The evolution of retroflex phonotactics in South Asia

Paul Arsenault
Tyndale University College
parsenault@tyndale.ca

1 Introduction

Retroflexion is a well-known areal feature of South Asia. Most South Asian languages, regardless of their genetic affiliation, contrast retroflex consonants with their non-retroflex dental and/or alveolar counterparts (Emeneau 1956; Ramanujan and Masica 1969; Bhat 1973). However, retroflex consonants often exhibit a limited phonotactic distribution relative to their non-retroflex counterparts, a fact that requires explanation. This paper examines two contradictory phonotactic restrictions on retroflex consonants in South Asia and argues that they are best explained if phonotactic restrictions on retroflexion are a direct result of the evolution of retroflexion in a language (or language family). This explanation differs from previous accounts, which posit (possibly universal) synchronic markedness constraints on retroflexion, grounded in speech perception.

2 Typology of retroflex phonotactics

In South Asia, phonotactic restrictions on retroflex consonants are of two basic types. For convenience we can label them the Dravidian and Tibeto-Burman (TB) types. These are summarized in Table 1, where \{C₁, C₃\} represent pre-vocalic positions and \{C₂, C₄\} represent post-vocalic positions.¹

<table>
<thead>
<tr>
<th>C₁</th>
<th>V</th>
<th>C₂</th>
<th>C₃</th>
<th>V</th>
<th>C₄</th>
</tr>
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<tbody>
<tr>
<td>-</td>
<td>-t-</td>
<td>t’</td>
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Table 1. Two retroflex phonotactic patterns

Dravidian languages tend to avoid retroflex (and other apical) consonants in strictly pre-vocalic environments \{C₁, C₃\}, and favour them in strictly post-vocalic environments \{C₂, C₄\}. An important caveat is that they typically allow retroflex consonants in C₁ position if C₂ is also retroflex (i.e., homorganic clusters).² As a result, the restriction often shows up as a prohibition on word-initial retroflexes (and other apicals). This pattern is ascribed to Proto-Dravidian and preserved in most South Dravidian languages. For example, the distribution of coronal consonants in the Kanniyakumari dialect of Tamil is shown in Table 2. Notice that apical alveolar and retroflex consonants are avoided word-initially (C₁) but occur freely in non-initial positions.

| /k/ | [ŋ] | k’, [ŋ̑] | t’k’, [ŋ̑k’] | [ŋ̑]k’ | — |
| /t, n, l/ | — | -t’, -nn’, -ll’ | -nt’ | -n, -l |
| /t, n, l/ | — | -t’, -nn’, -ll’ | -nt’ | -n, -l |
| /c, p'/ | c’, p’ | -cc’, -pp’ | -pc’ | — |

Table 2. Distribution of coronals in Tamil
(Kanniyakumari dialect, Christdas 1988)

The Dravidian pattern is the most common cross-linguistically. Some version of it also occurs in many Indo-Aryan and Australian languages, among others.

Tibeto-Burman languages tend to exhibit a very different pattern. These languages favour retroflex consonants in pre-vocalic environments \{C₁, C₃\} and avoid them in post-vocalic environments \{C₂, C₄\} (i.e., syllable codas). For example, the distribution of coronal consonants in Lhomi is shown in Table 3. Notice that retroflexes are favoured in onsets and avoided in codas.

| /k/ | k’, l’ | t’l’, [ŋ̑l’] | -Ct’ | -l’ |
| /t, l’ | — | -Cl’ | — | — |

Table 3. Distribution of coronals in Lhomi
(Vesalainen and Vesalainen 1976)

The TB pattern is less frequent than the Dravidian pattern cross-linguistically, but is well attested within the TB family.

The Dravidian and TB patterns are contradictory; where retroflexes are avoided in one, they are preferred in the other, and vice versa. Under these conditions it is impossible to identify any environment as universally marked or unmarked for retroflexion. However, both patterns can be explained naturally when the evolution of retroflexion within each family is considered.

3 Evolution of retroflex phonotactics

Cross-linguistically, the most common diachronic source of retroflexion is the class of liquids, most notably rhotics (r-sounds) but also laterals (l-sounds) (Bhat 1973; Hamann 2003, 2005). Liquids are prone to a degree of phonetic retroflexion, especially when they are realized as approximants (e.g., English [j]). They can induce retroflexion in adjacent consonants

¹ Intervocalic consonants, which are both pre- and post-vocalic, are typically unrestricted for place of articulation. Hence, they are not included in the discussion.
² This is typically the result of progressive assimilation, diachronically if not synchronically (e.g., t’l > t’, nṯ > ṇṭ).
through assimilation or coalescence. More often than not, retroflexion evolves in a language via progressive assimilation from a liquid to a following consonant (e.g., $rt > rt > t$). However, it can also evolve via regressive assimilation from a liquid to a preceding consonant (e.g., $tr > tr > t$).

The central hypothesis of this paper is that different phonotactic restrictions on retroflexion are a direct result of different evolutionary paths in the development of retroflexion. Specifically, the Dravidian pattern, which avoids initial retroflexion, results directly from retroflexion via progressive assimilation, while the TB pattern, which avoids retroflexion in codas, results from retroflexion via regressive assimilation.

In Proto-Dravidian (PDr), retroflexion first emerged in the class of liquids (*$l$ > PDr *$l$, *$l$, *$l$) and spread from liquids to following nasals and stops via progressive assimilation across morpheme boundaries (Zvelebil 1970; Tikkanen 1999; Levitt 2010). These developments are summarized in (1).

(1) Evolution of coronal contrasts in PDr
a. Starting point $l$ - ($l$)$r$ - $l$ - $l$ - $l$
b. Progress. assim. - - - $t$ - $t$ - $t$
c. Loss of liquid $l$ - ($l$)$r$ - ($t$)$r$ - ($t$)$r$

Ultimately, the loss of the conditioning liquid in (1c) yielded a three-way contrast between dental, apical alveolar and retroflex stops, with the original dental series in both initial and non-initial positions and the new alveolar and retroflex series limited to non-initial environments. Similarly, retroflexion has developed via progressive assimilation from liquids and back vowels in Indo-Aryan (Misra 1967; Bhat 1973; Hamp 1996; Tikkanen 1999) and Australian (Dixon 2002), producing comparable phonotactic patterns in those language families.

Tibeto-Burman languages have developed retroflexion primarily via regressive assimilation in Cr- and Cl- onset clusters (Bhat 1973; Matassoff 2003). The evolution of retroflexion in Tibeto-Burman is summarized in (2).

(2) Evolution of coronal contrasts in TB
a. Starting point $l$ - $Cr$ - $t$
b. Regress. assim. - $tr$ - $t$
c. Loss of liquid $l$ - $l$ - $t$ - $t$

In the case of TB, loss of the conditioning liquid in (2c) yielded a two-way contrast between dental and retroflex consonants, but only in pre-vocalic onset positions.

In summary, the Dravidian phonotactic pattern emerges whenever retroflexion evolves through progressive assimilation. *-Cr and *-IC sequences are typically non-initial and post-vocalic because they constitute well-formed syllable codas, but not well-formed onsets. Therefore, progressive assimilation in these clusters produces retroflexion only in non-initial, post-vocalic environments. The TB pattern emerges whenever retroflexion evolves through regressive assimilation. Cr- and Cl- sequences are typically syllable-initial and pre-vocalic because they constitute well-formed syllable onsets, but not well-formed codas. Therefore, regressive assimilation in these clusters produces retroflexion only in syllable onsets.

4 The role of perception

The proposed evolutionary account differs from previous accounts, based primarily on evidence from Australian and Dravidian languages, which argue for perceptually motivated synchronic constraints on retroflexion (Hamilton 1996; Steriade 2001; Hamann 2003). The perceptual cues critical to retroflex contrasts are most salient in VC transitions, and least salient in CV transitions. Thus, according to these accounts, retroflex contrasts are avoided in strictly CV positions, where they lack salient cues, and favoured in VC positions, where they benefit from robust cues.

The perceptual account provides a plausible explanation of the dominant Dravidian type pattern, but fails to explain the TB pattern. In the TB pattern, retroflex segments are restricted to those environments where their cues are least salient, and prohibited in those environments where their cues are most salient. The existence of the TB pattern suggests that the perceptual account cannot be generalized into any kind of universal markedness constraint or implicational universal, such as Steriade’s (2001) law of apical contrast, which states that apical or retroflex contrasts can only occur word-initially if they also occur after vowels. Clearly, the TB pattern violates this prediction.

The distribution of perceptual cues may still play an important role in the evolution of retroflex phonotactics. In particular, it may explain the frequency of the Dravidian type pattern relative to the TB pattern. Retroflex assimilation is expected to be predominantly progressive because progressive assimilation preserves the salient VC transition at the expense of the less salient CV transition ($VC_C\text{C}_1V > VC_C\text{C}_2V$), whereas regressive assimilation does just the opposite ($VC_C\text{C}_2V > VC_C\text{C}_1V$). Thus, the Dravidian pattern, which evolves via progressive assimilation, is expected to be more frequent than the TB pattern, which evolves via regressive assimilation.

5 Conclusion

South Asian languages provide important insight
into the origins of retroflex phonotactics. The evidence from South Asia indicates that different (and even contradictory) phonotactic restrictions on retroflexion can emerge as a direct result of the evolution of retroflexion in a language. Specifically, the Dravidian type pattern, which avoids initial retroflexion, results directly from progressive assimilation in liquid-plus-consonant sequences (e.g., \(-\text{rt} > -\text{r} \text{t}\) > \(-\text{t}\)), while the TB type pattern, which avoids retroflexion in codas, results directly from regressive assimilation in consonant-plus-liquid sequences (e.g., \(-\text{tr} > -\text{r} \text{r} > -\text{t} \text{r} > -\text{t}\)).

The evidence from South Asia raises doubts about the existence of any universal perceptually motivated synchronic constraints on retroflexion. However, the salience of retroflex cues in VC transitions may explain the fact that progressive retroflex assimilation is more common than regressive retroflex assimilation, and therefore, that the Dravidian type pattern evolves more frequently than the TB type pattern.

References


