The intonation of South Asian languages: towards a comparative analysis

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ABSTRACT

South Asia has long been considered a region of widespread convergence in phonology, morphology, and syntax. While these claims have not explicitly been extended to intonation in previous work, researchers such as Féry (2010) have suggested that multiple South Asian languages (SALs) from different families can be covered with the same intonational description, and that prominence and weight play no role in its implementation. The current study examines what is arguably the most characteristic unit of SAL prosody, the repeated rising contour (RRC), produced in recordings of *The North Wind and the Sun* in six SALs to confirm the existence of some crosslinguistic similarities while also identifying areas of substantial variation. I highlight the roles played by lexical accent, vowel peripherality, and vowel length in the alignment of tones, and describe variation within and across languages. I also suggest directions in which research must be carried out to expand our typological understanding of the region and propose a model flexible enough to cover its diverse languages.

1 Introduction

Since Emeneau's (1956) characterization of South Asia as a "linguistic area", a region of linguistic convergence across language families, researchers have identified numerous phonological, morphological, and syntactic properties that appear again and again across the Subcontinent. Typical South Asian languages (SALs) have a series of retroflex consonants, a productive process of echo reduplication in their phonology, a lack of prefixes in the inflectional morphology, subject–object–verb (SOV) word order, the use of non-nominative case marking for experiencer subjects, etc.

But of course, South Asia is massively diverse in number of languages (and dialects of those languages), falling into five large families — the Indic (a.k.a. Indo-Aryan) and Nuristani branches of Indo-Iranian, itself a branch of Indo-European; the entire Dravidian family; the Khasic, Munda, and Nicobarese branches of Austroasiatic; numerous branches of Tibeto-Burman; and a handful of languages of the Southwestern Tai branch of Tai-Kadai — as well as some smaller families (e.g. Andamanese), isolates (e.g. Burushaski), and yet-unclassified languages (e.g. Majhwar).

Thus, as more data from more languages are examined, claims of crosslinguistic homogeneity become more nuanced, often showing geographically-based subpatterns that occasionally cross language families (Subbārāo 2012). For example, the prevalence of retroflex consonants is heavily attenuated as one moves east, with Tibeto-Burman languages and the neighboring Indic language Assamese generally lacking this place of articulation. Inflectional prefixes, while rare in most South Asian languages, are frequent in Khasic. Kashmiri's verb-second pattern serves as a notable exception to the regionally dominant SOV pattern. And while experiencer subjects (e.g. 'Ram is hungry') do take non-nominative case marking in most SALs (with the exception of Khasic and many Tibeto-Burman languages), the choice of case varies geographically, with most languages (i.e. all Dravidian and Munda languages, and most Indic languages) opting for dative-accusative case while eastern languages (i.e. Assamese, Bengali, and Oriya of the Indic family; Bodo and Kokborok of the Tibeto-Burman family) use genitive marking.

The question underlying the current study is whether this prevalence of crosslinguistic (but geographically variable) properties of linguistic convergence in South Asia extends to intonation, i.e. **is there a "typical intonation" for SALs**? And if so, **what are the exceptions and regional patterns**?

For those unfamiliar with SAL intonation, one might ask, why is the intonation of SALs interesting? Traditional accounts might suggest that SAL intonation is relatively unconstrained by the kinds of prosodic complexities seen in better-studied languages. For example, unlike most of the languages west of the region (e.g. Arabic, English, Spanish), SALs are generally considered to have no lexical contrast in prominence ("stress") placement, and there are in fact no clear signs that stress is even a phonetic property of SALs at all. And unlike most of the languages north and east of the region (e.g.

Burmese, Thai, Chinese languages), most SALs have no lexical contrast in tone, with notable exceptions (e.g. Punjabi and the Tibeto-Burman languages). This may lead one to imagine that SAL intonation should be more vulnerable to phonetic and phonological effects of the segments, or to stylistic variation.

Somewhat surprisingly, though, traditional accounts suggest that SAL intonation is in fact strikingly uniform, supporting the idea that South Asia is a region of extreme linguistic convergence, even in intonation. An identical pattern is described across speakers, languages, and language families, consisting of repeating rising contours (RRCs) built from L tones on the left edge and H tones on the right edge of each content word, followed by a final boundary tone marking the edge of the intonation phrase (IP). This suggests strict rules of tone alignment and no space for variation.

The current study examines RRCs in a small controlled sample of recordings in six SALs from two families — Assamese, Bengali, Hindi, and Nepali of the Indic family and Tamil and Telugu from the Dravidian family — to challenge the assertion that one model can adequately describe diverse SALs. While recognizing the existence of some shared intonational properties (supporting a weak claim of the existence of a "typical" SAL intonation), I highlight the major areas of variation within and across SALs. Some of these language-specific properties in intonation can be seen as deriving from language-specific properties in syllable structure and weight assessment — e.g. the role of vowel peripherality in attracting L tones in Hindi, the role of contrastive vowel length in the alignment of H tones Telugu, and the lack of these weight-sensitive tonal attraction properties in Assamese, Bengali, and Nepali. Other areas of variation within and across languages — e.g. pitch accent alignment in Assamese, prevalence of pitch accent raising after voiceless onsets — cannot always be tied to features external to the intonation, and thus simply have to be incorporated as independent areas of variation.

The paper is divided as followed: §2 summarizes what is currently known about SAL intonation, especially from a comparative perspective, §3 introduces the methodology of the current study while §4 reports its results, and §5 concludes with future directions.

2 Background

The existing literature on the intonation of SALs only scratches the surface of the region, with most empirical work concentrating on Assamese, Bengali, Hindi, and Tamil. Moreover, even within this subset of languages, major inconsistencies arise in the analyses of everything from the presence of lexical prominence/accent (§2.1), to the alignment and number of tonal targets in the pitch contour (§2.2–§2.4).

2.1 Prominence/accent, a.k.a. "stress"

Ladd's (1996) typology of prominence marking classifies languages that phonologically favor one syllable (or mora) over the others within a word, i.e. those that mark one syllable/mora as "accented" or "prominent". This phonological favoritism can manifest itself in many ways, and often can also carry overt phonetic marking as well via stress and/or pitch contour. For example, "stress-accent languages" (e.g. English, Italian, etc.) mark their prominent syllables with correlates of stress, whereas "pitch-accent languages" such as (Tokyo) Japanese mark their prominent syllables with a particular pitch contour. A third category marks prominent syllables with both stress and a specific pitch contour; such languages include Swedish, Latvian, etc., and are also often called "pitch-accent languages" while Ladd calls them "stress-accent languages" with "lexical pitch". Lastly, a fourth category marks prominent syllables with neither stress nor specific pitch contour; Ladd identifies "Bengali (and probably most of the languages of India)" as representing "non-stress accent" with "postlexical pitch only". Ultimately, what this means is that prominent syllables in SALs should not be expected to have the overt signs of phonetic marking such as stress or lexically-specified pitch contour. Instead, we can look at other areas of phonetics and phonology, such as contrast preservation, resistance to reduction, and intonational pitch accent location.

Many SALs are described as having a fixed word-initial accent assignment (often ambiguously called in "stress assignment") pattern. Keane (2014) summarizes extensive phonological and phonetic evidence from Tamil. Like other Dravidian languages, Tamil has a fully balanced contrast of short /i e a o

u/ and long vowels /iː eː aː oː uː/. However, for the mid vowels, this contrast is only found in word-initial syllables, e.g. /ot̪ːu/ ‘stick’ vs. /oːt̪ːu/ ‘drive’ (Asher & Keane 2005). In all other positions, mid vowels cannot contrast in length, and are uniformly long, e.g. /maɾant̪oːm/ ‘we forgot’ but */maɾant̪om/. In addition, while initial syllables can host coda nasals that disagree in place with the following consonant (e.g. /anpu/ ‘love’), nasal place assimilation is obligatory elsewhere (Christdas 1988), revealing a preservation of the place contrast in initial syllables. Lastly, Keane (2003) presents evidence of phonetic reduction in non-initial syllables that resembles the kind seen in unstressed syllables in stress-accent languages; short vowels /i u a/ are centralized in non-initial position to [ɨ ʉ ə].

Similarly in Bengali, Dasgupta (2003) and Khan (2008) report that the contrast between tense /e o/ and lax /ɛ ɔ/ mid vowels (e.g. d̪ɛkʰe/ ‘see-3’ vs. /d̪ekʰe/ ‘see-PRF’; /hɔt̪o/ ‘casualties’ vs. /hot̪o/ ‘happen-HAB-3’) is neutralized to the tense variants /e o/ in non-initial position (e.g. */d̪ɛkʰɛ/, */d̪ekʰɛ/, */hɔt̪ɔ/, */hot̪ɔ/). This can produce alternations, e.g. /ɔn-/ ‘NEG’ + /ɛk/ ‘one’ → /ɔnek/ ‘many’. A similar neutralization occurs in oral vs. nasal vowels (Dasgupta 2003, Khan 2008), e.g. /hãte/ ‘walk-3’ vs. /hate/ ‘market-LOC’, as nasal vowels only occur initially, i.e. */hatẽ/, */hãtẽ/, even leading to historical shifts of non-initial nasals to initial nasalization, e.g. /ãt̪ːio/ < *ātmiya* ‘relatives’. A handful of loans also show truncation of initial syllables that are unaccented in the donor language, maintaining initial accent while remaining faithful to the donor language’s accentuation pattern, e.g. /maɪkin/ < English [əˈmɛɪɨkɨn] ‘American’, /slam(a)likum/ < Arabic /asːaˈlaːmu ʕaˈlajkum/ ‘(Muslim greeting)’ (Khan 2008).

Unlike the systems described above, some SALs have been described as having weight-sensitive prominence assignment patterns, in which a fixed syllable is prominent unless a heavier syllable attracts prominence. In Hindi-Urdu-type weight sensitivity (Hussain 1997), syllable weight (as measured in moras) can be increased with the presence of peripheral (or “long”) vowels /i e ɛ ɑ ɔ o u/ rather than centralized (or “short”) vowels /ɪ ə ʊ/ and/or with the addition of coda consonants (with the added stipulation that the final mora is extrametrical) e.g. /kʊˈd̪ɑl/ ‘pickaxe’ vs. /ˈbɑhəɾ/ ‘outside’ vs. /ˈtʃəpkəlɪʃ/ ‘altercation’ (using the IPA transcription of Ohala 1999); otherwise, the accent is penultimate, e.g. /ˈbʊɾɑ/ ‘bad’. In Assamese-type weight sensitivity (Mahanta 2001), initial syllables are accented unless they are open (light) and followed by a closed (heavy) syllable, which then takes the accent, e.g. /ˈɹati/ ‘night’ vs. /baˈgan/ ‘garden’ (using the IPA transcription of Mahanta 2012).

Thus, we have evidence that SALs have prominent syllables, despite the lack of overt phonetic correlates of stress. Crucially, these prominent syllables (generally) attract the low (L) target of the postlexical pitch accents L* and L*+H, as discussed below.

2.2 Repeating rising contours (RRCs)

The most widely cited observation suggesting an intonational system common to SALs is the sequence of rising contours identified here as repeated rising contours (RRCs), to remain theory-neutral for the moment. Each of these rises roughly corresponds to a content word plus surrounding functional material. The prosodic unit corresponding to this rise is called an Accentual Phrase (AP, strictly the domain of a single pitch accent) in Khan (2008/2014) for Bangladeshi Bengali and Keane (2014) for Tamil and a Phonological Phrase (P-phrase, strictly the domain of certain phonological process) in Hayes & Lahiri (1991) and subsequent work by others on Kolkata Bengali, Twaha & Mahanta (2016) for Assamese, and Féry’s (2010) comparative work. In the current paper, I use the term AP.

In Assamese and Kolkata Bengali, this right-boundary alignment has been found to be so consistent that the H tone is described as a reliable indicator of the edges of domains for segmental processes (Hayes & Lahiri 1991, Twaha & Mahanta 2016) and the disambiguation of syntactic structure (Lahiri & Fitzpatrick-Cole 1999). However, as mentioned in more detail in §2.4 below, the H tone of the RRC is often described as occurring well before the expected location, often just one or two syllables from the L tone, and several syllables away from the word’s (and thus the phrase’s) right edge.

2.3 Previous comparative work

Thus far, little comparative work has been carried out in this area, with the occasional study comparing the intonational properties of two languages (e.g. Bengali and Hindi, Choudhury 2015). The common theme underlying existing comparative work is that that SALs all have remarkably similar intonation, the most explicit claim of which is Féry's (2010) description of Bengali, Hindi, Malayalam, and Tamil. Based on her analysis of the RRCs in her recordings, she concludes that (at least these four) SALs are effectively identical in their intonation, and can be captured with a single model with no evidence of variation within or across languages. Specifically, she claims that IPs in these four SALs are divided into P-phrases (roughly one per content word, functionally equivalent to an AP), with all non-final P-phrases marked on the left with a L_P boundary tone, and on the right with a Ha boundary tone. There are no pitch accents, and thus prominence plays no role in intonation.

2.4 Inconsistencies

Some of the claims in previous comparative work stand in contrast to previous descriptions on the individual languages studied. For example, previous work on Bengali (Hayes & Lahiri 1991, Khan 2008/2014) suggests that the L tone beginning each RRC is a pitch accent (L*), not a left boundary tone (L_P). The same is tentatively claimed for Tamil by Keane (2014). More notably, Sengar & Mannell (2012) and Harnsberger (1994) show that in Hindi, the L target can be borne on a non-initial syllable predicted by syllable weight to be prominent/accented, more strongly supporting a pitch accent analysis.

Similarly, most previous accounts of SALs as well as previous comparative work describe strict right-boundary alignment of the H tone (Genzel 2007), transcribed Ha for models assuming APs and H_P for models assuming P-phrases. However, researchers occasionally mention that this H inexplicably appears early, typically during the syllable following the prominence, regardless of the length of the word. Keane (2014) discusses the possibility that the H tone might not be a boundary tone at all, rather it could be the trailing target of a complex pitch accent, i.e. L*+H, where the H target appears some fixed distance after the prominent syllable, which bears the L*. Ultimately, she finds that the alignment of the H tone can be significantly correlated to the location of the phrase's right edge as well as the location of the prominent syllable, and thus it is not entirely clear whether the H is a head-marking tone or an edge-marking tone. Additionally, Keane describes instances where there are two H targets within a word, suggesting an even more complex structure. My previous work on Bangladeshi Bengali (Khan 2008/2014) proposes that both complex pitch accent (L*+H) and boundary tone (L*…Ha) options are available, while the boundary tone option is far more common and variation from it can be partially predicted by information structure (e.g. the salience of the IP-final phrase).

3 Current study: motivation and methods

Given the inconsistencies in the descriptions of even the most basic and most widely-cited characteristic of SAL intonation, i.e. the RRC, the current study focuses on this fundamental part of the prosodic system to look for crosslinguistic similarities and variations in tonal alignment and realization.

To test the applicability of a single model of intonation for diverse SALs, the current study introduces comparative work in progress, based on two corpora: (1) recordings of the *North Wind and Sun* fable as recorded by one speaker per language in *JIPA* illustrations of six SALs: **Assamese** (Mahanta 2012), **Bengali** (Khan 2010), **Hindi** (Ohala 1999), **Nepali** (Khatiwada 2009), **Telugu** (Bhaskararao & Ray 2016), and **Tamil** (Keane 2004), and (2) the example recordings provided as supplementary materials for the chapters on Bengali (Khan 2014) and Tamil (Keane 2014) in *Prosodic Typology II* (Jun 2014). Note that the languages studied here are a superset of those studied in previous comparative work.

For crosslinguistic transparency, all recordings were transcribed with a single set of criteria, based on the conventions of B-ToBI (Khan 2008/2014). This way, differences between languages should not be artificially created through differences in how phenomena are transcribed (e.g. Ha vs. H_P), rather they should reflect intonational phonologically-relevant differences, i.e. those involving the number,

alignment, and relative height of tones. As the reader will surely note, adaptations had to be made to B-ToBI to capture other languages, and those differences will be highlighted as they are reported.[1]

Examples of RRCs from the six SALs, transcribed in the proposed annotation system adapted from B-ToBI, are given in Figures 1–6.

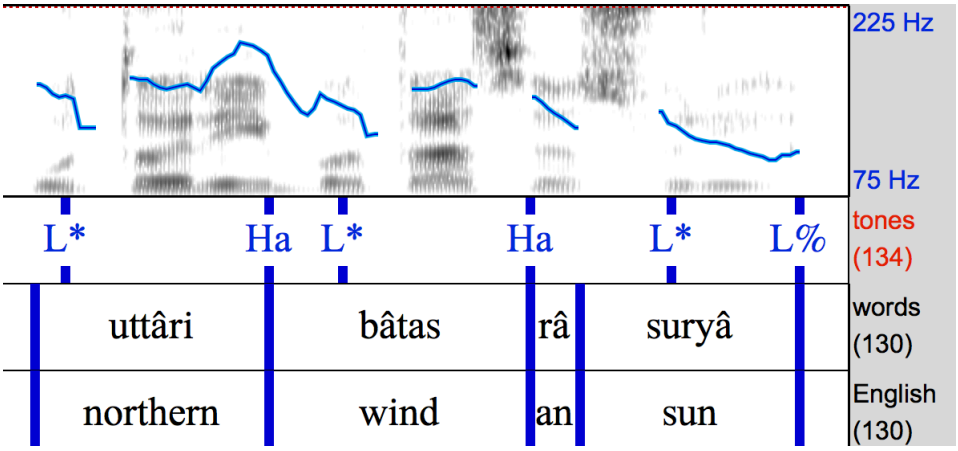

Figure 1. Two RRCs in Nepali. /uttʌri bʌtas ɾʌ suɾjʌ/ 'The North Wind and the Sun.'

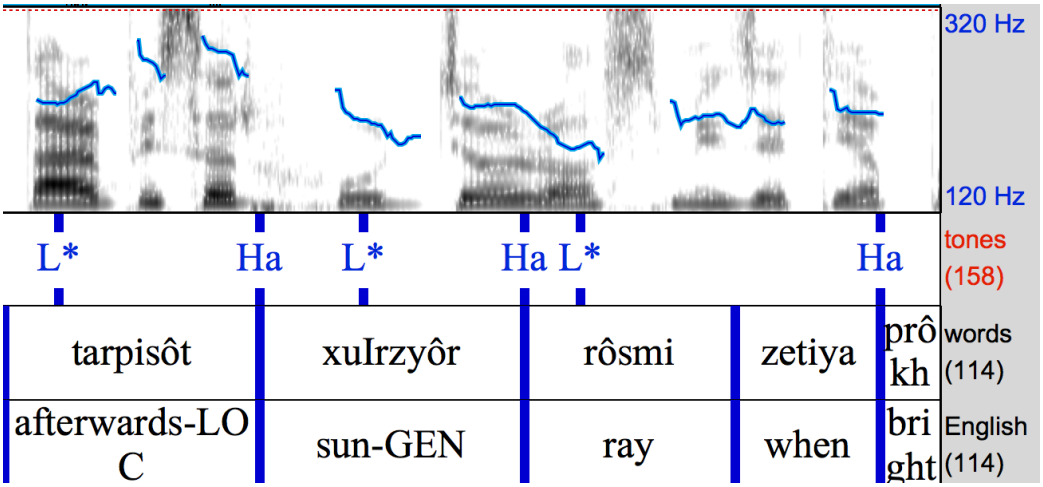

Figure 2. Three RRCs in Assamese. /taɹpisɔt xuiɹzyɔɹ rɔsmi zetiya/ 'Afterwards, when the Sun's rays…'. Each RRC would be transcribed L*…H$_P$ in Twaha & Mahanta (2016).

[1] For current purposes, APs can be thought of as functionally equivalent to P-phrases, and thus Ha, La, and LHa can be seen as equivalent to H$_P$, L$_P$, and LH$_P$, respectively. IPA transcriptions of SALs are based on *JIPA* illustrations, i.e. Mahanta (2012) for Assamese, Khan (2010) for Bengali, Ohala (1999) for Hindi, Khatiwada (2009) for Nepali, Keane (2004) for Tamil, and Bhaskararao & Ray (2016, in press) for Telugu. Examples recordings come from these illustrations unless otherwise noted.

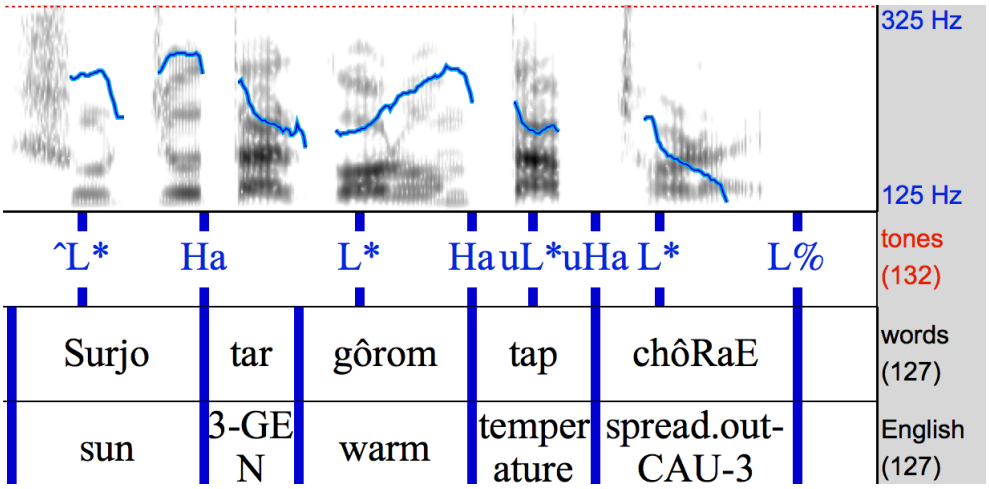

Figure 3. Three RRCs in Bengali. /ʃuɪdʒo ʈaɪ gɔɪom ʈap tɛʰɔɽaɐ̯/ ‘The Sun spread out his/her warmth.’

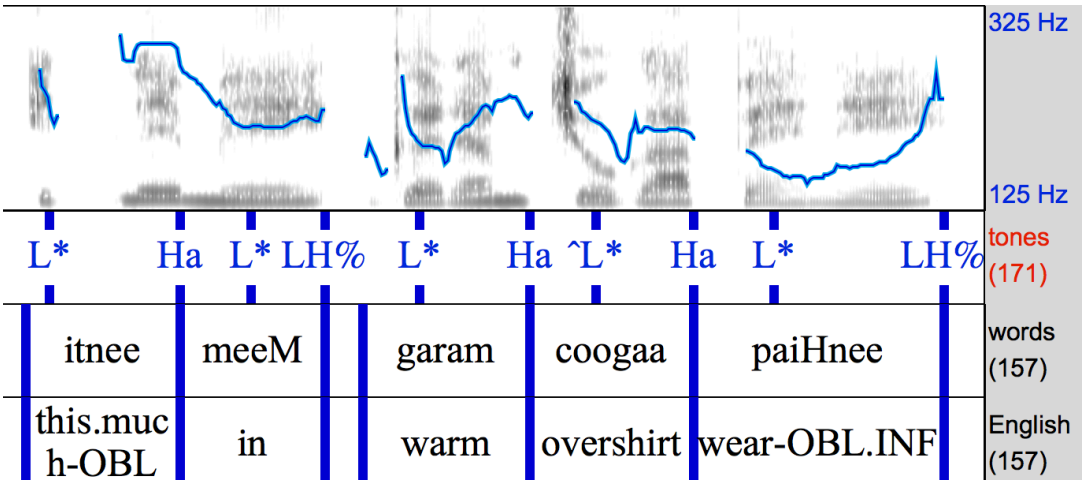

Figure 4. Three RRCs in Hindi. /ɪʈne mẽ gərəm ʧogɑ pɛhne/ ‘During this, a warm cloak-wearing…’. Each RRC would be transcribed LH in Harnsberger (1996) and L*…Hp in Patil et al. (2008).

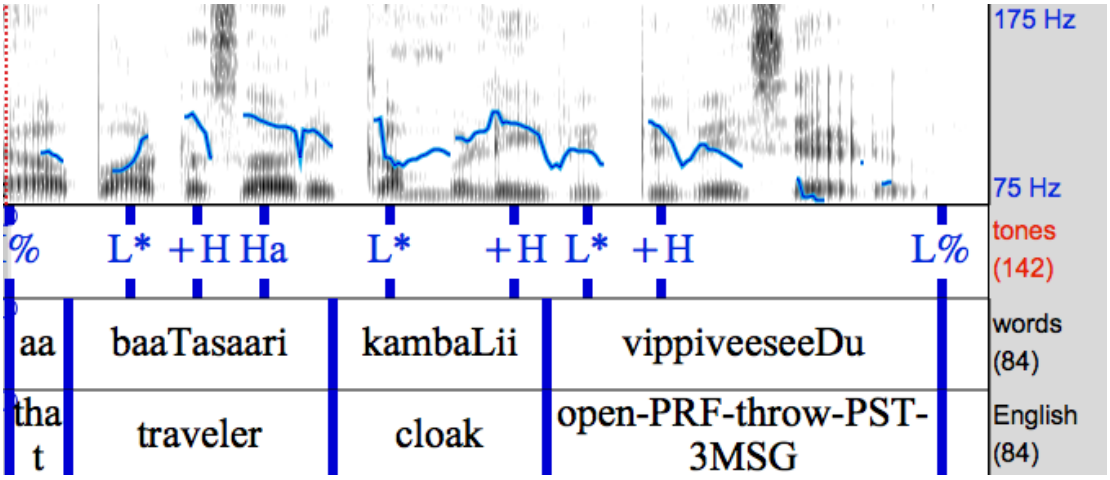

Figure 5. Two RRCs in Telugu. /ɐ: bɐːʈɐsɐːri kɐmbɐɭiː ʋippiʋeːseːɖu/ ‘The traveler threw off (his) cloak.’

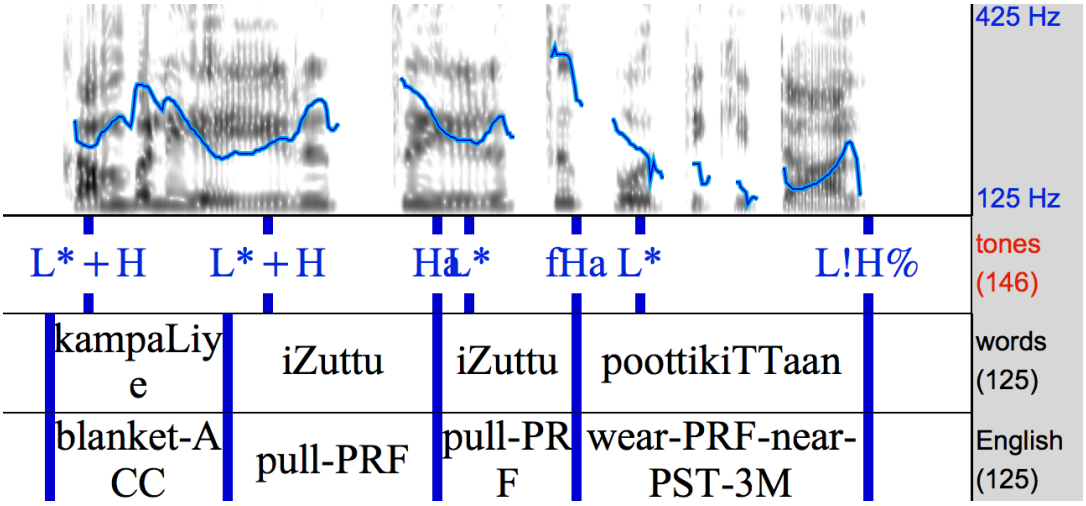

Figure 6. Three RRCs in Tamil. /kampaḷije i̪u̪t̪:u i̪u̪t̪:u po:t̪:iki̪t̪:a:n/ '…kept pulling the blanket more tightly.' Each RRC would be transcribed L*…H in Keane (2014).

4 Results

From the intonational transcriptions analyzed for the current study, I propose a much weaker version of the claim that there is a "typical" intonation for SALs. Indeed, most SALs do share some basic prosodic traits, as previously claimed. However, even within the realm of the characteristic RRCs, there are at least three crucial areas of language-specific and language-internal variation that have not properly been addressed in previous comparative work: L tone alignment, H tone alignment (and number of H tones per RRC), and L tone raising, each of which is described in detail below. (This list does not include other areas of variation that go beyond the scope of this paper, e.g. focus prosody, IP boundary tone inventory.)

4.1 Alignment of L tone: Rightward shift

The alignment of the L target beginning each RRC is generally on the word-initial syllable, aligning with descriptions of fixed prominence location in most SALs. This motivates a transcription that incorporates the asterisk representing prominence: L*. Fixed word-initial alignment of L* could be considered the "typical" case for SALs, and it is the only such alignment observed in Bengali, Nepali, Tamil, and Telugu. For Hindi and Assamese, however, L* can shift rightward.

In Hindi, rightward shift of L* occurs when the prominent syllable (as predicted by Hussain 1997) is non-initial. In such cases, the L* consistently appears on the prominence (Figure 7). Examples of rightward shift in Hindi strongly support the claim that the AP's L target marks prominence, i.e. it is a pitch accent rather than a boundary tone (Dyrud 2001, Genzel 2007, Patil et al. 2008), contra Féry (2010), who claims the L tone is strictly phrase-initial and not drawn to prominence.

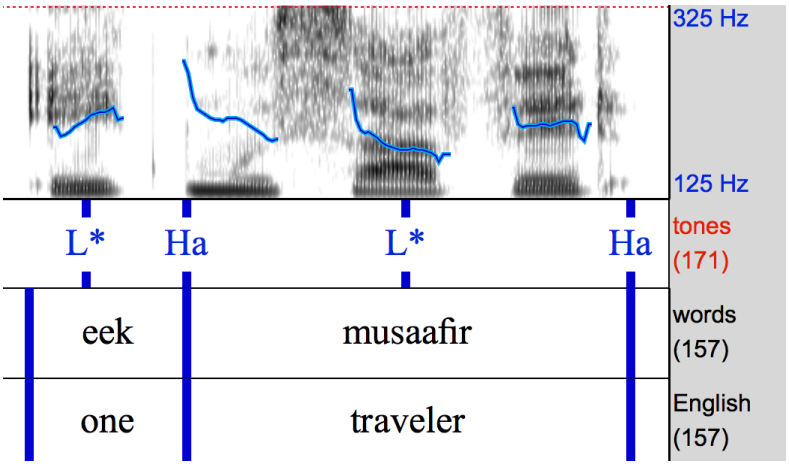

Figure 7. Rightward shift of L* in Hindi maintains the L target on the prominent non-initial syllable on /mʊˈsɑfɪr/ 'traveler'.

Things are more complicated in Assamese, where rightward shift is not clearly connected to prominence patterns (as predicted by Mahanta 2001). Instead, it appears rightward shift in Assamese from the initial to second syllable is simply an alternative option, as in Figure 8. It is unclear what drives rightward shift in Assamese: it may be purely stylistic, or below the level of consciousness. Another possibility could be that instead of rightward shift of the L*, the late rise could be explained as a contour tone on the right edge of the RRC, namely a rising LHa, incorporating a L target near the right boundary. Further work using more varied word shapes is needed here.

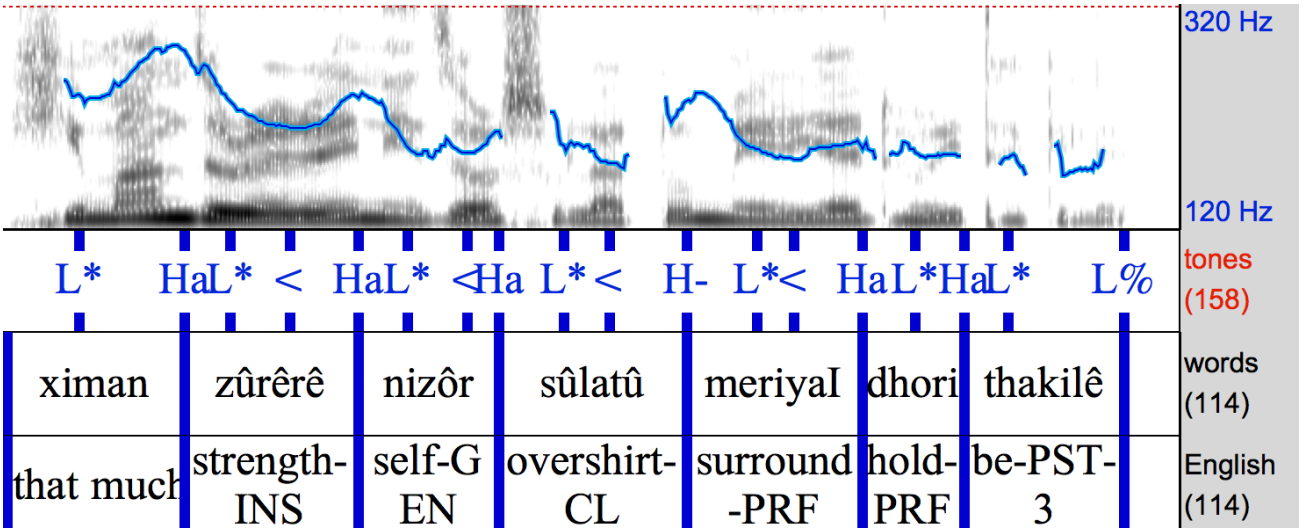

Figure 8. Optional rightward shift of L* in Assamese is transcribed here as L*…<, with the < marking the point where the L tone is realized. /xiˈmɑn ˈzʊɹɛɹɛ niˈzɔɹ ˈsʊlɑtʊ ˈmɛɹiyai ˈdʱoɹi ˈtʰɑkilɛ/ 'The more tightly he kept holding his cloak around him.' Prominence (following Mahanta 2001) is marked to illustrate that the L tones do not consistently appear on the prominent syllable.

4.2 Number and alignment of H tones

The results of the current comparative work suggest that the H target is typically AP-final in the Indic SALs studied (Assamese, Bengali, Nepali, Hindi), in line with the majority of previous work on SAL intonation; this can be considered the "typical" pattern for SALs. For Telugu and Tamil, however, the peak of the H target is (also) typically reached on the second syllable (Tamil) or third vocalic mora

(Telugu), suggesting a complex pitch accent (L*+H) with a language-specific alignment specification for the trailing tone. In fact, I propose that Tamil and Telugu have more complex tonal templates available than for the other SALs studied, with the option of having two H targets per RRC, one closely following the prominence and another near or at the phrase boundary.

Unlike the Indic languages studied here, the rise from the L target in Telugu and Tamil is typically not a steady slope to the phrase boundary. Instead, the rise peaks within the first few syllables of the RRC, regardless of the length of the overall phrase. In the case of Tamil, the peak is reached at the end of the syllable following the accent, as in Figure 9, suggesting a contour pitch accent such as L*+H. In Tamil, this early rise does not preclude the existence of a boundary tone at the AP's right edge. In fact, Keane (2014) notes that many APs in Tamil appear to have a double rise, with one H target near the accent and another at the boundary, each H target preceded by a L target. From the current analysis, I propose that a fully realized AP in Tamil can contain a complex pitch accent L*+H and a complex boundary tone LHa, as in Figure 10. Keane (2014) also considered the possibility that this LHLH contour is in fact composed of two APs, effectively L*…Ha…L*…Ha. I also leave this possibility open, especially considering that double rises are only seen on morphologically complex words, suggesting that each (orthographic) word may be composed of multiple APs; more work is needed here.

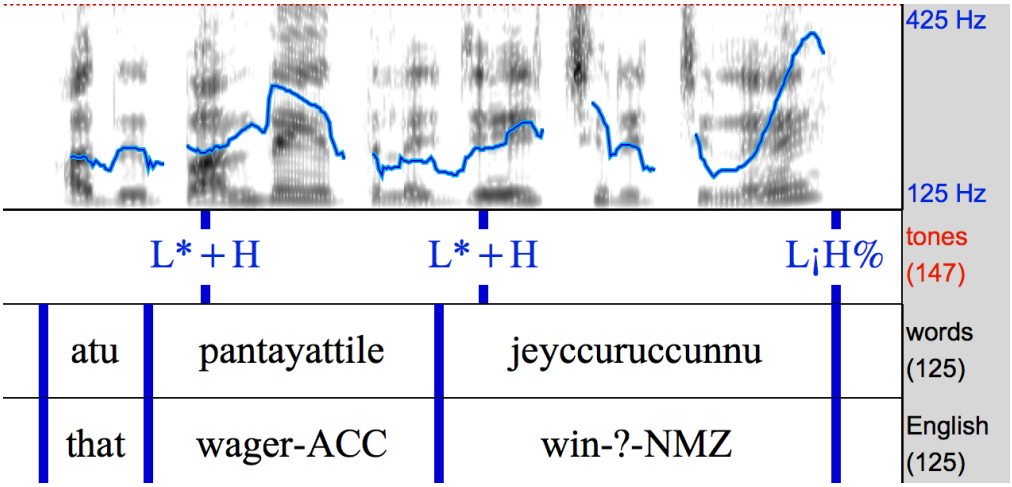

Figure 9. Two contour pitch accents L*+H in Tamil. /atu panʈajaʈːile dʒejtʃːuɾutʃːunnu/ '…the one who won that wager...' The equivalent transcription for each rise would be L*…H in Keane (2014).

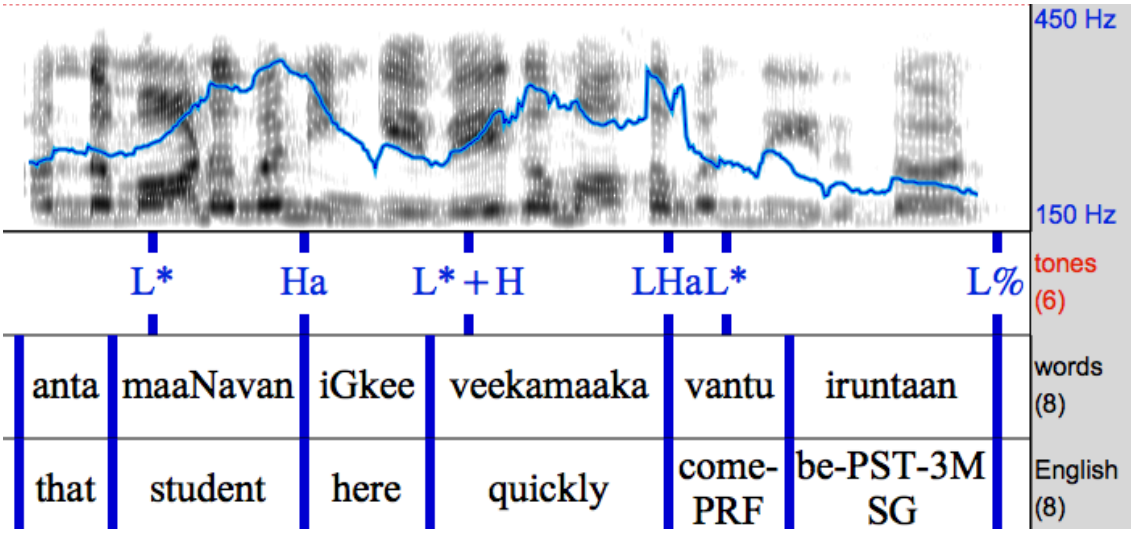

Figure 10. Double rise within a single orthographic word /ʋeːkamaːka/ 'quickly' in Tamil, suggesting either a L*+H…LHa contour or a sequence of two APs. /anta maːɳaʋan iŋkeː ʋeːkamaːka ʋanta iɾuntaːn/ 'That student has come here quickly (and stayed).' Example taken from Keane (2014), in which the pitch contour is transcribed L*…H…L*…H.

For Telugu, this prominence-adjacent peak comes slightly later than its Tamil equivalent, seemingly aiming for the third vocalic mora of the phrase, as in Figure 11. (This can occur on the second syllable if either of the first two syllables contains a long vowel, or on the third syllable otherwise.) Despite this longer rise, it can also be considered a contour pitch accent, as the H peak is tied to the distance from the accented syllable rather than the right edge of the phrase.

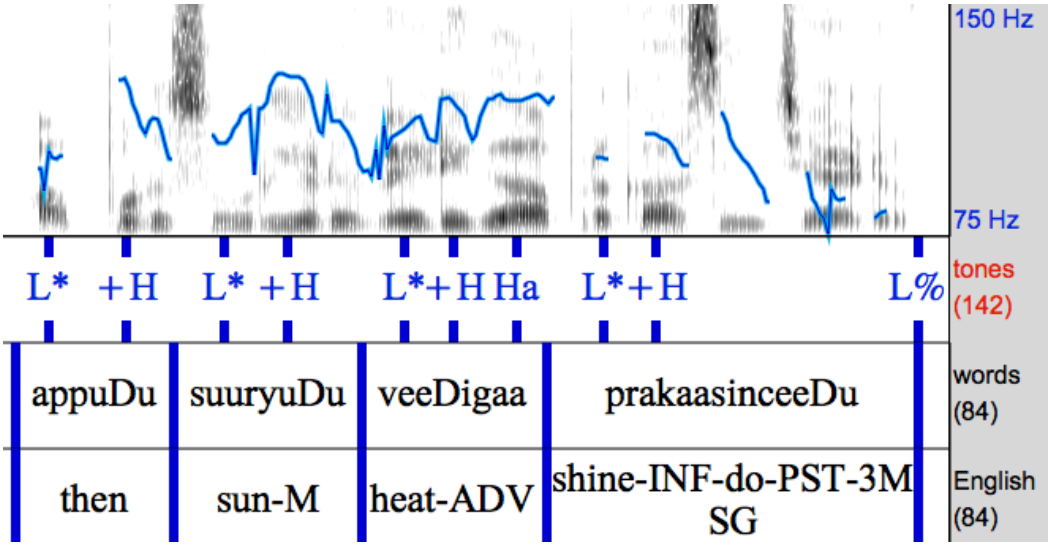

Figure 11. Plateau between two H targets in a single orthographic word /ʋeːɖigɐː/ 'warmly' in Telugu, suggesting an L*+H…Ha pattern. /ɐppuɖu suːrjuɖu ʋeːɖigɐː prɛkɐːsintʃeːɖu/ 'Then the Sun shined warmly.' Recording and IPA from Bhaskararao & Ray (2016 in press).

Telugu also allows for two H targets within a given word, as in Figures 11 and 12, although these surface quite differently than in the Tamil pattern. While not clearly predictable in Tamil, the appearance of the second H target in Telugu appears to be predictable based on three factors. This first factor is vowel length, as the second H target only occurs on phonemically long vowels. Secondly, the target vowel must

occur outside the pitch accent domain, i.e. it must come after the third vocalic mora. Thirdly, the AP containing this long vowel must not be IP-final; no second H target is found in IP-final APs. Thus, I propose this H target is effectively a boundary tone Ha, slightly displaced from the phrase edge as it seeks a long vowel host that may not be strictly phrase-final. As long-vowel-seeking boundary tones are not widely documented cross-linguistically, more research is needed to discern whether the claims about Telugu hold when looking across speakers and styles.

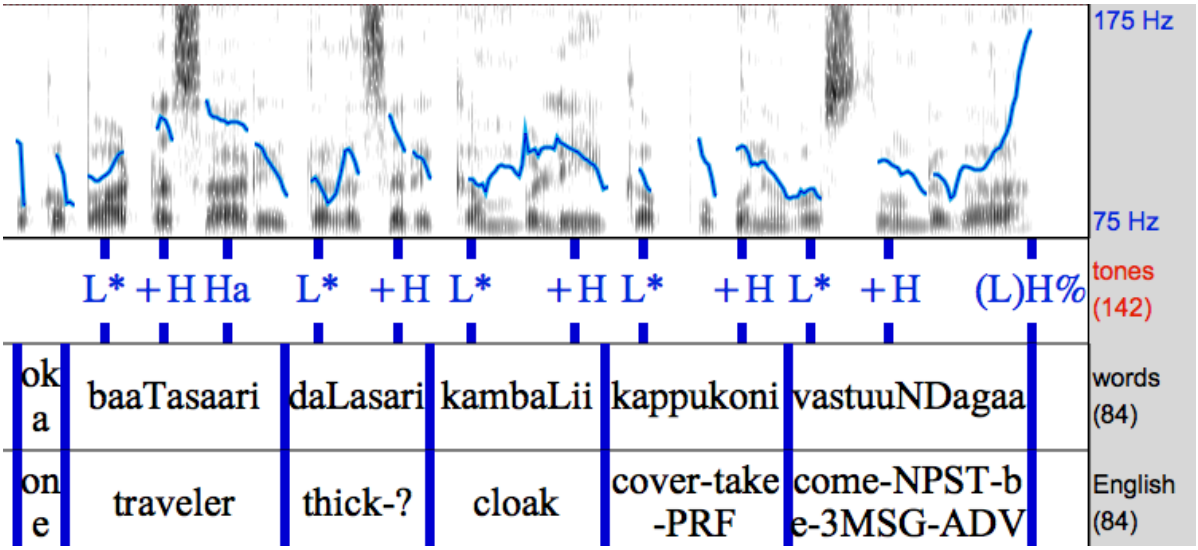

Figure 12. The presence of Ha in Telugu depends on the existence of a long vowel outside the pitch accent domain as well as a lack of IP boundary tones within the same range. /okɐ bɐːɭɐsɐːri ɖɐlɐsɐri kɐmbɐlːi kɐppukoni vɐsʈuːɳɖɐgɐː/ 'As a traveler was coming wrapped in a thick cloak…'. Recording and IPA from Bhaskararao & Ray (2016 in press).

In some of the Indic languages studied, an early peak for the H target seems to be a stylistic choice, and generally precludes the existence of an H target at the phrase boundary, unlike the case in Tamil and Telugu. In Bengali, for example, earlier work (Khan 2008/2014) proposed L*+H with the H peak reached at the end of the second syllable as an alternative to L*…Ha, often in IP-final position (Figure 13). Similar early rises can be found in Nepali as well.

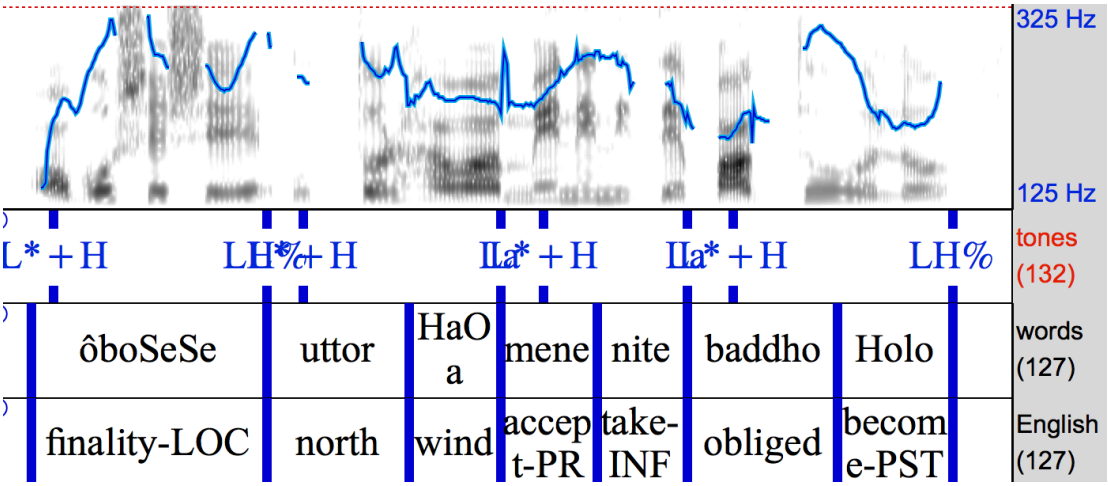

Figure 13. Early H target in Bengali as a stylistic choice (L*+H) rather than L*…Ha, in the phrase /ɔboʃeʃe uʈːoɹ haoa mene niʈe baɖʱːo holo/ 'In the end, the North Wind was obliged to accept...'.

4.3 L tone raising

Rising contours also vary in tonal realization from interactions with segmental phonetics; in the recordings transcribed for the current study, L* was often found to be noticeably raised to a level that could be characterized as "mid-range" between the expected levels for L* and Ha. Indeed, while M tones are generally avoided in AM Theory-based proposals, Mahesh (2016) labels similar instances as M* in Malayalam. These instances appears to be only possible when the syllable bearing the pitch accent begins with a voiceless consonant or a null onset (i.e. a vowel-initial syllable), although it is not obligatory. In some recordings (e.g. for Bengali), this raised form, transcribed ^L*, appears often with syllables beginning with voiceless stops, affricates, and fricatives, whereas for other recordings (e.g. for Tamil), it appears most noticeably with initial fricatives only, as in Figure 14.

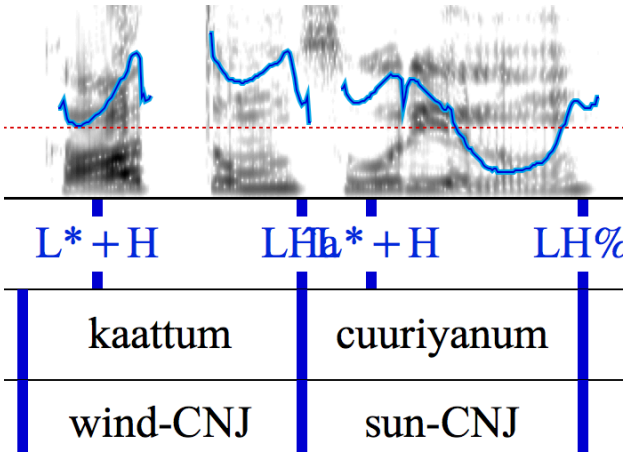

Figure 14. Example of raised pitch accent ^L* on /su:ɾjanum/ 'sun-CNJ' in Tamil.

There is a well-established phonetic connection between voicing and f0 (see Kingston 2011 for an overview), the articulatory mechanisms of which are complex and not fully understood. Essentially, what is most common crosslinguistically is that voiced consonants promote lower f0, which can be exaggerated and eventually reanalyzed as the primary cue to a contrast, leading to a phonemic low tone. In these SALs, indeed, voiced consonants do get paired with the more canonical L*, and only voiceless consonants can have the raised ^L*. However, what is mysterious is that voiceless consonants seem to be driving a raising of pitch to a mid level rather than the crosslinguistically more common lowering of pitch by voiced consonants; it may be that this is a more abstract phonologization of f0 lowering by voicing, emerging as f0 raising by voicelessness. Whichever the direction of this change, it is possible that this can be the beginning of an emergent tone contrast, tentatively proposed by Purcell et al. (1978).

5 Summary and future directions

Returning to our original question of whether there is a "typical" SAL intonation, even this limited collection of recordings reveals that in some basic ways, the answer is yes. In all six SALs studied here, as well as what we know from the general consensus in the literature, the placement of prominence is not lexically contrastive, even if it can vary within and across languages, and it is not overtly marked with stress in the way that prominence is marked in English. Each prominent syllable is eligible to host a pitch accent, which is the head of a domain that can be called an Accentual Phrase (AP), also often called a Phonological Phrase (P-phrase). Within each AP, there is a characteristic rising contour, starting from a low pitch on (or occasionally near) the prominent syllable (L*) and rising to a high target (+H or Ha/H_P) later. The low target itself can be notably raised due to segmental interaction.

Beyond these properties, however, the languages analyzed here show marked differences in several parts of their intonational phonology, including in the underlying structure and surface realization of their repeated rising contour. The AP's L tone marks the prominent syllable, which can be non-initial in Hindi; Assamese shows more variation. Similarly, the AP's H tone can mark the right edge (Assamese, Hindi), the long vowel closest to the right edge (Telugu), the tail of the prominent syllable, or some combination of these, in alternation (Bengali) or simultaneously (Tamil).

Some of these divergences, especially those of tonal alignment, stem from crosslinguistic variation in vowel weight, where Dravidian languages (Tamil, Telugu) have a straightforward short vs. long vowel system, Hindi has a centralized vs. peripheral vowel system, and peripheral Indic languages (Assamese, Bengali, Nepali) have no vowel weight distinctions. Indeed, while the Indic languages can be said to have [L*…Ha] as their most iconic intonational unit, the Dravidian languages appear more complicated when words of different lengths and segmental content are considered. Word length can promote the projection of a second H target in Tamil, producing a double rise, while a long vowel outside the pitch accent domain can project a second H target in Telugu, producing a plateau. Other differences, such as the number of tonal targets or their optionality, cannot be directly tied to segmental or syllabic properties, and thus have to be taken as independent areas of variation.

Of course, while the current study establishes that even a limited data set reveals notable variation in the RRCs of SALs, many questions remain. How pervasive is the phenomenon of tone alignment to long vowels in languages other than Telugu? How pervasive and how perceptible is the prominence-independent rightward shift of L* in Assamese? How perceptible is the variation between L* and its raised variant ^L*? Could this be a sign of an emergent contrast, possibly leading to another wave of tonogenesis within SALs? For those SALs that have already undergone tonogenesis from historical aspiration (e.g. Punjabi, Sylheti), how do lexical tones and intonational tones interact, and how similar do these systems look to non-tonal SALs? Lastly, the current study only focuses on a small number of speakers producing a controlled set of data representing languages in just two families; more speakers producing more kinds of material in more languages, especially those outside the dominant Indic and Dravidian families, must be incorporated into a fully comprehensive look at SAL intonation.

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