

## Sanskrit Accent without Gradience or Readjustment: Fixed and Floating tones

**Aim:** To identify the prerequisites for an account of the accentual behaviour of Sanskrit forms, which does not appeal to phonological gradience, rule ordering, or readjustment.

**Puzzle:** The first observation one can make is that some stems have a fixed accent (1a), while other stems lose their accent in inflected forms. Traditionally, stems which lose their accent to their affixes are known as mobile: *pad* ‘foot’ (Kiparsky & Halle 1977) (1b). Compare a fixed stem in the instrumental plural (1a-iv) with a mobile stem (1b-iv).

(1)		a. gav- ‘cow’	b. pad- ‘foot’
i.	ACC.SG	<i>gáv-am</i>	<i>pád-am</i>
ii.	NOM.DU	<i>gáv-ā</i>	<i>pád-ā</i>
iii.	DAT.SG	<i>gáv-e</i>	<i>pad-é</i>
iv.	INS	<i>gó-bhis</i> (PL)	<i>pad-bhyám</i> (DU)

Kiparsky & Halle’s observation (which we accept and build on) is that vocabulary items can come in one of two types, either they have an underlying accent or they are accentless. If there is only one accent, this gets the word-accent. In cases where both the stem and the affix have an accent, the leftmost underlying accent gets the word accent. If there is no underlying accent, accent is supplied to the leftmost-syllable. As Perry & Vaux (2018) note, while this system is highly successful, it does not capture all of the forms.

Take stems such as *pitar* ‘father’, these cannot be underlyingly accentless because, unlike (1b[iv]) we see them overriding the accent of (for example) /bhyām/ (INS.DU) (2b[iii]), but *pitar* cannot be simply an accented stem, because its stress is mobile with the INS.SG and the GEN.PL suffixes (2b[iv-v]). This stress shift cannot be attributed to invariant stress on these affixes because they in turn lack surface accent with certain stems such as *hotar*- ‘priest’ (2a).

(2)		a. hotar- ‘priest’	b. pitar- ‘father’
i.	ACC.SG	<i>hótār-am</i>	<i>pitár-am</i>
ii.	INS.PL	<i>hótṛ-bhis</i>	<i>pitṛ-bhis</i>
iii.	INS.DU	<i>hótṛ-bhyām</i>	<i>pitṛ-bhyām</i>
iv.	INS.SG	<i>hótr-ā</i>	<i>pitṛ-ā</i>
v.	GEN.PL	<i>hótṛ-ṇām</i>	<i>pitṛ-ṇām</i>

Kiparsky’s (2010) analysis of Indo-European accent accounts for (2i-iv) but not (2v), this is because in his account accent shift is caused by disyllabification and in (2v) the stem retains a syllabic consonant that could bear stress. It appears the GEN.PL’s accent is strong enough to shift stress regardless. This kind of data seems to suggest some form of gradience in the system, the kind that is modelled in certain frameworks such as Harmonic Grammar (Smolensky & Goldrick 2016; Zimmermann 2020), or special ‘weight’ diacritics (Vaxmann 2016). Alternatively, the data could be accounted for using morphosyntax-sensitive operations such as readjustment rules (Halle and Marantz 1993), as Perry & Vaux (2018) suggest. We outline an account which does not need to make use of these mechanisms, additionally disposing of the extrinsic rule ordering assumed by Perry & Vaux.

**Background:** In recent years there has been a push to use the full range of the available autosegmental representations of exponents to recast non-concatenative and non-modular morpho-phonological phenomena (such as readjustment rules) as fully phonological and item-and-arrangement (Trommer 2008; Zimmermann 2017; Scheer 2016). We content that the same is true here also for gradience. The key connecting both is the association line, which can be used contrastively in underlying forms. Phonological control of association lines is prevalent in related approaches of other frameworks (van Oostendorp 2006, Revithiadou 2007; Zimmermann 2017).

**Reanalysis:** Kiparsky & Halle (1977) already explain the phonological contrast between the items that contain an accent feature and those that do not. The special behaviour of certain forms can be attributed to their phonological shape, and once we accept that phonological representations are made of (at least) two basic tiers mediated by association lines, the number of contrasts obtained from a single feature in an exponent is not two (present or absent), but three: fixed (present, associated), absent, and floating (present, unassociated). A stem and a suffix of Sanskrit can have the following underlying accentual contrasts (accent in Sanskrit is taken to be a High tone).

- (3)      a. Fixed accent ‘cow’                      b. Mobile accent ‘foot’                      c. Floating accent ‘father’
- |                             |                 |                             |
|-----------------------------|-----------------|-----------------------------|
| H<br> <br>g a v             | p a d           | H<br>p i t a r              |
| d. GEN.PL<br>H<br> <br>na:m | e. ACC.SG<br>am | f. INS.PL<br>H<br>bh y a: m |

Taking these exponents, any of their combinations will result in the correct accentual surface form following the conditions of two intuitive strength, in combination with a default leftmost accent.

The following table shows their possible combinations and the winner according to the strength hierarchies, an example of each combination is provided. Crucially, although the effect is one that looks gradient, it is achieved using a purely categorical symbolic computation using only item-and-arrangement processes.

- (4)                      Filled > Empty                      Fixed > Floating

	<b>1 Fixed</b>	<b>2 Floating</b>	<b>3 Empty</b>
<b>A Fixed</b>	Tie, leftmost <i>hótṝ-nām</i>	Fixed wins <i>gó-bhis</i>	Fixed wins <i>gáv-am</i>
<b>B Floating</b>	Fixed wins <i>pitṝ-nām</i>	Tie, leftmost <i>pitṝ-bhyām</i>	Floating wins <i>pitár-am</i>
<b>C Empty</b>	Fixed wins <i>pad-nām</i>	Floating wins <i>pad-bhyám</i>	Tie, leftmost <i>pád-am</i>