

Feature Spreading in Sanskrit

Internal sandhi refers to the changes that sounds undergo when they come in contact with other sounds within a word. Most of these changes are examples of *feature spreading* or *assimilation*, when one sound takes on the features (voicing, aspiration, retroflexion, etc.) of another sound. Assimilation can be classified as *regressive* (right-to-left) or *progressive* (left-to-right).

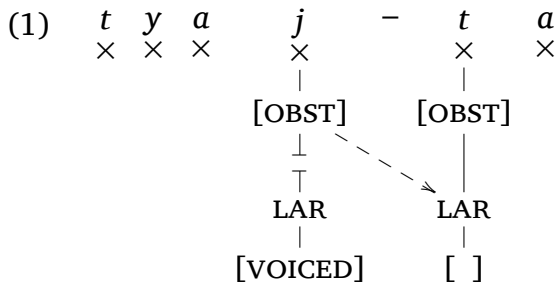
The most important changes to remember are those that happen in *obstruent clusters*. Obstruents (*jhaL*) include all of the stop consonants (*sparśas*) and sibilants (*ardhasparśas*).

1 Voicing assimilation

[VOICED], indicating vibration of the vocal cords, is a LARYNGEAL feature. [SPREAD GLOTTIS] (here abbreviated [S.G.]), or aspiration, is also a LARYNGEAL feature. Such features tend to be linked and de-linked *as a group*.

In *external sandhi*, the final consonant of a word takes on the voice features of the following sound (whether that sound is a vowel or consonant). These processes belong to Sanskrit's *postlexical* phonology.

In *internal sandhi*, the spread of [VOICED] is more limited. The general rule is regressive assimilation: obstruents will take on the voice features of a following obstruent. Example: *tyaj* 'abandon' + *ta*:



Here the whole LARYNGEAL node of *j*, including the feature [VOICED], is delinked. The sound *j* then gets all of its laryngeal features from the following sound *t*. Since *t* has no laryngeal features (no voice, no aspiration), *j* becomes *c* (no voice, no aspiration). Before obstruents (*jhaL*), palatal sounds (*cu*) become velar sounds (*ku*). Hence *tyaj* + *ta* → *tyac* + *ta* → *tyak* + *ta*.

Practice with participle suffixes (*Kta*), stem-forming suffixes (future *sya* or desiderative *saN*), inflectional endings (*tiN*), etc.: *bhaj* 'partake,' *yuj* 'join,' *bhañj* 'break.'

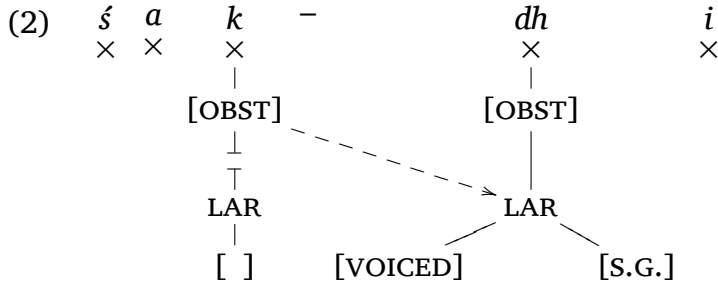
2 Aspiration assimilation

[S.G.] spreads similar to [VOICED], but with some crucial differences.

- A single aspiration feature can be linked to multiple sounds, but aspiration only manifests *on a single sound* in pronunciation. This will always be the onset of a syllable (often the last sound in a consonant cluster).

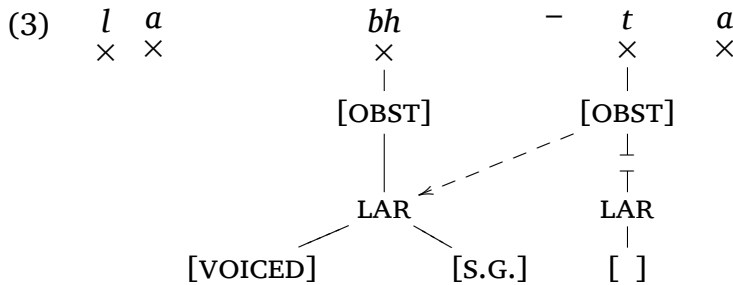
- In clusters of stops, *the direction of assimilation follows the aspiration*. If the aspirate is first in a cluster, we get *progressive* assimilation; if it's last, *regressive*.

The case of *śak* ‘help’ + *dhi* is similar to the regressive assimilation of voicing seen above:



When the LARYNGEAL node of *k* is delinked, it gets its LARYNGEAL features from the following *dh*. Thus it becomes voiced and aspirated. *However*, while aspiration can be linked to several sounds, it can only ‘show up’ on one sound. Thus *śak* + *dhi* → *śagh* + *dhi* → *śag* + *dhi*. (NB this is not the Pāṇinian derivation).

Often, however, the aspirate comes first, and in such cases we have *progressive* rather than *regressive* assimilation of LARYNGEAL features ([S.G.] and [VOICED]). For example, *labh* ‘take’ + *ta*:



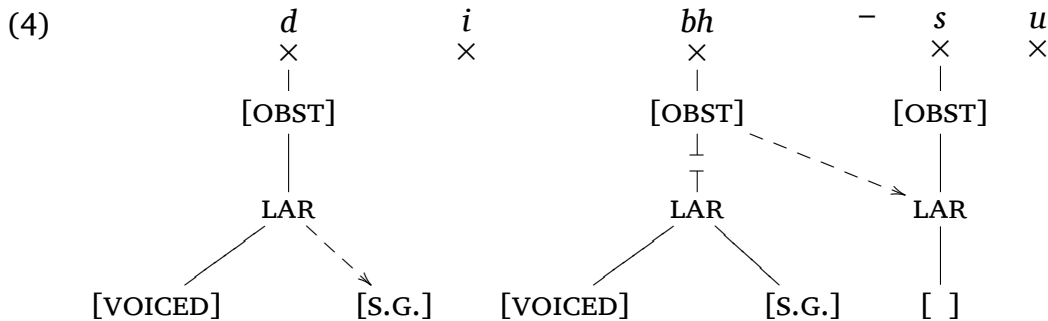
Here the LARYNGEAL features of *bh* spread to the following sound *t*, which becomes voiced and aspirated. Again, since aspiration can only show up on one sound in a cluster, we get *lab* + *dha* instead of *labh* + *dha*. *Progressive assimilation of laryngeal features* is called **Bartholomae’s Law**.

Practice with participle suffixes (*Kta* and *Ktavat*), *nomen agentis* (*trC*), inflectional endings (*tiN*), etc.: *rudh* ‘stop,’ *budh* ‘awake,’ *duh* ‘milk,’ *druh* ‘harm,’ *dah* ‘burn,’ *śudh* ‘purify,’ *sādh* ‘accomplish’

NB: for some verbs (*druh*, *duh*), a final *-h* represents an older *-gh* and thus patterns with *gh*; for others (*ruh*), a final *-h* represents a **z^h* sound that Sanskrit no longer has, and results retroflexion and compensatory lengthening in the *Kta*-forms (e.g., *ruh* + *ta* → *rūḍha*). Bartholomae’s Law does not apply to forms of the root *dhā* ‘place.’

Before a sibilant, the general rule again takes effect: delink the aspirate sound’s LARYNGEAL features. In this case, however, the feature [S.G.] is ‘thrown back’ onto the first consonant of the root. (Alternatively, we can assume that the feature [S.G.] is linked to the *whole* root, but in normal circumstances it only appears on the last consonant; when the LARYNGEAL features of that last consonant are delinked, [S.G.] has no place to go except the first consonant.) This is called **Grassmann’s Law**. Grassmann’s Law applies *only*

to roots which have two *voiced* consonants, and *only* when the laryngeal features of the second consonant are completely delinked (e.g., not when they are linked to a following consonant, as in *bodh + tavya* → *boddhavya*). For example, *dabh* ‘harm’ + *su* (*dibh* before a desiderative suffix):



Here the sound *bh* loses its LARYNGEAL features before the sibilant *s*, and hence becomes unvoiced and unaspirated (*p*). But then the feature [S.G.] (re)appears on the first consonant of the root. Hence *dabh + su* → *dibh + su* → *dip + su* → *dhip + su*.

Practice with the future and desiderative suffixes (*sya*, *saN*): *duh* ‘milk,’ *budh* ‘awake,’ *guh* ‘conceal.’

Practice with the endings *se*, *te*, *tas*, *thas* of the root *dhā* ‘place’ (NB that Bartholomae’s Law does not apply).

3 Retroflex assimilation: Ruki

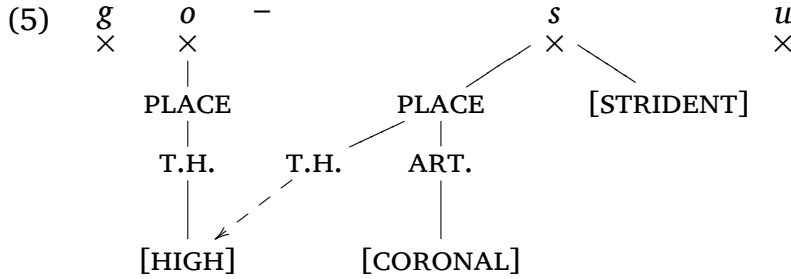
Retroflex features also spread within a word. Dental sounds alternate with their corresponding retroflex sounds (*s/ṣ*, *n/ṇ*, *t/ṭ*, *th/ṭh*, *d/ḍ*, *dh/ḍh*), hence I call these sounds *retroflexible*. But there are several different processes by which these sounds are actually retroflected.

One important case is where a palatal sibilant (*ś*), and in some cases a palatal stop (*c*, *j*) becomes a retroflex sibilant (*ṣ*) before another stop. If this following stop is *retroflexible*, then it is retroflected. E.g. *viś + ta* → *viṣ + ta* → *viṣ + ṭa*; *srj + ta* → *sṛṣ + ta* → *sṛṣ + ṭa*.

Ruki refers to the retroflexion of *s* by these sounds:

- R: *ṛ*, *ṝ*, *r*
- U: *u*, *ū*, *o*, *au*
- K: *k*
- I: *i*, *ī*, *e*, *ai*

When *s* immediately follows any one of these triggers, it becomes associated with the feature [HIGH] (in the TONGUE HEIGHT node). Thus *ruki* is a kind of progressive assimilation.

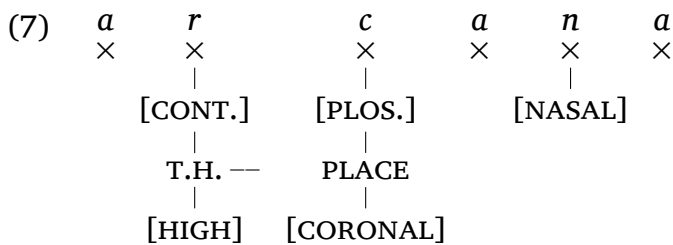
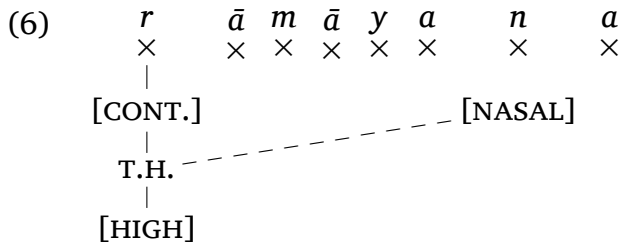


The combination of CORONAL (in the ARTICULATOR node) and [HIGH] (in the TONGUE HEIGHT node) is what makes retroflex sounds retroflex. Note that the target has to be a sibilant (with the feature STRIDENT) in order for the triggers to affect it. $go + su \rightarrow go + \underset{\cdot}{s}u$.

The **tisra-rule** is an exception to *ruki*: in words like *tisra*, *usra*, etc., retroflexion of *s* is blocked by a following *r* (this is a ‘dissimilation’ effect).

4 Retroflex assimilation: Nati

Nati refers to the retroflexion of *n*. The triggers for *nati* are r , \bar{r} , r , and $\underset{\cdot}{s}$. Unlike *ruki*, however, *nati* can work at a distance. *The retroflexion triggered by nati remains in effect until the end of the word is reached, or until it is blocked by a coronal plosive.* CORONAL includes palatal, retroflex and dental; PLOSIVE refers to stops (*sparśas*). *Nati* thus spreads retroflexion from a retroflex CONTINUANT rightwards towards a retroflexible (i.e., CORONAL) NASAL, but it stops when it encounters a PLOSIVE that is also CORONAL.



Practice: *ṛtīya ekavacana* and *śaṣṭhī bahuvacana* of *gātra*- ‘limb,’ *nakṣatra*- ‘constellation,’ *rāṣṭra*- ‘kingdom,’ *preman*- ‘love,’ *arka*- ‘sun’; *ātmanepada* participles of *ikṣ* ‘gaze,’ *bhakṣ* ‘eat.’

NB: Retroflexion of *s* and *n* can sometimes take place over the boundary between an *upasarga* and a *dhātu*. Roots like *nam* which are retroflexible (*pari-ṇam*) are taught with retroflexion in the *dhātupāṭha* and are thus called *ṇopadeśa*.