projection of grammatical LD left-edge is schematised in (299a)\textsuperscript{186}, and ensures that the $L_{\text{GRAM}}$ OCP effect is respected (299b,c).

(299) Toneless/low stems: weak projection of LD Lf edge to stem Lf edge

\begin{enumerate}
\item[\textbf{a.}] \hspace{1.5cm} $\cdots \{-, \sigma \cdots \{\sigma\}_x \sigma \# \}$ \hspace{1.5cm} penult $L_{\text{GRAM}}$ weakly projects Lf edge to stem Lf edge
\item[\textbf{b.}] \hspace{1.5cm} $\{\sigma_{\text{SP}}\} \sigma_{\text{OP}} - \{-, \sigma \cdots \{\sigma\}_x \sigma \# \}$ \hspace{1.5cm} *AE ($L_{\text{GRAM}}$) is respected; LD-Min is violated.
\item[\textbf{c.}] \hspace{1.5cm} $\{\sigma_{\text{SP}} \sigma_{\text{OP}}\} - \{-, \sigma \cdots \{\sigma\}_x \sigma \# \}$ \hspace{1.5cm} *AE ($L_{\text{GRAM}}$) is violated; LD-Min is respected.
\end{enumerate}

The longer toneless/low stems in (298g,i,k,m) could now somehow be accounted for by the weakly projected grammatical LD left-edge which prevents LD-M\textsubscript{IN} from extending depression off the SP onto the OP\textsuperscript{187}.

\textsuperscript{185} This putative weak projection of LD left-edge prefigures the same would-be configurational claim to be made in §7.8.1.10, where such a projection could prevent HD fusion across the prefix+stem boundary in toneless/low stems. In that instance, too, this weak projection will be rejected as incoherent.

\textsuperscript{186} No further structural conditions can be offered to preserve toneless/low stems from the LD minimality effect on the SP-OP sequence, until the Paradigm Uniformity constraint in (300-301). But cf. Appendix A, paradigm H, footnote 55, for LD-M\textsubscript{IN} success even in toneless/low stems, there claimed to correspond to the suppression of the toneless/low-vs.-H lexical verb tone contrast; cf. also paradigm J (data sets III, V) for LD-M\textsubscript{IN} effect across SP-OP.

\textsuperscript{187} This would-be nonlocal edge projection of grammatical L finds what appears to be an exact analogue in a Phuthi grammatical tone paradigm: in the perfective negative, presented in Chapter 6 §6.3.3.2 (150-153,159), the grammatical H in the stem appears to project a HD left-edge nonlocally at the left edge of the stem, even for toneless/low stems, even though stem $\sigma 1$ is not surface-H. The projection there would explain the failure of HD-M\textsubscript{IN}. (There is an alternative, though less appealing, explanation: the tense/aspect marker -ta- has a left edge opaque to H realignment (‘spread’)). Additionally, there is a close analogue to this nonlocal projection in Zulu, where a noun prefix H tone is prevented from extending into a noun stem not for anti-right-edge reasons, but because there is already a H somewhere in the noun stem; that is, Zulu seems to project a HD left-edge nonlocally at the stem left-edge, e.g. underlying $\sigma\sigma\#\sigma\sigma\sigma$ should be realised as $\ast[\sigma\sigma\#\sigma]_1\sigma[\sigma]$, but in fact surfaces as $[\sigma\sigma]\#\sigma[\sigma]_2$ (cf. Khumalo 1982:110); in these configurations, # indicates the prefix-stem boundary.
But, in truth, what exactly this morphologically aligned weak LD left ‘edge projection’
would actually mean is not clear: does the grammatical L parsed on the penult of toneless/low
stems now have two left edges? If so, the first is at the stem left-edge, which forms part of the
trigger condition for the OCP effect on adjacent lexical L tones (*AE (L_{lex})), the second at the left
derge of the sponsor position (penult), delimiting the locus of a general register-lowering effect.

For the same reason that a single H sponsor cannot project two right edges (rejected as a
pseudo-resolution to the disjoint HDs in §7.7.2.3), so a single L cannot project two left edges.
Simply put, the grammar would lose all predictability related to domain edges (e.g. edges needed
for reference by BASIC_ALIGNMENT, by any OCP constraints, by any (anti)edgeness effects). And
even if (299a) were feasible, it would still not allow a complete account of the lexical L-L
adjacency (that is, apparent OCP violation): (294k-n), however, remains unaccounted for unless
*AE (L_{lex}) is suspended in order to allow the SP LD to extend to the OP, without being hindered
by a lexical depressor initial to the H stem.

It might be construed that the LD-MIN failure effect in these data sets can be accounted
for solely by *AE (L_{gram}), but this is not possible, if indeed the toneless/low stems fail to parse
grammatical L on their penults when they contain a lexical L earlier in the stem HD domain
(294a-d).\footnote{Immediately below in §7.8.1.10 (302), I will claim that the idea of weakly projecting the
left edge of grammatical L (even when there is no surface evidence of L_{gram} realignment) is
utterly untenable. This suggests that L_{gram} is serving chiefly to mark the lexical tone category Low
(or toneless), that is non-High. In other words, L_{gram} serves to maintain contrast, at any expense.
The entire range of paradigm effects in this section (§7.8.1) can be reanalysed as a (somewhat
finessed) instantiation of CONTRAST maintenance, along with PARADIGM UNIFORMITY.}

Fundamentally, toneless/low stems would need to encode the proposed weakly projected
L_{gram} left-edge, \emph{even if} on the surface there were no penult L_{gram} on the penult\footnote{While this would seem to be akin to the OP (Chapter 5 §5.4.1.4, § 5.4.1.5) which projects
a HD left-edge even though it only rarely surfaces as H itself (the OP HD left-edge only becomes
evident when another HD immediately precedes the OP), there really is no parallel: the OP
requires a single HD left-edge, albeit frequently not saliently expressed; the present negative
toneless/low stems would require a double instantiation of a grammatical LD left-edge.}

Rather, it seems that the toneless/low stems and the H stems do two things: (a) each stem
length in each stem tone category (toneless/low or H) behaves the same (paradigm uniformity)\footnote{This pattern excludes 1-σ stems, which are obviously (and frequently) exceptional: the},

\begin{itemize}
\item But, in truth, what exactly this morphologically aligned weak LD left ‘edge projection’
\item would actually mean is not clear: does the grammatical L parsed on the penult of toneless/low
\item stems now have two left edges? If so, the first is at the stem left-edge, which forms part of the
\item trigger condition for the OCP effect on adjacent lexical L tones (*AE (L_{lex})), the second at the left
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\item For the same reason that a single H sponsor cannot project two right edges (rejected as a
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\item grammatical L on their penults when they contain a lexical L earlier in the stem HD domain
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\item left edge of grammatical L (even when there is no surface evidence of L_{gram} realignment) is
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\item (or toneless), that is non-High. In other words, L_{gram} serves to maintain contrast, at any expense.
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\item L_{gram} left-edge, \emph{even if} on the surface there were no penult L_{gram} on the penult\footnote{While this would seem to be akin to the OP (Chapter 5 §5.4.1.4, § 5.4.1.5) which projects
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\item length in each stem tone category (toneless/low or H) behaves the same (paradigm uniformity)\footnote{This pattern excludes 1-σ stems, which are obviously (and frequently) exceptional: the}
\end{itemize}
(b) the toneless/low stems systematically contrast tonally with the H stems (contrast preservation of lexical stem tone class). That is, every toneless/low stem has a H OP where every H stem (except the 1-σ aberration) has a toneless/low OP.

An analysis of these OP configurations would be built, then, on these two observations: paradigm uniformity (PU) and contrast preservation of lexical stem tone class. Referring back to earlier data, all toneless/low stems—1-σ (290a-d), 3-σ (290g), 4-σ (290h), and longer—would be paradigm-uniform with the 2-σ stems (290f), as achieved by the PU constraint in (300), together with a specific instantiation of CONTRAST (301), resulting in the distribution in (302).

(300) **PU Present Negative Tone** (PU NegTone)

PU OP-#Stem (\(\pi\)), \(\tau\)

In the present negative paradigm (\(\pi\)), syllables at the boundary (#) between the OP and stem must be tonally uniform (\(\tau\)) for all stems in the same tone class (toneless/low, High).

(301) **Contrast_StemTone \(\pi\) (Present Negative)** (Contrast_NegTone)

Contrast StemParadigm (toneless\(\text{pres}_\text{neg}\), High\(\text{pres}_\text{neg}\)), \(\tau\)

The toneless and High stems in this \(\pi\) paradigm (present negative) must contrast.

(302) **Distribution of tone at stem boundary**

a. toneless/low stems: \(-\sigma_{\text{OP}}-\sigma_{\text{stem}}\)... 
b. H stems: \(-\sigma_{\text{OP}}-\sigma_{\text{stem}}\)... 

(300-301) are not the most satisfactory way of achieving (302), because the solution is no longer phonologically explanatory, but rather declarative (at a morphological paradigm level). Given, however, that the OP is H in the UR here (cf. discussion in this section above, and earlier in §7.6.3.2), and given that no other configuration of LD constraints pertaining to one or more forms of the toneless/low stems seems able to achieve the right output, this morphological (300) and lexical (301) constraint seems the most articulate statement of the distribution\(^{191}\).

\(^{191}\) Self-evidently, (301) and (302) are overridden in the case of 1-σ stems. The details of such an analysis are not provided, because nothing follows from this.
7.8. 1. 10. Shift, fusion, anti-fusion, pseudo-anti-fusion

There is a last instance of domain fusion which does not fall out of any of the constraints or constraint interactions motivated so far. When a depressed 1ps H prefix (in the present negative) -gi- shifts its H rightwards into a non-depressor bearing stem, the shifted H fails to fuse in the case of toneless/low stems (303b-e)\(^{192}\), as attested by the downstep diacritic [\(\cdot\)]; the shifted, overlapping HD does fuse in the case of H stems, where no downstep interrupts the level H pitch across the entire \(\sigma_1\)-to-penult domain (304b-e), but for these H stems, the H shifted off the SP is expressed on stem \(\sigma_1\) and the lexically H stem \(\sigma_1\) sponsor is unexpressed; anti-fusion, even if desirable for some reason, is thus unavailable for selection (the shifted H is effectively masked by the stem H).

We have seen SP+Stem data displaying this anti-fusion effect already in §7.8.1.2 (235-239, 240-244), reexcerpted as (303-304). The crucial and surprising data is (303c-e) for toneless/low stems vs. (304c-e) for High stems: in the toneless/low stems (303), we expected to see the two adjacent HDs fuse because there is no lexical depression in these stems, yet they do not fuse; in the High stems (304), likewise, we expect HD fusion (inasmuch there will be seen to be any evidence for fusion at all), and we find fusion, or at least we find no downstepping.

**Present negative: H 1ps NegSP + toneless/low stems**

(303) *Non*-fusion across SP+stem boundary in toneless/low stems

- a. agī-ťí I don’t come
- b. agī-ľúími I don’t cultivate
- c. agī-ľíbááli I don’t forget
- d. agī-ľíbáťíísí I don’t delay
- e. agī-ľíbáťísíísí I don’t delay intensively

---

\(^{192}\) The 1-\(\sigma\) form (303a) fails to show fusion due to the general phrasal condition that requires a separate Register Domain on the ultima, cf. discussion in Chapter 5 §5.5.6. Similarly for H stems, the 1-\(\sigma\) form (304a) fails to fuse.
Present negative: H 1ps NegSP + H stem

(304) Fusion across SP+stem boundary in H stems

a. agíi-phí I don’t give
b. agíi-bóóni I don’t see
c. agíi-sébééti I don’t work
d. agíi-sébétíísi I don’t use
e. agíi-sébétíísisí I don’t work intensively

The crucial data (303c-e) tests for fusion of two HDs which do not ‘start out’ as adjacent, but acquire a shared edge through depressor shift at the right edge of the first HD, where the second HD also contains a Head (right edge) which is grammatically (L_{GRAM} or just L_{G}) depressed; this data then demonstrates anti-fusion, as attested by the downstep at the stem σ1-σ2 boundary in this toneless/low paradigm, as shown by the proposed domain interaction in (305a,c), as opposed to the would-be (but ill-formed) fusion data in (305b,d).

Present negative: H 1ps NegSP + toneless stems

(305) HD fusion failure if HD₁/HD₂ adjacency results from shift in HD₁ into depressed HD₂

a. agí-líbááli a[{gi}]-lí{báá}li I don’t forget
b. *agí-líbááli *a[{gi}]-lí{báá}li HD fusion: ill-formed
c. agí-líbátíísi a[{gi}]-lí{bá}túí{li}si I don’t delay
d. *agí-líbátíísi *a[{gi}]-líbá{tú}í{li}si HD fusion: ill-formed

For H stems, there is (unsurprisingly) perfect fusion of the lexical stem σ₁ H and the grammatical σ₂-to-penult H as configured in (306a,d); failure to fuse the stem σ₁-σ₂ here is not an option (306c,f). Whether the depressed SP, in turn, is fused to this (fused) stem HD domain (a,d), or not (b,e), is a moot point, as there are no testable tone expression implications. If there is no fusion, then the H on the depressed SP must shift into stem σ₁ position (306b,e), in which case the lexical H sponsored in stem σ₁ position is unincorporated in its own domain, which
stem domain perforce commences on \( \sigma_2 \) (and is fused with the grammatical H domain which commences on \( \sigma_2 \))\(^{193}\). If however there is fusion of the SP+stem domain sequence, then a triply fused single domain (HD\(_{x,y,z}\)) is expected (306a,d).

**Present negative: H 1ps NegSP + H stems**

(306) Possible HD fusion at SP-H stem boundary

a. \textit{agi-sébééti} \hspace{1cm} a\(_{x,y,z}\{\text{gi}_x\}-s\text{ê}b\text{é}é\}_yzt_i \hspace{1cm} \text{I don’t work}

b. \hspace{1cm} a\(_x\{\text{gi}_x\}-s\text{ê}y\}_yzt_i \hspace{1cm} \text{moot fusion failure: SP+stem}

c. *\textit{agí-sé’bééti} \hspace{1cm} *a\(_{x,y}\{\text{gi}_x\}-s\text{ê}y\}_yzt_i \hspace{1cm} \sigma_1-\sigma_2 \text{ HD unfused: ill-formed}

d. \textit{agí-sébítúísi} \hspace{1cm} a\(_{x,y,z}\{\text{gi}_x\}-s\text{ê}títí\}_yzt_i \hspace{1cm} \text{I don’t use}

e. \hspace{1cm} a\(_x\{\text{gi}_x\}-s\text{ê}y\}_yzt_i \hspace{1cm} \text{moot fusion failure: SP+stem}

f. *\textit{agí-sé’bítúísi} \hspace{1cm} *a\(_{x,y}\{\text{gi}_x\}-s\text{ê}y\}_yzt_i \hspace{1cm} \sigma_1-\sigma_2 \text{ HD unfused: ill-formed}

In (292) above, all fusible HD structures were considered. Just above, (305a,c) instantiate (292c), that is: HD\(_x\) fails to fuse with immediately following\(^{194}\) HD\(_y\) if HD\(_y\) contains a nested LD in any position. This configuration is repeated as (307a). (306a,c) instantiate (292f) above, repeated as (307b), where a depressed sponsor (=head) syllable in a domain HD\(_x\) forces the unincorporation of that sponsor with its sponsored domain (that here intrudes on HD\(_y\), become overlapped (and possibly fused) through depressor shift from HD\(_x\) into HD\(_y\).

[turn to the next page for (307) ‘Fusible HD structures, redux’].

\(^{193}\) An unfused, \textit{unshifted}, surface-low HD\(_x\) is not possible, however, as the HD contrast would be lost completely. I have argued in Chapter 5 §5.4.1.5 that \textit{CONTRAST_HD} is maintained at all costs.

\(^{194}\) The HD adjacency is only evident ‘after’ depressor shift from HD\(_x\) has taken place.
(307) **Fusable HD structures, redux**

a. \([\ldots \{\ldots\}\sigma_y \ldots \{\ldots\}]_y \Leftrightarrow \{\ldots\}\sigma_y [\ldots\ldots]_y\)
   - two HDs with a toneless syllable between them
   - depressed \(\sigma\) at the *right* edge (head) of HD\(_x\), HD\(_y\)
   - shift from HD\(_x\) into toneless (domainless) syllable
   - no fusion between HD\(_x\) and HD\(_y\)

b. \([\ldots\ldots]_x [\ldots\ldots] \Leftrightarrow \{\ldots\}\sigma_x [\ldots\ldots]_x \quad (\Rightarrow \{\ldots\\ldots\ldots\ldots\}_x y)\)
   - two adjacent HDs\(^{195}\)
   - depressed \(\sigma\) at *right* edge (head) of HD\(_x\)
   - shift from HD\(_x\) onto HD\(_y\) sponsor syllable, causing unincorporation of HD\(_y\) sponsor.
   - fusion is not determinable: possibly, in the third form, HD\(_x\) fuses with HD\(_y\).

The problem with HDs that become adjacent through depressor shift and fail to fuse (303c-e, 305a,c, 307a) does not appear to be connected to the manner in which the HDs become adjacent, but, crucially, to the fact that this toneless/low paradigm contains a phonological property which inhibits fusion. It has been argued above that these toneless/low stems reflect a grammatical L tone, that is, HD\(_y\) contains a LD\(_{\text{GRAM}}\). Although I have argued that this grammatical L does not realign to the left edge of the grammatical HD in a present negative stem, the presence of this L anywhere inside the target domain area for grammatical tone (stem \(\sigma\)-2-to-penult) is sufficient to prevent fusion\(^{196}\). This confirms the anti-fusion configuration given in (292c) above, which continues to be covered by the *L-in-H constraint proposed earlier in §7.4.3.3 (91), and invoked again for the patterns in §7.8.1.9 (292) above.

On the other hand, it might be argued again (cf. §7.8.1.9 (299)) that the grammatical penult L has the anti-fuse properties associated with the left edge of a LD (where left-edge in toneless/low stems is the stem \(\sigma\)-2 position). The prefix HD is able to ‘see’ that there is a (grammatical) LD inside the stem domain, even if it is non-local to the stem left-edge itself. This anti-fusion property would be conceptualised as the ability of L\(_{\text{GRAM}}\) to prevent two HDs from

\(^{195}\) The full ‘sequence’ of fusion and shift in (307b) is as follows (what has been schematically labelled HD\(_x\) in (307b) is here HD\(_y\)/HD\(_z\)):

\([\ldots\ldots]_x [\ldots\ldots]_y \Leftrightarrow \{\ldots\}\sigma_x [\ldots\ldots]_y \Rightarrow \{\ldots\\ldots\ldots\ldots\}_x y_z\)

That is: (i) there are three adjacent HDs (SP-OP-Hstem); (ii) HD\(_x\) and HD\(_z\) (OP and stem) fuse; (iii) depressed head of HD\(_x\) shifts H into HD\(_y\), causing overlap; (iv) possibly (but it is not entirely clear), shifted HD\(_x\) fuses with HD\(_y\), giving a single fused HD\(_x,y,z\).

\(^{196}\) Cf. footnote 187, where two analogues are provided to the non-local anti-fusion properties indicated here: (a) a nonlocal grammatical HD left-edge effect in Phuthi; (b) the Zulu nonlocal effect of probing for H inside a noun stem.
fusing across the $\sigma_1$-$\sigma_2$ boundary, by weakly and nonlocally projecting the LD left-edge at the $\sigma_1$-$\sigma_2$ position. But there is no point in even considering this as a viable alternative: the double projection of any domain edge guts the domain representation of predictive power. The $^*L$-$IN$-$H$ analysis suffices to preclude SP+stem fusion in toneless/low stems for this paradigm.

Finally, for this present negative paradigm, we encounter a ‘pseudo-anti-fusion’ pattern in data from the stem boundary of both toneless/low stems (308a-b) and H stems197 (308c-d), where there is a depressed stem $\sigma_2$; this entirely uncontroversial fusion failure is triggered by the left edge of every lexical LD (that is, every depressed syllable), which interrupts any H pitch contour by downstepping it (cf. discussion of Register Domains (RDs) begun in Chapter 5 §5.5.6, to be continued in §7.9). Each data line is given in three forms: without HD structure (left column); with RD structure and unfused (right column); with RD structure and fused (second line). The RDs in (308b,d) are incoherent. Glosses are (308a,b) ‘I don’t follow’, (308c,d) ‘I don’t sell’.

I term this pseudo-anti-fusion because although fusion fails for toneless/low stems here, it is only because the fusable/unfusable distinction that correlates with toneless/low vs. High stems is obliterated by the presence of lexical depression in the stem (in $\sigma_2$ position). Lexical

---

197 The data here reflects the effect where overlap is rated highly enough to force non-fusion of adjacent SP and stem LDs and of stem $\sigma_1$ and $\sigma_2$ HDs.
depression forces the restarting of a distinct register domain (a depressor segment always triggers
a new Register Domain, cf. the Register principles summarised below in §7.9). Thus, the
anti-fusion that emerges in (308) is not because of HDs that are per se grammatically fusible or
unfusible in the lexically neutral case, but purely because of a particular lexical depression
property. Register domains always create a new (lower pitch) level of H realisation, overriding
any HD structure.

In Tableau 20 (310), I exemplify all the major combinations of SP (non-depressor, and
depressed H 1ps -gi-), OP (non-depressor, and depressed H 1ps -gi-), stem class (H or
toneless/low), stem type (non-depressor or (lexical) depressor-bearing), as follows: (310a-c)
toneless/low 2-σ stem, where presence of grammatical L prevents fusion at the SP+stem
boundary; (310d-g) toneless/low 2-σ stem, where grammatical L left-edge repels depressed
prefix H from shifting a H into the penult; (310h-k) H 2-σ stem, where there is no grammatical L
to prevent fusion198; (310l-n) H 2-σ stem, where there is no grammatical L in the stem to prevent
the shifted H off the depressed SP from entering the penult, which shifted H (most likely)
overlaps with the stem σ1 lexical H (in coexpression)199; (310o-q) H 2-σ stem with lexically
depressed σ1, where the depressed SP H enters the stem, only to be expressed on the penult,
because LD fusion is so highly rated; (310r-t) toneless/low 2-σ stem with non-depressor OP;
(310u-w) H 2-σ stem with non-depressor OP; (310x-z) depressed H SP + non-depressor OP
(with possible SP-OP HD fusion) + toneless/low stem; (310aa-cc) depressed H SP +

---

198 There are constraints that cannot be reflected on this tableau, for space reasons that are
relevant here, e.g. fusion on the optimal output candidate (310h) should be overridden by an
anti-fusion effect at the antepenult-penult boundary, but this effect is paradigm-specific, and fails
to do so in the case of the grammatical present negative paradigm.

199 There is a problem with suboptimal candidate (310n): it clearly violates depressor shift
requirements, but EXPRESS_L >> EXPRESS_H is ranked below *L-in-H, according to which (310n)
appears to be better than optimal (310l). Some kind of (perhaps conjoined) constraint, e.g.
EXPRESS_L & EXPRESS_H, is at work further up the constraint hierarchy, to force depressor shift;
similarly, if the SP in (310ff) were expressed H inside the LD, depressor block must be forced:

   *a[[ká-gi]]-[lúgí]mi

   (This particular candidate is not evaluated in (310dd-ff))

Although this satisfies CONTRAST_HD, -gi - must be forced to be H (and thus to trigger
shift) in its own HD, which HD must not fuse with preceding -ka-; and *[kás-... ] must be
eliminated as a possible candidate by some form of EXPRESS_L constraint (hence the conjoined
constraint proposed just above).
non-depressor OP (with possible SP-OP HD fusion, and OP+stem fusion) + H stem; (310dd-ff)
non-depressor SP + depressed H OP + toneless stem; (310gg-ii) non-depressor SP + depressed H
OP + H stem.

The constraint subset invoked in Tableau 20 below is the one motivated in this section
(§7.8.1), along with motivated rankings from earlier sections of the chapter (309).

(309) **Present Negative constraint interactions**

a. *StemClash >> Max L\textsubscript{GRAM} (π)  
   (from 262)

b. *AE (L\textsubscript{LEX}, L\textsubscript{GRAM}) π >> Max L\textsubscript{GRAM} (π) >> Dep L  
   (from 277)

c. Max L\textsubscript{LEX} >> *AE (L\textsubscript{LEX})  
   (from 289)

d. Max L >> *L-in-H  
   (from 123b)

e. *L-in-H >> Express\_L >> WSA-Lf (L)  
   (from Constraint Summary 3 (130),
   from (123); Constraint Summary 6
   (217), from (185)

f. Crisp L >> WSA-Lf (L)  
   (from Constraint Summary 2: (63),
   from (61))

g. LD-Min >> Express\_H  
   (from Constraint Summary 4: (152))

h. Express\_H (σ) >> *Express\_OP (π)  
   (from 283)

i. Contrast\_HD>>(Express\_L & Express\_H)>>*L-in-H  
   (from footnotes 182, 199, 200;
   not reflected in Tableau 20)

[turn to the next page for (310) ‘Tableau 20: Present Negative paradigm’].
Tableau 20: Present Negative paradigm

<table>
<thead>
<tr>
<th>/ aká- + -líími /</th>
<th>Contrastr</th>
<th>Max</th>
<th>*AE (L_{Lex})</th>
<th>*AE (L_{Gram})</th>
<th>Max</th>
<th>*L-in-H</th>
<th>Crisp L</th>
<th>Ex press</th>
<th>WSA-Lf</th>
<th>LD-Min</th>
<th>*AE (H)</th>
<th>Ex press</th>
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<td>(b) a[kx{ka-lif}],mi</td>
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<tr>
<td>(c) a[kx,ká-lif],mi</td>
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<th>Max</th>
<th>*L-in-H</th>
<th>Crisp L</th>
<th>Ex press</th>
<th>WSA-Lf</th>
<th>LD-Min</th>
<th>*AE (H)</th>
<th>Ex press</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d) a[gí]-{lif},mi</td>
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<tr>
<td>(e) a[gx]-lif],mi</td>
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<tr>
<td>(f) a[gx]-lif],mi</td>
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<tr>
<td>(g) a[gx]-{lif},mi</td>
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</table>

[Tableau 20 continues on the following page]

200 The evaluation of anti-fusion candidates in this tableau requires a convention for interpreting domain constituency: every ‘original’ (pre-fusion) LD remains a counted LD for the purposes of *L-in-H. If one of two adjacent HDs contains a LD, and the two HDs fuse, then each HD instantiation in the fused domain violates *L-in-H twice (thus, the identity of both (coincident) fused HDs remains evident). If two adjacent HDs fuse, and each contains a LD, then the fused HD violates *L-in-H twice for each HD instantiation. Thus, HD fusion is prevented in an example such as (310gg) vs. (310ii), where the first candidate must not worsen its prefix HD by fusing it with following depressed 1ps OP LD:

\[(gg) \text{ a[ká]-{lif},-bóó,mi} \text{ vs. (ii) } \text{ a[kx{ka}-,{-gí},-bóó,mi} \]

In (gg), *L-in-H is violated once for HD\(_x\), once for HD\(_y\). In the second form, *L-in-H is violated once for HD\(_x\), once for HD\(_y\), making this a worse candidate. Double-underlined vowels in this table (310h-q, u-w, aa-cc, gg-ii) indicate moras sponsored as H both lexically (in terms of verb root category) and grammatically (as required by the present negative paradigm). This is in keeping with the practice established in Chapter 6 §6.3.1.4, footnote 43 referring to Table 13 (124). For perspicacity, data adduced through the course of this chapter (and the previous one) has not been supplied with the double-underlining, however.

705
akábóóni ‘s/he doesn’t see’

<table>
<thead>
<tr>
<th>/ aká- + -bóóni /</th>
<th>Contra스트 HD</th>
<th>Max L_{LEX}</th>
<th>*Stem Clash</th>
<th>*AE (L_{LEX})</th>
<th>*AE (L_{GRAM})</th>
<th>Max L_{GRAM}</th>
<th>Max H</th>
<th>*L-in-H</th>
<th>Crisp L</th>
<th>Ex pressures L</th>
<th>WSA-Lf (L)</th>
<th>LD-Min</th>
<th>*AE (H)</th>
<th>Express H</th>
</tr>
</thead>
<tbody>
<tr>
<td>(h) a[ská - bóó]ni</td>
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<td>(i) a[ská - bóó]ni</td>
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<tr>
<td>(j) a[ská - bóó]ni</td>
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<td>*!</td>
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<tr>
<td>(k) a[ská - bóó]ni</td>
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<td>*!</td>
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</tbody>
</table>

agibóóni ‘I don’t see’

<table>
<thead>
<tr>
<th>/ agi- + -bóóni /</th>
<th>Contra스트 HD</th>
<th>Max L_{LEX}</th>
<th>*Stem Clash</th>
<th>*AE (L_{LEX})</th>
<th>*AE (L_{GRAM})</th>
<th>Max L_{GRAM}</th>
<th>Max H</th>
<th>*L-in-H</th>
<th>Crisp L</th>
<th>Ex pressures L</th>
<th>WSA-Lf (L)</th>
<th>LD-Min</th>
<th>*AE (H)</th>
<th>Express H</th>
</tr>
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<tbody>
<tr>
<td>(l) a[gi - bóó]ni</td>
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<tr>
<td>(m) a[gi - bóó]ni</td>
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<td>*!</td>
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<tr>
<td>(n) a[gi - bóó]ni</td>
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<td>*!</td>
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<td>*0</td>
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<tr>
<td>(o) a[gi - vi]ni</td>
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</table>

- See footnote 199 for comment on evaluating candidate (310n), apparently preferable to (310l). (310n) would satisfy CONTRAST_HD, but violates a putative conjoined constraint (EXPRESS_L & EXPRESS_H), which needs to force depressor shift, that is: CONTRAST_HD >> (EXPRESS_L & EXPRESS_H) >> *L-in-H.

agivuuíni ‘I don’t harvest’

<table>
<thead>
<tr>
<th>/ agi- + -vűni /</th>
<th>Contra스트 HD</th>
<th>Max L_{LEX}</th>
<th>*Stem Clash</th>
<th>*AE (L_{LEX})</th>
<th>*AE (L_{GRAM})</th>
<th>Max L_{GRAM}</th>
<th>Max H</th>
<th>*L-in-H</th>
<th>Crisp L</th>
<th>Ex pressures L</th>
<th>WSA-Lf (L)</th>
<th>LD-Min</th>
<th>*AE (H)</th>
<th>Express H</th>
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</thead>
<tbody>
<tr>
<td>(o) a[gi - vi]ni</td>
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<td>(p) a[gi - vi]ni</td>
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<tr>
<td>(q) a[gi - vi]ni</td>
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<td>*!</td>
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</tbody>
</table>

[Tableau 20 continues on the following page]
<table>
<thead>
<tr>
<th>akáti'lími  ‘s/he doesn’t cultivate them’</th>
<th>/ aká- + -tí-liim-i /</th>
<th>Con</th>
<th>Max</th>
<th>*AE</th>
<th>Max</th>
<th>*L-in</th>
<th>Crisp</th>
<th>Ex</th>
<th>WSA-Lf</th>
<th>LD-Min</th>
<th>*AE</th>
<th>Ex</th>
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<tbody>
<tr>
<td>(r) a[ká-tí]-[(líí)]mi</td>
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<tr>
<td>(s) a[ká-tí]-[(líí)]mi</td>
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<tr>
<td>(t) a[ká-tí]-[(líí)]mi</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>akábábóóni  ‘s/he doesn’t see them’</th>
<th>/ aká- + -bá-bóóni /</th>
<th>Con</th>
<th>Max</th>
<th>*AE</th>
<th>Max</th>
<th>*L-in</th>
<th>Crisp</th>
<th>Ex</th>
<th>WSA-Lf</th>
<th>LD-Min</th>
<th>*AE</th>
<th>Ex</th>
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<tbody>
<tr>
<td>(u) a[ká-bá-bóó]ni</td>
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<td>(v) a[ká-bá]-[(bóó)]ni</td>
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<tr>
<td>(w) a[ká-bá]-[(bóó)]ni</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>agit'ilími  ‘I don’t cultivate them’</th>
<th>/ agi- + -tí-liim-i /</th>
<th>Con</th>
<th>Max</th>
<th>*AE</th>
<th>Max</th>
<th>*L-in</th>
<th>Crisp</th>
<th>Ex</th>
<th>WSA-Lf</th>
<th>LD-Min</th>
<th>*AE</th>
<th>Ex</th>
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<tbody>
<tr>
<td>(x) a[gi]-[(líí)]mi</td>
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<tr>
<td>(y) a[gi]-[(líí)]mi</td>
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<tr>
<td>(z) a[gi]-[(líí)]mi</td>
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</table>

[Tableau 20 continues on the following page]
### 7.8.1.11. Reinterpreting the lexical stem contrast as H vs. L

The present negative paradigm examined in the preceding sections adds weight to the case that the underlying lexical distinction in the verb system is between H and L stems, that is, that non-H stems are specified as L (where L is understood as a grammatical tone: $L_{\text{gram}}$), rather than as toneless. Paradigms where $L_{\text{gram}}$ plays an active role, including the present negative above.
and also the past subjunctive (presented in §7.6.2), allow the paradigm of L stems to be ‘unmasked’, that is, to display the effects of being L. Elsewhere (which is in the majority of paradigms), wherever there is no evidence for $L_{\text{gram}}$, or there is evidence that $L_{\text{gram}}$ is definitely inactive (e.g. the present participial, cf. Chapter 6 §6.2.1.1), we would continue to need the anti-parse $^\ast$Max-L constraint (motivated in §7.6.2.1 (163) above).

While there is a certain elegance in the H-vs.-L typology of verb stems, we need to retain the caveat from the earlier discussion (§7.6.2.1) that it does not appear useful to argue that the OP morpheme is, in general, lexically L (even though it is frequently expressed as toneless on the surface), since it never displays depressor shift effects. In other words, there is no analytic advantage (rather, there is some disadvantage) in claiming that all toneless morphemes (including affixes such as the OP) are, in fact, L.

The matter is not resolvable with any of the data yielded from Phuthi in this dissertation.

7. 8. 2. Lexical vs. Grammatical Depression

I turn now from a very detailed examination of one grammatical paradigm—the present negative—to consider further instantiations of lexical depression, but where the insertion of the depression feature is conditioned prosodically and segmentally in three possible ways: (a) the optimal insertion site is the stem penult, a possibility already seen in the lengthy discussion in §7.8.1 (most saliently in §7.8.1.1, §7.8.1.2 (232)); (b) the insertion site optimally contains a segmentally sonorant (glide/liquid/nasal) onset; (c) depression insertion on prefixes may also be constrained morphologically to lexical sets (‘strong’ noun classes). Factors (a-b) will be examined in §7.8.2.1, factor (c) will be examined in §7.8.2.3.

7. 8. 2. 1. Prosodic conditioning on L-insertion: penult prominence

Non-consonant-triggered lexical depression (that is, depression which is also breathy voiced, but which appears to have no historically breathy/depressor segmental sponsor$^{201}$)—as

---

$^{201}$ This claim is based on comparative data from other Nguni languages, to be given in footnotes 204 to 215 accompanying the data. Note: the orthography in these footnotes used for the Xhosa and Swati data is not quite the standard orthography for either language (penult lengthening is not usually marked; neither, of course, is tone sponsor status, depression or surface tone).
opposed to the paradigm-specific grammatical depression just examined in §7.8.1 (not saliently breathy voiced)—is quite rare in Phuthi. Nevertheless, the data in (311-312) contains a range of items where the penult\textsuperscript{202} (almost invariably lexically H) is the target insertion site.

\begin{equation}
\text{(311) Insertion of Lexical L on specific lexical items}\textsuperscript{203}
\end{equation}

\begin{itemize}
\item[a.] \text{\texttt{kú-yaála}} \quad \text{to refuse} \quad \text{verb (H)}\textsuperscript{204}
\item[b.] \text{\texttt{kú-rhuúsá}} \quad \text{to rust} \quad \text{verb (H)}\textsuperscript{205}
\item[c.] \text{\texttt{kú-roóála}} \quad \text{to roll up} \quad \text{verb (H)}\textsuperscript{206}
\end{itemize}

\textsuperscript{202} This observation may appear, at first, to be trivial. The non-derived stem shape in most Bantu languages is canonically \{-σσ\}. The pattern may simply be targeting stem σ₁ in (311), confirmed by the 1-σ stem in (311d). But the stems in (312) do seem to suggest that the penult is the target site: no lexeme has its antepenult as potential target, or its \textit{ultima} (unless \text{\texttt{LEXEME}}=\texttt{1σ}).

\textsuperscript{203} Depression (breathiness) in these items is reflected in the spelling with an <h>, except for (304k) where <th> would be misleading, since <th> would signify an aspirated alveolar stop; the <h> has no separable phonological status in these words.

\textsuperscript{204} Cf. Xh. \texttt{ákw-áála} ‘to refuse’, Sw. \texttt{kw-áála} (second mora of the penult seems breathy). To this otherwise Nguni vowel-initial stem, Phuthi prothesises the glide <γ> (here, and preceding all non-round vowels)—elsewhere a <w> is prothesised to o- or u- initial stems—to create well-formed CV onsets. (This contrasts with the regionally unstable \texttt{-e- / -o -} excrescent vowels in Nguni, which do not appear at all in Phuthi, cf. Chapter 2 §2.2.4.4). Proto-Phuthi-Swati—perhaps Proto-Tekela (cf. discussion of regional language classification in Chapter 1 §1.1.7)—had already innovated depression enhancement in this stem. Generally, the inserted glides are \textit{not} depressors (that is, not breathy), e.g. \texttt{kú-wótela}, cf. Xhosa \texttt{uk-ózela}, ‘to become drowsy’. Thus, <yh> in (311a) is depressor-enhanced, not borrowed, nor inherited (beyond Proto-Phuthi-Swati).

\textsuperscript{205} This stem must be borrowed from Afrikaans \texttt{roes} [rûs], ‘rust’. Although it cannot be certain that the Afrikaans source sonorant was depressed (breathy) at the time of the loan, Afrikaans stressed syllables—if they commence with a sonorant onset—are typically slightly breathy (and depressed); this stressed=breathy pattern has diffused to several varieties of South African English, and—as data in §7.6.2 (past subjunctive), §7.8.1 (present negative) and §7.8.2 (this section) shows—may be slowly coming to characterise the prominence position (penult syllable) in Nguni languages such as Phuthi and Swati.

Herbert (1987) proposes that segment release properties (ejectives, aspirates) cutting across Bantu, Khoisan and Afrikaans are pan-regional. Interestingly, the choice of the Phuthi superclose vowel [u] (as opposed to [u]) to substitute for the Afrikaans vowel suggests that at the point of loan the Afrikaans vowel was already fronting its /u/, as Phuthi [u] has very salient narrowed lip rounding. In contemporary Afrikaans this vowel is more like centralised [u].

\textsuperscript{206} Borrowed from Afrik. \texttt{rol} [rəl] ‘roll’. It is not known whether the Afrikaans source sonorant was breathy at the time of the loan (contemporary Afrik. sonorants are often breathy).
d. líi-whá    cave    noun (H)\textsuperscript{207}

e. lhákhaá  over there, yonder    demonstrative (adverbial): H (ante)penult\textsuperscript{208}
    [superdistal]

f. lháákho  there    demonstrative (adverbial): H penult\textsuperscript{209}

g. lháákha  here    demonstrative (adverbial): H penult\textsuperscript{210}

h. -mgaáti    wet    adjective: H penult\textsuperscript{211}

i. nheéti    only    adverb: H penult\textsuperscript{212}

j. -nyheéti    many    adjective (underived stem): H penult\textsuperscript{213}

k. é-taási    down    adverb: H penult\textsuperscript{214}

\textsuperscript{207} Cf. Xhosa líi-wá ‘cave’, Swati líi-wá ‘cliff’.

\textsuperscript{208} This 3rd position (superdistal) demonstrative reflects depressor shift, confirming the status of the first syllable as depressed. Cf. Xhosa (a)pháyáa, ‘over there, yonder’, Swati lapháyaa.

\textsuperscript{209} This 2nd position demonstrative has a rising penult, confirming its depressed status; similarly, cf. Swati lhaápho ‘there; but cf. non-breathy Xhosa áápho ‘there’.

\textsuperscript{210} This 1st position demonstrative has a rising penult, confirming the depression status. Cf. Swati lhaápha; but cf. non-breathy Xhosa áápha ‘here’.

\textsuperscript{211} This stem could conceivably be eliminated from the list, as it is a morphologically complex copula base certainly derived from émaatí ‘water’ (though the tones seem muddled). The copula morpheme here the breathy voicing (cf. §7.5). But such a stem is certainly lexified. If it were assembled synchronically, it would require a segmental copula -g- to be prefixed to the (pre)prefix Noun Class 6 vowel e-, thus -g-em-áatí, literally ‘(which) is water’. Interestingly, this example provides evidence that the é- (pre)prefix in Class 6 is not etymologically original. If it were, we would expect the adjectival base to be the full -gemáa-tí.

\textsuperscript{212} Borrowed from Afrikaans net [net] ‘only’. It is not clear whether the Afrikaans source sonorant was depressed (breathy) at the time of the loan.

\textsuperscript{213} This is an original (Tekela) Nguni stem, though not depressed (breathy) in its cognate σ1 forms, cf. Swati -nyénti, Xhosa -nĩzi.

\textsuperscript{214} Cf. Xhosa é-záántsi ‘down’; but Tekela Nguni (chiefly, Swati and Phuthi) do not retain breathiness where they have /t/ cognate to Zunda Nguni /zl/. But cf. Swati Swati é-táánsi, which suggests that breathiness was innovated—as in many other cases—before the Šwati/Phuthi split. Cf. also footnote 220.
Quantitative, enumerative stems

a. -ôôhle all\textsuperscript{215} Quantitative-1 (cf. Chapter 2 §2.2.1.1 (46))

b. g-ôôhle, wh-ôôhle, s-ôôhle, lh-ôôhle, b-ôôhle, yh-ôôhle, hh-ôôhle, t-ôôhle, k-ôôhle\textsuperscript{216}

c. -êédzi / -ôôdzi alone, each\textsuperscript{217} Quantitative-2 (cf. Chapter 2 §2.2.1.1 (46))

d. gi-ûng-êédzi, û-wh-êédzi, â-yh-êédzi, si-sôôdzi, líl-ôôdzi, bá-b-ôôdzi, û-wh-ôôdzi,

í-yh-ôôdzi, á-hh-ôôdzi, tî-t-ôôdzi, bû-b-ôôdzi, kû-k-ôôdzi\textsuperscript{218}

The penult is unambiguously a depressed H in the non-verbs (311f-k); in (311e) the third position (superdistal) locative pronoun is derived (perhaps through cliticisation) from second position (distal) in (311f)—the non-derived locative ‘stem’—where the penult is derived; in (311d), there is no stem penult in the monosyllabic stem (the only available stem syllable is depressed and H); in the verbs in (311a-c), the basic verb stem (coextensive with the full segmental word in the imperative mood) has a depressed H penult. Similarly, the penult stem syllable in both (312a,c) is depressed and H.

The pattern that emerges from this small set of lexical items is tonally clear: Phuthi selects certain lexical stems and assigns both lexical depression (L\textsubscript{LEX}) and lexical H tone (H\textsubscript{LEX}) to the penult syllable\textsuperscript{219}. In fact, for almost all examples in (311), the penult is also the stem-initial

\textsuperscript{215} The stems in (312) are transparent loans from Sotho /-ôle/ (with Sotho tense mid vowels) and /-osi/. Sotho lacks breathiness altogether (also no depression in Swati -ônkhe, Hosa -Ônke).

\textsuperscript{216} It may be that, in some typological (and paradigm-uniform) sense, even the vowel-initial stems -ôhle and -ôdzi would be closed by a (now unexpressed) glide if there were no agreement morpheme prefixed to them, in which case they, too, would be depressible, and candidates for depression insertion. Or it may be that because these lexical stems contain a stem-initial (penult) syllable that is onsetless, the vowel nucleus is also defaultly available for depression insertion. Or, simply, because in the assembled word forms, 5 out of 9 forms in (312b) and 7 out of 12 forms in (312d) contain depressible sonorant onsets in the penult (stem-initial) position. Thus, they are natural targets for depression enhancement.

\textsuperscript{217} Cf. Xhosa -êdwa / -ôdwa, Swati -êdywa / -ôdywa ‘alone, each’.

\textsuperscript{218} In sequence: 1ps; 2ps/3ps/Class1/Class3; 1pp/Class7; 2pp/Class5; 3pp/Class2/14; Class4/9; Class6; Class8/10; Class15. Cf. §7.2 footnote 3: [b] in b-ôôhle may be not breathy.

\textsuperscript{219} In Chapter 8 §8.3.4 and §8.3.11, I consider the phonological and lexical implications of...
syllable. But the pattern of depression insertion identified for the present negatives makes it clear that the word penult is the depression site; even though 2-σ verbs can become 3+ σ, their canonical length remains 2-σ. Lacking evidence to the contrary for the lexical items in (311-312), I maintain that the locus is set up with respect to the word right-edge, that is, on the penult.

For the items in (311-312), there is, additionally, conditioning according to onset sonorancy: (311a-j) all contain a sonorant onset in the penult, from the set of [m n l r j w]. It seems no small coincidence that all lexical stems deploying depression on the penult (except 311k\textsuperscript{220}) commence the depressor syllable with a consonant that is intrinsically voiced (sonorant) and thus also intrinsically depressable. (312a-d) are vowel-initial stems, and thus are exempted from any generalisation about onset sonorancy (but cf. footnote 215).

Finally, I propose that a set of stems such as in (311-312) is selected for depression insertion, because those penults are already predisposed to depression through their sonorant onset status. I speculate that the reason for such depression insertion is one of enhancement: tonal depression enhances the lowness already present in the voicing of sonorant onsets, effectively by making such onsets ‘ultra-voiced’. Yet if the reason for depression enhancement were purely phonological, then in all lexical items where both the penult is H and the onset is sonorant the penult should be depressed. But this is not the case, as (313)\textsuperscript{221} makes clear.

\begin{footnotesize}
\begin{itemize}
\item[\textsuperscript{220}] As seen in footnote 214, (311k) has a partial explanation: Phuthi ē-tąāsí corresponds to Zunda Nguni ē-ząāntsí, with depressor fricative [z] in the depressed syllable, systematically replaced in Phuthi by undepressed—and undepressable, pace Ní Chiosáin & Padgett (1997, 2001)—voiceless stop [t], cf. Swati ē-n'ąāsí. Why other Phuthi [t]-commencing syllables corresponding to Zunda [z] are not also depressed, e.g. Ph mú-tąādí vs. Xh ūm-ząāl’i ‘parent’, would remain unexplained. One may speculate that there is a correlation between the high-frequency locative adverbial form ē-tąāsí and the prosodic use of penult depression which serves a pragmatic goal of speaker emphasis or focus (cf. discussion in Chapter 8 §8.1.4).
\item[\textsuperscript{221}] I have said that not all eligible items have a depressed penult, and I can say more explicitly that the majority of items with potentially eligible sonorant-commencing syllables appear to lack the depression feature because they fail on one criteria or another, e.g. the basic stem is longer than two syllables, hence the target is not in penult position (e.g. kū-ỳà́rà̀lā ‘to change’), the stem is lexically toneless and not H (e.g. kū-ỳëtā), or both (e.g. kū-ỳà́múkēełā ‘to
\end{itemize}
\end{footnotesize}
Speculating outside the phonology, depression enhancement in the examples in (311-312) may signal a discourse need for speaker emphasis, or reflect high frequency of usage.

7. 8. 2. 2. Tone/depression foot

Up to this point, no specific proposals have been made for locating the lexically depressed syllable on the penult, yet the penult position is the one selected in almost all instances for depression insertion (311-312). The only instance where non-consonant-triggered depression arises elsewhere than the penult is when it occurs on the ultima, and this only in short 1-σ stems (where the penult lies leftwards of the stem boundary\(^{222}\)).

The proposal then is that Phuthi targets the penult through a binary, right-aligned left-headed foot, much as was suggested for making the penult prominent through weight-accent projection (\textit{WAP}) in Chapter 4 (§4.1.4.5). Exactly the same set of deconstructed metrical constraints would target the penult (that is, the head of a single right-aligned trochee) for depression insertion here, except that depression enhancement in this case is sensitive to sonorancy and H-ness (314); we might term the foot a Depression Accent Projection (DAP), in the vein of WAP and TAP (tone-accent projection\(^{223}\)).

\(^{222}\) There is also morphologically specific depression insertion, to be treated in the following section (§7.8.2.3), which insertion is tied to the associative and enumerative morphemes, irrespective of syllable position.

\(^{223}\) The Tone Accent Projection (TAP) trochee is sensitive to extrametricality, thus targeting the antepenult in a phrase-final lexical paradigm (since the ultima was seen to be extrametrical), whereas the Weight Accent Projection (WAP) trochee is sensitive only to the phrase right-edge (in a phrase-final word), since it identifies the penult as the locus for weight (length) projection, I would maintain. The Depression Accent Projection (DAP) foot is distinct from both TAP and WAP: it does not care about phrase-finality at all, nor extrametricality; it simply targets the word right-edge (regardless of phrase position).
**Depression Enhancement** (Depression Accent Projection)

Align \( (L_{lex}, Lf, WAP, \text{Head}[H, [\text{son}] \text{ onset}]) \)

Align the left edge of a lexical L tone with the head of the trochaic weight-accent-projection (i.e. the left edge of this projection), where the trochee head coincides with the combined properties of a tonally H syllable with a sonorant onset.

(314) can be nuanced to include stem-edge sensitivity in order to include short 1-σ stems.

7.8.2.3. Lexical / morphological conditioning on L-insertion

There is a final set of grammatical items in Phuthi that attract lexical depression, but not necessarily to the penult: they are prefixes where depression parsing appears conditioned by two distinct factors: (a) sonorant voicing, as already seen in (311), and (b) lexical noun class category membership (this second criterion will be seen to outweigh the first).

A brief foray into affix morphology is necessary as background. Bantu languages typically divide their noun classes into two morpholexical sets—‘strong’ vs. ‘weak’—based largely on prefix morphology (but including nuanced distinctions for derivative noun classes such as 1a/2b, which invariably pattern with classes 1 and 2). Weak classes are also referred to as ‘nasal classes’ because they typically contain a nasal consonant in their noun class prefix (Meinhof (1932:40-41); Doke (1954:65))\(^{224}\). Among other potential distinctions, strong classes have a CV-shaped SP, weak classes have a V-shaped SP, most likely because their initial, reconstructed \(^*g\)- has deleted since Proto-Bantu (e.g. Class 1 \(^*gu\)- > \(u\)-, Meinhof (1932:41)).

As presented in Chapter 2 §2.2.1.1 (48), the set of noun class prefixes found in Phuthi can be subdivided into strong vs. weak (315a-b). Strong (non-nasal) noun classes lack any nasal consonant in the noun class prefix (315a). Bantu weak classes in general include Class 1a as an extension of Class 1—even though the Class 1a prefix never contains a nasal consonant (315b)—because Class 1a is certainly derived from Class 1 (Meeussen (1980), Guthrie (1967-1971)). ‘Nasal’ is thus a subset of ‘weak’; but the crucial division for most Bantu languages is between ‘strong’ and ‘weak’.

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\(^{224}\) Meinhof (1932)—the English translation of Meinhof (1899), revised in the second edition in 1910—and Doke (1954) both comment on the distribution of prefix shapes relating to class prefixes that contain or lack a nasal consonant (though not explicitly naming the split ‘strong’ and ‘weak’). By the late 1960s, this lexical class division is routinely referred to as strong vs. weak in the teaching literature of Southern Bantu languages (e.g. the Lumko Xhosa course: Riordan et. al. (1969)).
In Phuthi, ‘weak’ and ‘nasal’ are even more non-coextensive than the expected Class 1/1a wrinkle because Class 9 (i-) bears no nasal consonant at all (*contra* the more general Bantu *(y)iN- shape). The Phuthi Class 9 prefix has lost the homorganic nasal still found in most other Nguni languages (and found in syllabic form prefixed to 1-σ stems in the Sotho/Tswana languages), that is, Proto-Nguni *i*-N- > Phuthi i-∅-.

Nevertheless, the weak class category necessarily includes Classes 1, 3, 4, 6, 9 (for which we see evidence in (316) to follow below); the language ‘remembers’ that it has two lexical sets of noun class prefixes, as given in (315a) vs. (315b).

(315) Strong vs. weak / nasal noun classes in Phuthi

a. strong (non-nasal) classes: eba- (2), li- (5), si- (7), ti- (8), ti- (10)225, bu- (14), ku- (15)

b. weak classes: mu- (1, 3), Ø- (1a), mi- (4), ema- (6), i- (9)

c. nasal classes: mu- (1, 3), mi- (4), ema- (6)

Each noun class has sets of class-specific prefixes that fulfil various grammatical roles, as presented in detail in Chapter 2 §2.2.1.1 (45-50), including grammatical agreement (concord), anaphoric reference (pronominalisation), time and space deixis. These concords are built off the noun class prefix, in some paradigms transparently, in others more opaquely. I have made frequent use of especially two such prefixes—subject and object (SP, OP)—throughout this work.

Other types of prefix include the associative (labelled ‘possessive’ in the southern African literature on Bantu languages in the tradition of Doke (1926, 1954)) and enumerative, given in (316) below, both of which are relevant for the discussion around lexical depression assigned to

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225 Remarkably, throughout the languages where this strong/weak division applies, Class 10 is grouped with the strong (non-weak, non-nasal) classes, even though its NC prefix sometimes includes a nasal consonant, e.g. Swati tǐ(N)-, Xhosa i(z)i(N)-. This is because Class 9 and 10 are indistinguishable morphologically from each other in Proto-Bantu (Meeussen 1980), where they are both reconstructed as *N-. The Southeastern Bantu (i)zǐ(N)- (Zunda Nguni) / tǐ(N)- (Tekela Nguni) / dǐ(N)- (Sotho/Tswana) Class 10 prefix is in fact a pre-prefix, built onto the Class 9/10 N-. Class 11 (u)lu- (Zunda Nguni) / lu- (Tekela Nguni, Tswana) is strong too, but is entirely absent from Phuthi (and Sotho), and from the northern Xhosa dialects contiguous to the Phuthi-speaking regions. All other upper noun classes found in Southeastern Bantu (e.g. the extended set in Venda) are strong too, cf. Chapter 2 §2.2.1.1 footnote 107. The full set of 13 strong/weak distinctions in Phuthi is given in §2.2.1.1 (49).
grammatical prefixes. All weak classes in Phuthi deploy the associative\textsuperscript{226} prefix as both H \textit{and} depressed; weak classes deploy the enumerative prefix as depressed, but not H. All strong classes fail (for both paradigms) to deploy any such depression on their associative and enumerative prefixes.

(316) Nominal prefixes: weak (1, 1a, 3, 4, 6, 9) vs. strong (2, 2b, 5, 7, 8, 10, 14, 15, 17)

<table>
<thead>
<tr>
<th>tones</th>
<th>Noun class prefix</th>
<th>Associative prefix</th>
<th>Enumerative prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H, non-depressed</td>
<td>H, depressed</td>
<td>non-H, depressed</td>
</tr>
<tr>
<td>H</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>mú-</td>
<td>wá-</td>
<td>wu-</td>
</tr>
<tr>
<td>1a</td>
<td>Ø-</td>
<td>wá-</td>
<td>wu-</td>
</tr>
<tr>
<td>3</td>
<td>mú-</td>
<td>wá-</td>
<td>wu-</td>
</tr>
<tr>
<td>4</td>
<td>mí-</td>
<td>yá-</td>
<td>yi-</td>
</tr>
<tr>
<td>6</td>
<td>ñma-</td>
<td>(fi)yá-</td>
<td>wa-</td>
</tr>
<tr>
<td>9</td>
<td>í-</td>
<td>yá-</td>
<td>yi-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>tones</th>
<th>H</th>
<th>H</th>
<th>toneless</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>ñba-</td>
<td>bá-</td>
<td>ba-</td>
</tr>
<tr>
<td>2b</td>
<td>bó-</td>
<td>bá-</td>
<td>ba-</td>
</tr>
<tr>
<td>5</td>
<td>lí-</td>
<td>lá-</td>
<td>li-</td>
</tr>
<tr>
<td>7</td>
<td>sí-</td>
<td>sá-</td>
<td>si-</td>
</tr>
<tr>
<td>8</td>
<td>tí-</td>
<td>tá-</td>
<td>ti-</td>
</tr>
<tr>
<td>10</td>
<td>tí-</td>
<td>tá-</td>
<td>ti-</td>
</tr>
<tr>
<td>14</td>
<td>bú-</td>
<td>bá-</td>
<td>bu-</td>
</tr>
<tr>
<td>15</td>
<td>kú-</td>
<td>kwá-</td>
<td>ku-</td>
</tr>
<tr>
<td>17</td>
<td>(kú-)</td>
<td>ká-\textsuperscript{227}</td>
<td>ku-</td>
</tr>
</tbody>
</table>

\textsuperscript{226} The associative prefix is introduced and exemplified in Chapter 2 §2.2.1.1 (46), §2.2.2.2. \textsuperscript{227} Cf. Chapter 2 §2.2.1.4 (60) for discussion of ka- ‘chez-locatives’.
The associative prefixes are exemplified in (317-318), with a Class 1a possessor noun (ŋtaaté ‘father’), with domain structure added to select items in (319).

(317) **Associative prefixes: weak possessee classes are H, depressed**

a. Class 1 mú-tfwána wa-ŋtaaté child of father\(^{230}\) (father’s child)  
   NC1-child AP1-father

b. Class 1a ŋtaaté wa-ŋtaaté father of father

c. Class 3 mú-nwána wa-ŋtaaté finger of father

d. Class 4 mú-nwána ya-ŋtaaté fingers of father

e. Class 6 émá-nyáwu a-ŋtaaté feet of father\(^{231}\)

f. Class 9 í-yéto ya-ŋtaaté deed of father

(318) **Associative prefixes: strong possessee classes are H, not depressed**

a. Class 2 ébá-tfwána bá-ŋtaaté children of father  
   NC2-children AP2-father

b. Class 2b bó-ŋtaaté bá-ŋtaaté fathers of father

\(^{228}\) The words used in this example set are, in isolation, as follows (phrase-medial provided first, reflecting the extension of H tone by WSA-R\(_T\) to a penult target; phrase-final form with long penult is given in parentheses; only the noun singular is given, when the stem is used twice): mú-tfwána... (mú-tfwáana) ‘child’, ŋtaaté... (ŋtaaté) ‘father’, mú-nwána... (mú-nwaana), ‘finger’, lë-nyáwu... (lë-nyaawu) ‘foot’, í-yéto... (í-yeto) ‘deed’, sí-tjhába... (sí-tjhaaba) ‘tribe’, bú-tfu... (búú-tfu) ‘humanity’, kú-líma... (kú-liima) ‘to cultivate / cultivating’, k-o-ná (k-o-ná) ‘there’.

\(^{229}\) Class 1a possessor nouns allow the absence of any overt segmental morphology, with the result that the effect of H spread and depressor shift is salient. For all other AM-NC-STEM sequences (where NC is not 1a), a templatic AM vowel -e- is required; this is a hallmark of the Tekela Nguni languages: Phuthi, Swati and the others; cf. Chapter 2 §2.2.1.1 (49ix), §2.2.2.2-§2.2.2.3 for discussion of morphological associatives.

\(^{230}\) This sequence should perhaps be segmented as mú-tfwána wa-Ø-ŋtaaté, where Class 1a has a Ø prefix:  
   NC1-child AM1-NC1-father  
The morpheme structure is identical through (317-318), and is not repeated on every line.

\(^{231}\) Alternatively, the Class 6 form is attested (in Mpapa) as: hìga-ŋtaaté, that is, with a breathy segmental onset to the associative (cf. Sotho non-breathy hì-).
c. Class 5 lí-nyáwu lá-ŋtaaté foot of father
d. Class 7 sí-tjhába sá-ŋtaaté tribe of father
e. Class 8 tí-tjhába tá-ŋtaaté tribes of father
f. Class 10 tí-yéto tá-ŋtaaté deeds of father
g. Class 14 bű-tfu bá-ŋtaaté humanity of father
h. Class 15 kú-líma kwá-ŋtaaté cultivating of father
i. Class 17 (k-o-ná) ká-ŋtaaté there at father’s (chez father)

Examples (317a, 318a) are given with domain structure in (319). In addition, the same pattern with the 2σ Class 1a noun ṣmaá is provided, which manifests depressor shift from antepenult to penult (319c), and the failure of HD-MIN (minimality) satisfaction through *AE (OCP) satisfaction.

(319) Domained associatives
c. [mú-tfwá]na [{wa}-mǐ]:[má] child of mother
d. [ébá-tfwá]na [bá]-mǐ:[má] children of mother

The data in (317-318) above has made it clear that for certain categories of prefix (associative, enumerative), Phuthi opts to display lexical depression as a morphosyntactic category diacritic. It is also clear, however, that it is not strictly the status of prefixes as nasal-bearing or not that is crucial, but rather it is the morphological set of what were

232 The Class 17 phrase is not strictly a possessee-possessor sequence, though it was likely reinterpreted from that into an apparently headless associative form (the possessor/modifier alone: ‘father’s’); the wrinkle is that such an associative prefix ká- is secondary, that is, it replaces a primary prefix (of a noun in one of the people classes: 1, 1a, 2, 2b). Cf. Chapter 2 §2.2.2.1 for discussion of absolute pronouns like k-o-ná.
Proto-Bantu nasal-bearing prefixes (‘weak’ classes) that is crucial, whatever may have been the fate in this particular Bantu daughter language of the proto-nasal in these class prefixes.

As far as the conditioning of depression by sonorancy, all weak associative prefixes commence with glides (wá-, yá-) except for Class 6 (ńá-~á-); the Class 6 prefix suggests that while sonorancy may be a very salient factor in the triggering of depression insertion, it may not be fully sufficient as it stands. And yet in both Mpana and Sigxodo Phuthi, for some speakers, Class 6 associative prefix can alternatively be wá-, as it can also be for the Class 6 OP (cf. Chapter 2 §2.2.1.1 (46). If we regard the glide-initial Class 6 prefix as canonical, and the onsetless á-prefix to be an innovation, then the sonorancy conditioning on depression insertion can be maintained, and the conditioning factor of ‘(weak) noun class’ can be abandoned.

7.8.3. Depression Enhancement Reflects Salience

We have seen several configurations of depression in this chapter, summarised in (320) below. We have seen that depression can be either lexical or grammatical. Lexical depression is triggered on any syllable with a breathy onset, as given in §7.2.1.1 (1). The successful parsing of consonant-triggered lexical depression is not contingent on prosodic location in a word of the depressed onset, e.g. kú-dżákáala ‘to become injured’ (320a).

We have seen in §7.8.2.1 that lexical depression is inserted, possibly as an enhancement feature, on a H depressed penult with sonorant onset, e.g. kú-yhäála ‘to refuse’ (320b). We have also seen in §7.6.2 that lexical depression is instantiated on OPs but only in certain paradigms, including the past subjunctive (cf. §7.6.3.2, and Chapter 2 §2.2.4.9). We have seen lexical depression triggered on certain nominal prefixes: (a) the noun copula prefix (§7.5.1), irrespective of onset voicing (320c); (b) the associative and enumerative prefixes (§7.8.2.3), both of which tend to have sonorant onsets (320d).

Finally, we have seen grammatical depression (§7.8.1) triggered in a verb paradigm at the same prosodic locus as for lexical enhancement (the penult), but without any condition on onset sonorancy (320e). In this depression instantiation, only a subset of phonological depression

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233 One could attempt to conflate the depressable segmental onsets for the associative morpheme (two glides [j w], glottal fricative [h]), according to shared features: they share just [−consonantal, +voice]—although [h] is considered to be [+sonorant] in some analyses.
properties accompanies the depression: depressor block preceding the penult is manifested, but not depressor shift off the penult; an anti-fusion effect at the left edge is displayed, but no leftwards realignment of L.

Thus, whatever the specific domain realignment properties (shift, block, anticipation, minimality), it is clear that Phuthi invokes two distinct types of depression: lexical depression, which appears to coincide with audible breathiness, and grammatical depression, which does not.

The set of depression environments other than consonant-triggered lexical depression seems slightly baffling, and perhaps unconflatable. But I propose that both sets of environments could be unified under a single abstract category, ‘salience’, defined as ‘phonologically/morphologically salient for speaker or for hearer, or for both’, summarised in Tableau 21 (320); the bolded syllable is the target of the depression in each case. If this disjunctive set of trigger environments can be unified, then depression insertion can be reduced to the simple observation: ‘depression targets salience’. Such conflation remains necessarily speculative.

Tableau 21: Depression Typology

<table>
<thead>
<tr>
<th>Depression type</th>
<th>Salience conditions</th>
<th>example</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>penult H sonorant onset strong/weak relevance?</td>
<td></td>
</tr>
<tr>
<td><strong>Lexical</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) consonant-triggered (inherent)</td>
<td>no(^{234}) no no no</td>
<td>kú-džakála ‘to get injured’</td>
</tr>
<tr>
<td>(b) lexical enhancement</td>
<td>yes yes yes (mostly) no</td>
<td>kú-yhaála ‘to refuse’</td>
</tr>
<tr>
<td>(c) noun copula prefix</td>
<td>no yes yes (Sgx: all classes; Mp, Sgx: weak classes) no</td>
<td>yhi-tšáaba ‘it is a mountain’</td>
</tr>
<tr>
<td>(d) associative prefix</td>
<td>no yes yes (except Cl.6) yes</td>
<td>wa-númá (cl.1/1a) ‘of mother’</td>
</tr>
<tr>
<td>(e) past subjunctive OP</td>
<td>no yes no no</td>
<td>...bá-tʃ-líima ‘and they cultivated them’</td>
</tr>
<tr>
<td><strong>Grammatical</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) pres negative / remote past</td>
<td>yes (yes) no no</td>
<td>agí-líími ‘I don’t cultivate’</td>
</tr>
</tbody>
</table>

\(^{234}\) In the ‘penult’ column of this tableau, ‘no’ indicates ‘not necessarily’.

721
• (320c) indicates that for one dialect (Sigxodo) there is a copulative prefix *yí*-(with sonorant onset), which not only serves as the general predicator for three noun classes (Classes 2b, 4, 9), but which can preprefix any segmental copula from any noun class.

• (320f): ‘yes’ is in parentheses for the H tone column, since although the penult in the present negative is H because this paradigm targets the penult as the rightwards extent of the grammatical H, in very short stems (1σ) there is no penult, and the ultima is not H.

The phonetic phenomenon of breathiness has not been investigated in this work, but it is likely more nuanced than the phonological observations suggest. Depression and breathy voice may extend across a range of spread glottis configurations. Traill (1990) has made it clear from careful instrumental work that whatever the phonological facts of Swati adduced in Rycroft (1981b), the two types of depression claimed in that language—the first breathy, the second depressed (with lowered, or lowered and rising pitch) but not breathy—are not the same phonetic phenomenon; Traill has identified five distinct phonetic types.

The implications of the tone/voice clash effects and phonological contrast in the Phuthi grammar are taken up in Chapter 8, where a depression cline is proposed (§8.3.10).

7. 8. 4. Conclusion

The purpose of the lengthy exposition of the Phuthi present negative in §7.8.1 has been to show that a single grammatical paradigm displays a remarkable range of tone/voice (here: H/L) interactions, deploying both lexical and grammatical instantiations of both tones, realigning both tones, fusing both types of tone domains under certain conditions, invoking the left edge of both types of tone domain (lexical and grammatical) as a downstep trigger.

I have presented a wide range of empirical tone behaviour, requiring a range of analytic strategies (and on occasion, as yet incompletely successful solutions). No patterns from this verb paradigm have been passed over. The central observation is that in all but one instance, the toneless/Low paradigm remains tonally distinct from the High paradigm; this is achieved, chiefly, by the parsing of an abstract grammatical L tone feature, whose left edge displays depression block (§7.8.1.1-§7.8.1.2) and anti-fusion properties, but which also lacks depression shift properties. This unalignable L tone (§7.8.1.3) suggests that there are two distinct instantiations of L—one lexical, one grammatical—just as there are of H (§7.8.1.4). But the properties of the two instantiations of grammatical tone are distinct: although parsed distinctly,
lexical and grammatical H reflect the same domain properties; lexical and grammatical L, however, do not (cf. Tableau 19 (257), for a summary of the distinct characteristics).

The behaviour of toneless/Low stems suggests that these stems are underlyingly L (§7.8.1.5, §7.8.1.11), which grammatical L is subject to an anti-clash effect for H stems (allowing us to maintain a richness-of-the-base line of analysis, with respect to H stems), and various OCP effects (§7.8.1.6). Tonelessness is, thus, a derivative of the (paradigm-specific) anti-parse effect on a Low stem L feature.

This data set has allowed us to establish a general typology of HD fusability (§7.8.1.7-§7.8.1.10), where the key observation is that no HD will fuse onto a successive HD which partially or completely overlaps with a LD. That is, the recent data from this paradigm confirms the relentless theme of the present chapter: L (and LD) is antagonistic to H (and HD). Shift data in this paradigm make it clear that pre-antepenult downstep in Phuthi is empirically possible (§7.8.1.10), and thus confirms that all data is reliably testable for HD constituency: absence of downstep explicitly implies fusion (as claimed first—for fused HDs—in Chapter 5 §5.2).

In §7.8.2, the second part of this preceding lengthy discussion of a single paradigm, a range of non-consonant triggered lexical depression has been adduced, and grouped under the general abstract property of ‘salience’: depression is claimed to enhance salience (§7.8.3). The redundant adding of depression is triggered lexically by a set of prosodic (penult syllable, H tone) and segmental (sonorant) properties.

7. 8. 5. CONSTRAINT SUMMARY

I summarise the new rankings (321), and the entire tone/voice constraint set in the present chapter (322), with the dominance relations visually sketched in (323). This final dominance relations figure is rather crowded, but accurately reveals the staggering complexity of the voice/tone relationships in Phuthi. The set of relationships among tone and voice properties is reviewed in Chapter 8 §8.3.8 and §8.3.10 (especially the cline of depression patterns to follow in §8.3.10 (101)).
Constraint set (tone/voice), version 7: new rankings

a. BA-Lf (L_{GRAM}), Express_{L_{GRAM}} >> Express_{Edge} >> Head_{H} >> Express_{L_{LEX}} >> WSA-Lf (L_{LEX})
   (from 258)

b. *StemClash >> Max L_{GRAM} (\pi)
   (from 309, from 262)

c. Max L_{LEX} >> *AE (L_{LEX}, L_{GRAM}) (\pi) >> Max L_{GRAM} (\pi)
   (from 309, from 277)

d. Max L_{LEX} >> *AE (L_{LEX})
   (from 309, from 289)

e. Contrast_HD >> (Express_{L} & Express_{H}) >> *L-in-H
   (from footnotes 63, 81, 182, 199, 200)

Total constraint summary (tone/voice, partial): version 7

- Resolving Clash
  a. BA-Lf (L), BA-Rt (L)
  b. Express_{L} >> Express_{H}
  c. Max-H, Max-L >> Express_{L} >> Express_{H} >> *Rise

- Anticipating L
  a. Crisp(L) >> WSA-Lf (L) >> BA-Lf (L)
  b. BA-Rt (L) >> WSA-Rt (L)

- Shift
  a. Head_{x} = (*AE_{x} >> NonFin(\pi_{x}) >> HD-Min_{x} >> AvoidProm(\pi_{x}) >> WSA-Rt(\pi_{x}) >> BA-Rt_{x})
  b. Express_{Edge} >> Head_{H} >> Express_{L} >> Express_{H}

- Block
  a. Express_{Edge}, Max-L, Head_{H} >> *L-in-H >> Express_{L}, WSA-Lf (L)

- L Minimality
  a. NonFin, AvoidProm >> LD-Min
  b. LD-Min >> Express_{H}
  c. *Overlap(L) >> LD-Min
  d. *Overlap(L), NonFin_{LD}, AvoidProm_{LD} >> LD-Min >> Express_{H} >> NonFin_{HD}, AvoidProm_{HD}

- Masked and quasi-depression
  a. *Max-L (\pi) >> Max-L \quad \pi = past subjunctive
  b. (Express_{H} >> Express_{L}) (\pi) \quad \pi = past subjunctive

- Unincorporation
  a. Express_{Edge} >> Incorporate
  b. Contrast_HD >> Incorporate
  c. Express_{Edge} >> Express_{L}
  d. Max H, Max L >> Incorporate
  e. Max-L >> *L-in-H
  f. Express_{Edge}, Max L >> *L-in-H >> Express_{L} >> WSA-Lf (L) >> Incorporate
• **Disjoint H**
  a. Express_Edge >> Express_L
  b. Express_L >> Express_Prefix
  c. Express_Prefix >> WSA-Lf (L)
  d. Contrast_HD >> Express_Prefix
  e. Express Edge vs. Contrast_HD
  f. Contrast_HD >> Express_L
  g. Express_Edge, Contrast_HD >> Express_L >> Express_Prefix >> WSA-Lf (L)

• **Selecting disjoint H or non-disjoint H**
  a. *AE (L) >> Express_Prefix (ζ)
  b. Express_Prefix >> *AE (L) (ζ)

• **Reranking of *Overlap**
  a. *Overlap >> everything (x = H, L, any other feature)

• **Grammatical L**
  a. BA-Lf (L_{GRAM}), Express_L_{GRAM} >> Express_Edge >> Head_H >> Express_L_{LEX} >> WSA-Lf (L_{LEX})
  b. *StemClash >> Max L_{GRAM} (π)
  c. *AE (L_{GRAM}) π >> Max L_{GRAM} (π) >> Dep L
  d. Max L >> *AE (L_{LEX})
  e. Contrast_HD >> (Express_L & Express_H) >> *L-in-H

  [turn to the next page for (323) ‘Constraint rankings (tone/voice), version 7: dominance orderings’]
(323) Constraint rankings (tone/voice), version 7: dominance orderings

*Overlap
  | Max L_{LEX}
  | *AE (L_{LEX})
  | *AE (L_{GRAM}) (\pi)

BA-Lf (L_{GRAM})   Express_L_{GRAM}   *AE_x
\quad /\quad /
Express_Edge  NonFin (\pi)_x
\quad /
Head H ↑
\quad /
*StemClash
\quad /
Max L_{GRAM} (\pi)
\quad /
Contrast_HD  Max-H
\quad /
Crisp L   *L-in-H
\quad /
Express_L_{LEX}
\quad /
Align_Prefix
\quad /
WSA-Lf (L_{LEX})
\quad /
Incorporate
\quad /
BA-Lf (L)   NonFin LD
\quad /
AvoidProm LD
\quad /
LD-Min
\quad /
Express_H
\quad /
*Rise
\quad /
NonFin HD
\quad /
AvoidProm HD
In Chapter 5 §5.5.6, I introduced the notion of an intonation phonological pitch domain—termed Register Domain—in addition to the H tone domain, in order to encode H tone downstep effects that do not necessarily fall out of shared H domain edges (antepenult/penult), but need to include reference to downstep at the morphological interface of the OP and stem boundary, and at the prosodic penult/ultima boundary.

The observation made there was that two adjacent H domains will fail to reflect distinct H feature tokens, unless something prevents them failing. That is, two such adjacent HDs will fuse—they will absolutely neutralise their distinctness—unless a constraint overrides the fusion requirement. This theoretical fusion forces two adjacent domains not to be (re)parsed to a new (lower) tone height midway through a H tone sequence. The only way we can know that fusion has failed is if there is a tone downstep between the two HDs. There is, thus, a binary choice between fusion and downstep: two adjacent HDs are either fused or the second is downstepped relative to the first. Register Domains are not needed for this general case of fusion.

However, two problems were encountered in Chapter 5: (a) the HD fused with an OP is downstepped relative to a preceding HD on the SP, even though the expressed H portion of the domain does not coincide with the HD left-edge because the OP is anti-expressed by the morpho-phonetic *EXPRESS_{OP} constraint (Chapter 5 §5.4); (b) downstep can also occur internal to a single unfused HD, in the case of the syllable boundary between long penult and ultima (termed ‘ultima downstep’, cf. §5.5.5-§5.5.6).

It was proposed in §5.5.6 that an additional domain type, a Register Domain (RD), be invoked at the level of intonational domain expression. In the default case, the RD initiation (indicated by ‘|’) corresponds precisely to a HD left-edge, to be articulated through Principle A below; in the non-default cases, the RD initiation is parsed by additional principles B, C, and, later, D below.

The first three principles are as follows:

**Principle A:** every\(^{235}\) HD left-edge implies a RD left-edge (324);

**Principle B:** the OP morpheme requires a RD to begin after the OP right edge (325)\(^{236}\);

**Principle C:** an ultima inside a HD requires RD initiation at the ultima left-edge (326).

\(^{235}\) It makes no sense that the first HD in any phrase be downstepped, since there is no earlier
RDs are not conceptualised as the same kind of theoretical entity as a HD or LD; rather, they are direct instructions to the pitch implementation device. As such they do not reflect phonological domain-construction principles (e.g. they do not need a right edge). Only one edge is critical (the left edge). The RD also has no unique parsing feature; in some sense it is a meta-domain, parasitic on HD edges, enriched by the other trigger features enumerated here.

I recapitulate here the general downstep case (324) and the two problematic downstep cases—OP downstep (325) and positional (ultima) downstep (326). Each example consists of a single word.

(324) Principle A = general downstep: every HD left-edge $\Rightarrow$ RD left-edge

a. l[kú]-l[bóó]na  to see  H prefix unfused to H 2-σ stem at antepenult/penult boundary
b. *l[kú-bóó]na  H prefix incorrectly fused to H stem at antepenult/penult boundary
c. l[bá-bó]na...  they see...  H prefix fused to H 2-σ stem phrase-medially
d. *l[bá]-l[bó]na...  H prefix incorrectly unfused to H 2-σ stem phrase-medially
e. l[kú-sébéé]ta  to work  H prefix fused to H 3-σ stem pre-antepenult
f. *l[kú]-l[sébéé]ta  H prefix incorrectly unfused to H stem pre-antepenult
g. l[bá]-ya- l[wáá-kha]  they draw it (water)  H OP fused to H 1-σ stem, Contrast_HD $\gg$ *Express_OP
h. *l[bá]-ya- l[wáá]-l[khá]  H OP incorrectly unfused to expressed H stem ultima

H pitch implementation in the same phrase. Hence, the register algorithm could be nuanced by ignoring the very first HD left-edge in any particular phonological verb word.

236 The short OP 1-σ stem conforms with downstep Principle A, because in this instance the OP itself is exceptionally expressed H, overriding the *Express_OP constraint.
237 The data for fusion (as a response to the in situ OCP violation) in (324a-f) is taken from Chapter 5 §5.2.
238 The data for downstepping beyond the fused OP+stem domain (324g-h, 325a-d) is taken from Chapter 5 §5.4.
The data in (324) supports the claimed fusion of adjacent HDs (proposed in Chapter 5 §5.2): HD fusion correctly fails in (324a) because the HD boundary is at the antepenult-penult boundary, triggering the conjoined constraint (\texttt{AVOIDPROM\_&\_CRISPSTEM}); HD fusion correctly succeeds in (324c,e,g).

(325) **Principle B = Object Prefix\textsuperscript{239} downstep: OP right edge $\Rightarrow$ RD left-edge**

\begin{itemize}
\item a. $| [\text{bá}]$-ya-[ba-]li|míisa they help them cultivate H OP with toneless/low stem
\item b. $| [\text{bá}]$-ya-[ba-]li|báltiisa they delay them H OP with toneless/low stem
\item c. $| [\text{bá}]$-ya-[ba-]bóní|físa they show them H OP fused to H stem
\item d. $| [\text{bá}]$-ya-[ba-]ségbé|tiisa they use them H OP fused to H stem
\end{itemize}

(326) **Principle C = positional downstep: HD ultima $\Rightarrow$ RD left-edge**

\begin{itemize}
\item a. $...ti-| [\text{bóo}|nó] views post-negative noun (no prefix H tone)\textsuperscript{240}$
\item b. $li| [\text{mú}|sá] help cultivate! imperative $\sigma_2$ grammatical H, 3-$\sigma$ toneless/low stem\textsuperscript{241}$
\item c. $li| [\text{bátí}|sá] delay! imperative $\sigma_2$ grammatical H, 4-$\sigma$ toneless/low stem
\item d. $| [\text{bónú}|sá] show! imperative $\sigma_1$ lexical H (3-$\sigma$) fused to $\sigma_2$ grammatical H
\item e. $| [\text{ségbé}|fí|sá] use! imperative $\sigma_1$ lexical H (4-$\sigma$) fused to $\sigma_2$ grammatical H
\item f. $| [\text{kúu-}|káhá] to draw (water) fused prefix with H 1-$\sigma$ stem
\end{itemize}

In addition to these downstep configurations, we can now add a fourth principle from the present chapter, in light of all the depression data considered in the preceding sections:

**Principle D**: every depressor inside a HD—that is, every LD right edge—is followed by a RD left-edge (327).

\textsuperscript{239} The data for downstepping at the fused OP+stem domain juncture (324g-h,325a-d) is taken from Chapter 5 §5.4.1 (92-93), (106-107).

\textsuperscript{240} The data for downstepping at the ultima (326a-f) is taken from the discussion of penult shapes in Chapter 5 §5.3 (54f,g), Tableau 6 (79).

\textsuperscript{241} The data in (326b-e) is also taken from the discussion of the imperative in Chapter 6 §6.3.3.1.

729
(327) **Principle D = depression downstep: LD right edge $\Rightarrow$ RD left-edge**

a. $[kú-\{vu\} | lé]laana$ to open for each other post-depressor syllable downstepped relative to prefix H; toneless/low stem\(^{242}\).

b. $[kú-\{vi\} | sí]siisa$ to understand post-depressor syllable downstepped relative to prefix H; H stem.

c. $[kú-\{gudzi\} | sé]laana$ to help shear for e.o. adjacent LDs fused; post-depressor $σ$ downstepped; toneless/low stem.

d. * $[kú-\{gù\} | \{dzi\} | sé]laana$ unfused LDs incorrectly predict downstepping twice.

e. $[kú-\{gadzi\} | sé]laana$ to help stamp for e.o. adjacent LDs fused; post-depressor $σ$ downstepped; H stem.

f. * $[kú-\{gà\} | \{dzi\} | sé]laana$ unfused LDs incorrectly predict downstepping twice.

I observe that Principle D—like Principle A—supports the fusion claim for adjacent LDs: if (327c,e) were unfused, we would expect *two* RD left edges to intervene between the left and right portions of the HD (327d,f). Yet there is no evidence to suggest that a sequence of depressed syllables has a greater tone depression effect on pitch than a single depressed syllable.

The analytic advantage of RD left-edges is that downstep is now signalled in the theory by a single cue. The disadvantage is that downstep cannot be solely read off HD left-edges (though with some prosodic and morphological beefing up, the pitch implementation cues could probably be built off each HD left-edges).

We have now accounted for all varieties of downstep—that is, register lowering—in the language, through the Register Domain construct.

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\(^{242}\) The data for downstepping after a Low domain (327a-f) is taken from §7.2.2.
7. 10. Conclusion

The chapter opened with a brief review of the tone/voice literature, with particular reference to Bantu and to the Nguni subfamily (§7.1). We then saw a wide range of tone/voice effects in Phuthi examined in the remainder of the chapter. It has been shown, centrally, that the phenomenon of tone/voice antagonism, widespread in Nguni, is also found in Phuthi, in the form of a set of consonants that tonally depress the syllables they are the onsets of, either by converting an otherwise expected H tone to be L (§7.2), with potential knock-on rightwards shift and block effects (§7.4), or by implementing a rapid LH rise on the depressed syllable (§7.2.5).

The H-domain right-edge expression requirements have been shown to force rightwards expansion of a depressed H in head (rightmost) position, that is, of linearisation of the conflicting L and H tones across the antepenult and penult syllables (depressor shift, in §7.4.1, §7.4.3), or a rising H tone in the form of blocked expansion off the HD head syllable, under conditions of the H being trapped (blocked) between depressed syllable onsets (§7.4.2, §7.4.3).

Further, it has been made clear that breathy voicing and tonal depression are not coterminous: tonal depression (but not breathy voice)—argued to be the presence of a L domain (LD) parsing a Low feature—has been seen to be anticipated (realigned) leftwards to a morphological stem edge (§7.3), and rightwards to satisfy LD minimality (§7.5); in addition, tone depression has been seen to be deployed lexically by the grammar to implement the grammatical copula construction, displaying a continuum of tone/voice interactions (§7.6); SPs and OPs in some paradigms offer a theoretically interesting problem of would-be domain-overlap (unincorporation) and disjoint instantiation of a single H feature (§7.7). Finally, tone depression has been seen to be deployed grammatically (distinct from lexical properties) to enhance the categorial lowness of toneless stems (§7.8), signalling a phonological distinction between lexical and grammatical L tone behaviour.

It has become manifestly clear that tonal depression causes significant interference with the expression of H-ness inside a H domain in the language, where this interference is not merely concretely phonetic, but is abstractly phonologised and extended away from the phonological trigger to a wider set of anti-parse and anti-express environments whose parameters require reference to both phonology and morphology.
We now turn, in Chapter 8, to examine the implications of all of the tone and voice patterns presented and analysed in the course of the substantive chapters of this dissertation, that is, from Chapter 4 (Lexical Tone I), Chapter 5 (Lexical Tone II), Chapter 6 (Grammatical Tone), and the present Chapter 7 (Tone, Breathiness and Depression).