

# Words within words

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# Evidence for prosodic structure in ancient IE languages: Italic 1

- writing: segmentation in Italic inscriptions

- Umbrian

- (1) pre veres : treplanes : iuve :  
 before gate.abl Trebulan-abl lupiter.dat.sg  
 krapuvi : tre buf : fetu :  
 Grabovius.dat.sg three cattle.acc.pl sacrifice-ipv  
 Before the Trebulan gates sacrifice three cattle to lupiter  
 Grabovius' (Tab.Ig. Ia 2-3; 3rd century BC)

# Evidence for prosodic structure in ancient IE languages: Italic 2

- writing: segmentation in Italic inscriptions *cont.*

- Archaic Latin

(2) Manios : med : **fhe : faked** : Numasioi  
 Manius.nom me make.perf.3.sg Numerius.dat  
 Manius made me for Numerius.

(Praeneste fibula; 7th century BC)

- Faliscan

(3) equo[...] : arcentelom | huti[c]ilom : **pe : para[i]**  
 | silver.acc vessel.acc make.perf.1.sg

| [...] made the silver vessel. (CIE 8079; ca. 600 BC)

# Evidence for prosodic structure in ancient IE languages: Greek

## Greek prosody: sandhi in Attic inscriptions

- (4) hētis d' àn tōm póleon mè et<sup>h</sup>élei  
 this ptcl ptcl the.gen.pl city.gen.pl not want.3.sg  
 If one of the cities is not willing... (IG I<sup>3</sup> 6; ca. 470-460 BC)
- (5) tōm mè apodot<sup>h</sup>énta  
 the.acc not give back.aor.ptcp.acc  
 what has not ben paid (IG I<sup>3</sup> 34; 425/4 BC)
- (6) hó ti àn dokēi autōm pat<sup>h</sup>ēn  
 that ptcl seems self.acc suffer.inf  
 what he should suffer (IG I<sup>3</sup> 34; 425/4 BC)

# Evidence for prosodic structure in ancient IE languages: Vedic Sanskrit 1

sandhi in Vedic is domain-specific: Oldenberg (1888: 472)

- sandhi in “engeren Wortverbindungen” (= φ-phrases?)

(7) jyótiṣ paśyanti vāsarám  
light.acc see.prs.3.pl morning.acc  
They see the morning light.

RV 8.6.30

- differs from sandhi in “loseren Wortverbindungen”

(8) gūḷ<sup>h</sup>ám jyótiḥ pitáro ánv avindan  
hidden.acc light.acc father.n.pl adv find.impf.3.pl  
The fathers found the hidden light.

RV 7.76.4

# Evidence for prosodic structure in ancient IE languages: Vedic Sanskrit 2

## external sandhi in words

- pragr̥hya: *índraś ca agníś ca* 'Indra and Agni' (10.90.13), cf. *índraś cāgníś ca* (5.51.14)
  - in compounds (heavy 2nd syllable): *jīrāśvaḥ* 'with swift horses' (1.141.12) vs. *jīrāśvaḥ* (2.4.2) (Kuryłowicz 1975: 43).
- voicing: *úd agād ayám ādityó* 'this Aditya went up' (1.50.13)
  - in compounds: *sádaśvaḥ* 'with good horses' (5.58.4) vs. *satáḥ* 'good' g.sg. (e.g. 1.36.3) (Kuryłowicz 1975: 6)

# Evidence for prosodic structure in ancient IE languages: Vedic Sanskrit 3

external sandhi in words *cont.*

- *-as* → *-o* before voiced C: *dúvo gírah* 'service and songs' (1.14.1)
  - before suffix: *duvoyú-* 'deferential' vs. *duvasyú-* (both *passim*), but cf. *med<sup>h</sup>ā-* 'insight', Av. *mazdā*, cf. also *sūre duhitā* (1.34.5) and Jamison (2010)
- N → *m̐* before C: *tām tvā* (*passim*), *yām yajñām* 'which sacrifice' (1.1.4)
  - with preverbs: *saṃtaní-* 'sound', *samyák saṃyānti dhūmínaḥ* 'the smoky [flames] come together completely' (5.9.5)
  - with reduplicants: *yaṃyamīti* 'stretch' intensive 3.sg. (1.95.7)



# Evidence for prosodic structure in ancient IE languages: Avestan and Old Persian

- no external sandhi in clitic groups: Av. *manas=cā* vs. *manō#* 'thought', *mašiiqs=cā* 'human', acc.pl. vs. *mašiiāṅg#* (Hoffmann & Forssman 1996: 111)
  - cf. Old Persian: no word final lengthening in clitic groups: *manā#* vs. *mana=cā* vs. *avākaram=ca=mai*y, *utā#* vs. *uta=mai*y etc.
- external sandhi in compounds, e.g. *manō.marəta-* 'recited in thoughts', *spəntō.mainiiu-* 'of sacred thought' (: *spənta-*) (de Vaan 2003: 433), *ō* word-final in n.sg. of *a*-stems
- external sandhi before incohering suffixes, e.g. *spəntōtəma-* 'most sacred' (: *spənta-*), and endings, e.g. *raocōhuua* 'light' loc.pl. (: *raocah*) (de Vaan 2003: 436-7)

# Compounds

## Final vowels are lengthened

at morpheme boundaries in compounds and with certain suffixes.

- Greek data (Lindner 2011: 53-61)
  - rare, but attested
    - *prō-pérysi* 'two years ago' (also *propérysi*) (Wackernagel 1889: 9),
    - cf. ion.att. *elap<sup>h</sup>ēbólos* (: *élap<sup>h</sup>os*) (Wackernagel 1889: 11, Tribulato 2015: 23)
    - cf. *stratāgós* (: *ágō*, see Lindner (2011: 54, fn.28)) vs. *stratárk<sup>h</sup>ēs* and *homōnymos* vs. *dusōnymos*
  - not attested in verb-noun compounds (Tribulato 2015)
- Avestan data
  - rare, but attested, see *vər<sup>a</sup>θra-jā* vs. *vər<sup>a</sup>θrā-janəm* 'victorious'

## Vedic compounds

Lengthening is frequent

- *viśvā́-nara-* 'of all men' (lengthening due to initial laryngeal?)
- *yajñā-sáh-* 'capable of a sacrifice' (: *yajñá-*) (length from (non-attested) weak stem, Schindler 1979: 60a, fn.4?),
- *prā́-vṛta-* 'covered' (from *\*pro-h<sub>1</sub>*, Rasmussen 1989: 188, fn.19, or *\*pro-o*, Dunkel 2014: 639? But cf. *ab<sup>h</sup>ī-*, *pārī-*, *ápā-* etc.)
- *śatā́-mag<sup>h</sup>a-* 'rich in hundreds' (: *śatá-*), *tuvī-mag<sup>h</sup>a-* 'very rich', cf. *tuvi-kratu-* 'very mighty'
- verb-noun compounds: *śikṣā́-nará-* 'helping the men', *radá́-vasu-* 'giving wealth' (initial laryngeal?)

Kuryłowicz 1956: 339

“[Words with initial laryngeal] ne fournissent pas un *modèle prosodique* propre à être généralisé comme un outil de la versification.”

# Lengthening with incohering suffixes

- Greek

- comparative suffix *-teros*, cf. *sop<sup>h</sup>ōteros* 'wiser' (: *sop<sup>h</sup>ós*) (Wackernagel 1889: 5, Risch 1974: 94-95)
- *-sýnē*, cf. *hier(e)ōsýnē* 'priesthood' (: *hierós*), *megalōsýnē* (: *megálos*) (Schwyzer 1939: 529)

- Avestan: not attested, but

- cf. above on *spəntōtāma-*
- cf. punctuation, both in compounds and with suffixes, e.g. *āsu.aspō.tāma-* 'with swift horses', superlative

## pada suffixes in Vedic

- pada-pāṭ<sup>h</sup>a treats case endings *-b<sup>h</sup>yām*, *-b<sup>h</sup>iḥ*, *-b<sup>h</sup>yaḥ* like parts of compounds: e.g. *aśvīb<sup>h</sup>yām* 'Aśvin' ins.du. (1.44.2), pada-pāṭ<sup>h</sup>a: | aśvi-b<sup>h</sup>yām |, cf. e.g. *vṛtrahá* 'Vṛtra-slayer' (3.20.4), pada-pāṭ<sup>h</sup>a: | vṛtra-hā |
- caesura in metrics before pada suffixes (as before the 2nd part of a compound), cf. Arnold (1905: 192), Kuryłowicz (1975: 7,fn.1)
- external sandhi (mainly with tadd<sup>h</sup>ita suffixes), cf. *duvoyú-* above
- external sandhi with case endings *-b<sup>h</sup>yām*, *-b<sup>h</sup>iḥ*, *-b<sup>h</sup>yaḥ*, e.g. *vácob<sup>h</sup>ir* 'speech' ins.pl. (1.36.1), pada-pāṭ<sup>h</sup>a: | vacaḥ-b<sup>h</sup>iḥ |

## Lengthening with pada-suffixes

- lengthening before suffixes (Kuryłowicz 1975: 59, Arnold 1905: 127):
  - *-tama-*: *purūtāma-* (4×), e.g. pada-pāṭ<sup>h</sup>a on 1.5.2: | puru-tamam |, vs. *purutāma-* (12×)
  - *-van-*: regular pattern, *ṛtāvān-* 'pious' (: *ṛtā-*, e.g. pada-pāṭ<sup>h</sup>a on 10.6.2: | ṛta-vā |, cf. av. *ašāvan-*)
  - with *-vant-/ -mant-*: rare in RV, but frequent later. Regular in *sutāvānt-* 'with Soma juice', see e.g. *sutāvātām* (10.100.11), pada-pāṭ<sup>h</sup>a: | suta-vatām |
  - *-yú-*: *mitrāyú-* 'seeking friendship', pada-pāṭ<sup>h</sup>a on 1.173.10: | mitra-yuvaḥ |, vs. *vīrayú-* 'manly' (: *vīrá-*)
- lengthening before *-b<sup>h</sup>yām*, *-b<sup>h</sup>yaḥ*, *-b<sup>h</sup>iḥ* rare, but see *makṣúb<sup>h</sup>iḥ* 'swift' ins.pl. (8.26.6), pada-pāṭ<sup>h</sup>a: | makṣu-b<sup>h</sup>iḥ |

## A striking parallel: Lengthening at right word edges

Final short vowel /a,i,u/

is lengthened regularly for metrical reasons.

But: lengthening is not always forced by the metre, cf.

- (9) imám me varuṇa śrud<sup>hī</sup> | hávam  
 this.acc my Varuṇa.voc hear.ipv call.acc

◡ — ◡ — ◡ — ◡ — | (8)

Varuna, hear this call of mine. (1.25.19) (last syllable is anceps!)

- (10) stuhí-stuhíd eté g<sup>hā</sup> te | máṃhiṣṭ<sup>hā</sup>so  
 praise.ipv-praise.ipv=ptcl these ptcl those bounteous.sup.nom.pl  
 mag<sup>h</sup>ónām

bounteous.gen.pl

◡ — ◡ — — — — | (8)

Praise them, do praise them! These are the most bounteous of the bounteous. (8.1.30) (g<sup>hā</sup> for g<sup>h</sup>a; longum in non-ictic position)

## Interim conclusion

- short word-final vowels are lengthened optionally in Early Vedic.
- short vowels in the juncture of a compound are lengthened.
- short vowels before pada suffixes / endings are lengthened.
- writing conventions and external sandhi confirm the similarity between word edges and edges within words.
- → final lengthening applies at the level of the p-word.

But why are word edges lengthened? And under which conditions?

Why does the left edge of pada suffixes pattern with word-like prosodic boundaries?

What exactly does word-like mean?



## Conditions on lengthening

*...der lange Auslaut ist ursprünglich nur vor einfachem Consonanten und ausserhalb eines Abschlusses, der kurze Auslaut dagegen vor Doppelconsonanzen und am Schlusse eines grammatischen (daher in der Poesie am Schlusse eines metrischen) Ganzen üblich gewesen. (Zubatý 1888-1890: 2, 139)*

- Descriptive generalization: word-final lengthening applies iff exactly one C follows.
- → constraint against word-final light syllables:
  - ${}^{\circ}V \# CV^{\circ} \rightarrow {}^{\circ}VV.CV^{\circ}$
  - ${}^{\circ}V \# CCV^{\circ} \rightarrow {}^{\circ}VC.CV^{\circ}$  (long by position)
- → cannot extend to phrase-edges

# Heavy syllables

- CC-constraint presupposes syllabification:
  - either the target is a heavy syllable
  - or lengthening is blocked if the result were a superheavy syllable
  - in both cases lengthening of final -VC is excluded
- lengthening applies at word edges in a domain larger than the word
- this constituent is also the (or a?) domain of syllabification

*śrud<sup>hī</sup> hávam* (ex. 9) = *.śru.d<sup>hī</sup>.há.vam.*  
*śrud<sup>hī</sup> bráhma* (6.17.3) 'hear the prayer' = *.śru.d<sup>hī</sup>b.ráh.ma.*

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in compounds (Seiler 1950: 17-18)

*tuvī-mag<sup>h</sup>a-* 'very rich' = *.tu.vī.ma.g<sup>h</sup>a-*  
*tuvi-kratu-* 'very mighty' = *tu.vik.ra.tu-*

# Phrase-edges

- a verse typically coincides with a major syntactic category (S), cf. Zubatý (1888-1890: 140)
- no lengthening occurs at the edge of a verse (though at the caesura)
- → no S-final lengthening (cf. external sandhi)
- type of phrase?
  - (9): VP [śrud<sup>h</sup>ī | hāvam]
  - (10): φ-phrase [etē g<sup>h</sup>ā te] | māṃhiṣṭ<sup>h</sup>āso mag<sup>h</sup>ónām (Keydana 2011)
  - lengthening within an S in non-ictic position

(11) [yād arṇasām | móṣat<sup>h</sup>ā                      vṛkṣām  
 that see.acc    steal.aor.subj.2.pl tree.acc  
 kapanéva]                      ved<sup>h</sup>asaḥ  
 caterpillar.nom=like sage.voc.pl

..., when you steal from the sea [of cattle] like a caterpillar  
 from a tree, you sages. (5.54.6)

## Some numbers: verbal endings in lengthened final vowel in non-ictic positions

numbers from non-ictic lengthenings taken from Zubatý (1888-1890)

- > 1000 tokens in ictic positions (metrical reasons possible)
- 101 tokens in non-ictic position
- 88× in VPs or sequences of fronted verb + clitic(s)
- 13× at edges of constituents
  - 4× imperative followed by vocative
  - 3× final position in fronted relative clause
- note also: lengthening very frequent with W2-clitics (Zubatý 1888-1890: 2,137)

# The $\varphi$ -phrase

- Clitic groups like in (10) are evidence that the domain is a prosodic constituent, not a syntactic one.
- Possible candidate: the  $\varphi$ -phrase, since
  - $> \omega$  (as  $\omega$  has internal sandhi, but lengthening patterns with external sandhi),
  - $< \iota$ -phrase (as  $\iota$ -phrase corresponds to S and S is not the original domain of lengthening and external sandhi)
- The extension to other positions inside the  $\iota$ -phrase is a secondary development, cf. external sandhi.



# Pada-suffixes as $\omega$ s in $\varphi$ -phrases

- suffixes with word-like behaviour are typologically not uncommon (English, German, ...)
- pada-suffixes are  $\omega$ s
- external sandhi before pada-suffixes points to  $[\omega \omega]_{\varphi}$

# What makes a suffix a word?

- its history, e.g. Germ. *-lich* < \**līka* 'shape': no evidence in the prehistory of pada-suffixes
- a formal pattern
  - pada-suffixes are consonant-initial, see Wackernagel (1889: 7) (cf. Wiese 1996: 68)
    - examples of °C° without lengthening
  - word-like shape of the suffix, compound-like shape of the derivational / inflectional form



## A formal pattern for pada-suffixes

- pada-suffixes resemble root nouns: *-van-* equals  $^{\circ}van-$ , cf. *mag<sup>h</sup>ávan-*: compound (*mag<sup>h</sup>a* 'gift' +  $^{\circ}van-$  'win') or derivative (*mag<sup>h</sup>a* + *-van-* 'bountiful'), see Scarlata (1999: 467)
- or inflectional forms of root nouns: *-b<sup>h</sup>yām* (cf.  $^{\circ}prām$  'filling' acc.sg.), *-b<sup>h</sup>iḥ* (cf.  $^{\circ}b<sup>h</sup>uḥ$  'being' nom.sg.). For *-b<sup>h</sup>yaḥ* cf. verbal root formations like *k<sup>h</sup>yaḥ* aor.inj.2.sg. 'look'
- thus, derivations or inflected forms with pada-suffixes match compounds:
  - *viśvāvat-* 'common' (TS 3.5.6.2) vs. *viśvāsāh-* 'defeating everybody'
  - *mayob<sup>h</sup>iḥ* 'joy' ins.pl. vs. *mayob<sup>h</sup>uḥ* 'bringing joy' nom.sg (1.187.3)
- root-compounds are attested with high type frequency

# Rhythmic lengthening?

- Greek: Saussure (1884)
- Vedic: e.g. Macdonell (1910) and Keydana (2016) on Vedic reduplicated aorists, see also Kulikov (2005), Jamison (1988), and Jamison (1983)
- Avestan: *vər<sup>ə</sup>θra-jā* 'crushing resistance' n.sg. vs. *vər<sup>ə</sup>θrā-janəm* acc.sg. (Hoffmann & Forssman 1996: 57: "rhythmischer Ausgleich")

## Problems with rhythmic lengthening

- lengthening occurs only at edges: → rhythm at best a necessary factor, not a sufficient one
- empirical problems: lengthening does not necessarily produce contour, cf. (10) and the data in Wackernagel (1889)
- theoretical problems: rhythmic patterns independent of accent?  
Two types of foot structure? Weight vs. stress?

(13) red. aor. á.[jī.ja].nat 'give birth', á.[cik.ra].dat 'bellow' etc.

(14) ráth<sup>o</sup>            vṛṣaṇvān            máda[tā            ma]nīṣiṇaḥ  
 chariot.nom with steeds.nom rejoice.ipv.2.pl wise.voc.pl  
 The chariot is harnessed with steeds. Rejoice, you wise  
 ones. 1.182.1

- weight contours preferred for metrical reasons. → bias towards rhythmic patterns an epiphenomenon?

## Sievers' Law? (Kuryłowicz 1956, 1968, 1975)

- starting point: pre-Vedic distribution of *-iy/y-*  
 $\check{a}T_1T_2iya-$   $\bar{a}Tiya-$   $\check{a}Tya-$
- generalized pattern:
  - short vowel before cluster with R
  - long vowel before simple consonant plus  $\text{R}$  in short syllable
  - typically at morphological juncture
  - (later development: any cluster, any nucleus)

*Die Dehnung des Kurzvokals unter den genannten Bedingungen diente als zusätzliches, morphologisch überschüssiges Charakteristikum abgeleiteter (motivierter) Formen. (Kuryłowicz 1975: 60)*

# Lengthening and prosody

## Typology of word-final lengthening

- broadly attested at the end of an utterance or an  $\iota$ -phrase (e.g. Crystal & House 1988)
- the larger the constituent, the greater the amount of lengthening (e.g. Cho 2016)
- lengthening at the word level: “when durational cues to word boundaries are available, and are sufficient to exceed durational discrimination thresholds, listeners are able to exploit them.” (Cutler & Butterfield 1990: 328).
- on prosodic bootstrapping in language acquisition and adult sentence processing, see e.g. Wellmann et al. (2012) with literature

## A tentative explanation for the Vedic data

$$[\omega^* \dots V]_{\omega} [CV\dots]_{\omega} \omega^*]_{\phi} \rightarrow [\omega^* \dots VV]_{\omega} [CV\dots]_{\omega} \omega^*]_{\phi}$$

- (second) domain of syllabification:  $\phi$ -phrase (see Cardinaletti & Repetti 2009 for the interaction of  $\omega$ -syllabification and  $\phi$ -syllabification)
- $\rightarrow$  syllabification across  $\omega$ -edges obscures word boundaries
- lengthening (like external sandhi) counteracts by introducing a boundary signal for lexical entries,
- thus facilitating lexicon retrieval
- lengthening before CC is blocked due to FAITH  $\gg$  \*SUPERHEAVY
- rhythm an epiphenomenon: short vowels are more frequent in Vedic than long ones

# ω-boundaries elsewhere

- typological parallels?
  - Possibly French, see Bagou, Fougeron & Frauenfelder (2002) and Michelas & D'Imperio (2010)
  - cf. also gemination at word boundaries in Toch.AB and Greek: domain?
    - e.g. TB

(15) ciṣṣe laraumñe      ciṣṣe ārtañye    pelke      kalta|(r)r  
 thy affection.nom thy love.nom breath.nom stand.3.sg  
 śolāmpa ṣṣe  
 life.com with  
 my affection for you, my love for you are together like breath  
 with life (THT 496, 2-3)

- e.g. Greek *tān ēmínan* 'the half' (IC IV 41, 5th c.BC, Solmsen 1901: 165,fn.1)

## Addendum: Lengthening at the left margin

- affects only REDs and preverbs
- lengthening in REDs generally treated as rhythmic pattern (Keydana 2016 with literature)
- REDs show external sandhi, cf. also punctuation
- Wackernagel (1889), Kuryłowicz (1975: 49): right edge of a RED equals word edge
- slight modification: crucial is the left stem edge. Thus, it's again about lexicon retrieval, not about rhythm
- REDs pattern with preverbs since
  - no prefixation in stem formation or inflexion (except for REDs)
  - high type frequency of preverbs



# Conclusion

- a unified account for word-final lengthening, lengthening in compounds, and lengthening before pada suffixes is possible
- lengthening occurs at  $\omega$ -edges inside (recursive)  $\varphi$ -phrases
- lengthening is a boundary signal facilitating lexicon retrieval
- rhythmic lengthening is an epiphenomenon
  - the target is an  $\omega$ -final long vowel, not a heavy syllable
  - lengthening in heavy syllables is blocked by \*SUPERHEAVY

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