

Partitive, diminutive, nominalizer?

The development of **-ka-* in Indo-Iranian

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The problem: IIr. *-ka-* and its function(s)

- The oldest Indo-Iranian languages have an ubiquitous nominal suffix *(*)-ka-* (< PIE **-ko-*) that is often characterized as diminutive, based on examples like (1).

(1) Vedic *-ka-*-stems

- a. *putrá-* m. 'son' : *putra-ká-* m. 'little son'
- b. *pā́da-* m. 'foot' : *pāda-ká-* m. 'little foot'
- c. *vamrá-* m. 'ant' : *vamra-ká-* m. 'little ant' (PN)
- d. *jyā́-* f. 'bowstring' : *jyā-ká-* f. 'little bowstring'

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- ▶ But it is controversial whether this diminutive meaning should be reconstructed for PIE—and in fact it is mostly absent from the Avestan evidence.
- ▶ In the Middle Indic and Middle Iranian languages, *-ka-* moreover develops into a plain nominal suffix and eventually a nominal declension class marker — does this development follow from or presuppose a prior diminutive meaning?

Roadmap

The goal of this talk is to argue that the development of IIr. *-ka-*

1. instantiates a grammaticalization path PARTITIVE > DIMINUTIVE > NOMINALIZER
2. shows that morphosyntactic reanalysis is unidirectional, and
3. follows from more general principles governing morphosyntactic reanalysis (“grammaticalization”); cf. Grestenberger (2023).

Roadmap:

- ▶ Background: Diachrony of nominal diminutives
- ▶ Development of “diminutive” **-ka-* in Indo-Iranian
- ▶ Arguments for directionality of morphological reanalysis & morphological change
 - ▶ Proposed grammaticalization path:
Partitive → Diminutive → *n* (Nominalizer) → Inflectional morpheme
- ▶ Implications & conclusion

Diachrony of diminutives

- ▶ Typological generalization: Nominal diminutives arise via a grammaticalization path CHILD > SMALL > DIM (Jurafsky 1996; Kuteva et al. 2019: 88–90).
- ▶ Kuteva et al. (2019: 90) suggest a related grammaticalization path CHILD > PARTITIVE, but: “More examples from other language families are needed to substantiate this grammaticalization”
- ▶ Jurafsky (1996) explicitly argues for a unidirectional path CHILD > DIM > PARTITIVE.

Diachrony of diminutives: problems

- ▶ Jurafsky actually uses PIE **-ko-*/Indo-Iranian (Iir.) **-ka-* to argue *against* the alternative (and more or less standard) analysis PARTITIVE (“part of”, “relational”) > DIMINUTIVE.
 - ▶ Most of the older literature on PIE **-ko-*/Iir. *-ka-* actually argues in favor of PARTITIVE > DIMINUTIVE, e.g., Brugmann 1892; Edgerton 1911c.

“The abstractionist reconstruction implies an unnatural semantic shift from an abstract quality (‘related to’) to a concrete, real-world natural kind (‘child’). This violates the unidirectionality hypotheses (...) discussed in §2, and is a shift unparalleled in other languages.”

(Jurafsky 1996: 567)

Diachrony of diminutives: problems

- ▶ But there is no violation of unidirectionality — **-ko-* never meant ‘child’ or anything concrete and was never restricted to diminutive formations (more below), so there was no purported development of abstract > concrete
- ▶ “unparalleled in other languages” is also not true — at least in the IE languages there are plenty of parallels for the development “genitival”/partitive > diminutive (Nussbaum 2009)
 - ▶ **Latin:** both **-ko-* (= IIr. *-ka-*) and **-lo-* (> Lat. *-lus*, *-u/olus* (< **-e-los*), & *-culus* (< **-ke-los*) developed diminutive meaning & turned into plain nominalizers/*n* on the way to the Romance languages (e.g., It. *orecchio* ‘ear’ < Late Latin *ōri-c(u)lum*, *specchio* ‘mirror’ < *spe-c(u)lum*, etc.).
 - ▶ **Germanic:** New High German *-(e)l-* < Old High German *-il(a)* (< PIE **-elo-*, **-ilo-*); originally also formed nouns and adjectives of appurtenance, e.g., *Arm* ‘arm’ → *Ärm-el* ‘sleeve’ (**‘belonging to/having to do with the arm’*); *Eiche* ‘oak’ → *Eich-el* ‘acorn’ (**‘belonging to/of the oak’*); and here too there’s some evidence that the adjectival function was older (Weiss 2020)

Obviously more cross-linguistic evidence from other language families is needed, but “unparalleled” clearly not true.

(*)-ka- in Indo-Iranian: Vedic

- ▶ *Pace* Jurafsky, -ka-forms with unambiguous diminutive readings are actually rare in Rigvedic Sanskrit and in Avestan
 - ▶ Jurafsky (1996: 568) cites from Edgerton 1911c (= Edgerton 1911a, 1911b), claiming that “of the 62 Rig Veda -ka forms he lists 42 are diminutive and 10 more are possibly historically diminutive”. It is unclear which forms he’s referring to or where Edgerton discusses them, and he also fails to mention that Edgerton actually argues that the diminutive uses are secondary.
- ▶ In Vedic (RV), -ka- forms (Edgerton 1911c; AiG II,2: 515–40):
 - ▶ A → A: attenuative adjectives from adjectives
 - ▶ N → N: animate (m./f.) (concrete) nouns, including:
 - ▶ personal names
 - ▶ nominal diminutives
 - ▶ √ → A: root-derived “verbal adjectives”
 - ▶ adjectives derived from pronominal forms/stems
- ▶ Note: -ka-derivatives from stems in -u-, -i-, and a- were resegmented to -uka-, -ika-, and -aka- (some with lengthening of the presuffixal vowel) that partially took different routes of development in Middle Indic (e.g., -aka- became an agent noun-forming suffix). In the following, these are treated together with simple -ka- (cf. AiG II,2: 143–50; 308–13; 480–3)

-ka- in the RV

(2) RV: 68 *ka*-forms with identifiable bases

Derivative	Base	# of forms	%
verbal adjective	√	20	29.4%
(attenuative) adjective	adj.	15	22%
m./f. substantive	m./f. substantive	23	34%
adj.	pron.	7	10.2%
other		3	4.4%
Total		68	

► + 17 with unclear/onomatopoetic base

Verbal adjectives

(3) -ka-adjectives derived from roots or verbal stems (& their substantivizations)

Derivative	Meaning	√/verb	
<i>-lābh-ika-</i>	‘seizing, winning’	<i>rabh/labh</i>	‘seize, take’
<i>-r̥j-īkā-</i>	‘bright, shiny’	<i>arj</i>	‘shine’
<i>ārj-īkā-</i>	soma vessel (m.)	<i>arj</i>	‘shine’
<i>ānī-ka-</i>	‘mouth; face’ (n.)	<i>anⁱ</i>	‘breathe’
<i>dr̥ś-ika-</i>	‘visible; sight’ (n.)	<i>dr̥ś</i>	‘appear, become visible’
<i>hlād-ikā-</i>	‘refreshing’	<i>hlād</i>	‘become cool, fresh’
<i>mārḍ-ikā-</i>	‘grace, favor’ (n.)	<i>mṛḍ</i>	‘be generous, graceful’
<i>mṛḍ-ikā-</i>	‘grace, favor’ (n.)	<i>mṛḍ</i>	‘be gracious’
<i>muh-ukā-</i>	‘instant’ (n.)	<i>muh</i>	‘become startled’
<i>sāy-aka-</i>	‘to be thrown; arrow’ (m./n.)	?* <i>say⁽ⁱ⁾</i>	‘throw’
<i>śló-ka-</i>	‘what is heard; praise’ (m.)	<i>śrav</i>	‘hear’
<i>śuṣ-ka-</i>	‘dry’	<i>śuṣ</i>	‘be dry’
<i>vi-bhīd-aka-</i>	‘splitting apart, destroying’	?* <i>vi-bhid</i>	‘split apart; destroy’
<i>vṛdh-īkā-</i>	‘grown; equal to (+ dat.)’	<i>vṛdh</i>	‘grow’
<i>vṛkkā-</i>	(< * <i>vṛt-kā-</i>) ‘kidney (fat)’ (m.)	<i>vṛt</i>	‘turn’
<i>vṛśc-ika-</i>	‘scorpion; tarantula’ (m.)	<i>vraśc</i>	‘cut off, fell’
<i>sān-ukā-</i>	‘eager to win’	?* <i>san</i>	‘win’
<i>jāgarū-ka-</i>	‘alert, aware’	* <i>jāgaru-</i>	‘awake, aware’
<i>salal-ūka-</i>	‘scooting’ ¹	<i>sal/sar</i>	‘run, flow’ (int.)
<i>parpharī-ka-</i>	‘dispensing gifts’ (?)	<i>phar;</i> ?* <i>parphari-</i>	‘scatter, disperse’ (int.)

Attenuative adjectives

- (4) (attenuative or pleonastic) -ka-adjectives derived from adjectives (& their substantivizations)

Derivative	Meaning	Adjective	
<i>anya-ká-</i>	‘other (thing, n.)’	<i>anyá-</i>	‘other’ (adj.)
<i>arbha-ká-</i>	‘small, young’	<i>árbha-</i>	‘small’
<i>dva-ká-</i>	‘twice; together’	<i>dvá-</i>	‘two’
<i>eka-ká-</i>	‘alone’	<i>éka-</i>	‘one, single’
<i>kanīna-ká-, -ā-</i>	‘young man/woman’	<i>kanīna-</i>	‘young’
<i>kāṭu-ka-</i>	‘sharp, acidic’ (& n.)	* <i>kaṭú-</i>	‘sharp’
<i>pra-vartamāna-ká-</i>	‘rolling towards sth.’	<i>pra-vártamāna-</i>	‘rolling towards sth.’
<i>sana-ká-</i>	‘old-ish’ (pej.)	<i>sána-</i>	‘old’
<i>śana-ká-</i>	‘slow’	<i>śána-</i>	‘slow’
<i>śīta-ka-, f. śīti-kā-</i>	‘cool’	<i>śītá-</i>	‘cold’
<i>dūra-ká-</i>	‘distant; distance (n.)’	<i>dūrá-</i>	‘far; distance’ (n.)
<i>tri-ká-</i>	‘triple’	<i>trí-</i>	‘three’
<i>viśva-ka-</i>	PN (m.)	<i>viśva-</i>	‘all, every’ (adj.)
<i>śyāva-ka</i>	PN (m.)	<i>śyāva-</i>	‘dark’; also PN (m.)
<i>samaniká- n.</i>	‘competition, fight’	<i>sámana-</i>	‘together; meeting’ (n.)

Attentuitive adjectives

- ▶ Forms that were derived from directional adjectives in *-āñc-*/*-āk-* were excluded from (4), since in these cases the *-k-* was originally part of the base.
 - ▶ *ápāka-* ‘coming from a distant place; distant’ (*ápāc-* ‘turned backwards, away’); *arvāká-* ‘close by’ (*arvāc-* ‘turned towards’); *parā-ká-* ‘distance’ (n.; *pārāc-* ‘turned away, beyond’); *samī-ká-* ‘fight’ (n.; *samyác-* ‘together’ (adj.)); *prátika-* ‘turned towards; face’ (n.)’ (*práti, pratyác-* ‘turned against, towards’)
 - ▶ I’ve also excluded derivatives from local adverbs and prepositions for which no intermediate form in *-āñc-*/*-āk-* exists but which seem to have been formed in analogy with the latter group, i.e., *upā-ká-*, *úpā-ka-* ‘close together’ (*úpa, *upāc-* ‘close to, at’); *abhāka-* ‘collision’ (n.; *abhí* ‘towards’); *antiká-* ‘close to, near; vicinity’ (n.; *ánti* ‘before, near’)

Substantives from substantives

- (5) Concrete substantives in *-ka-* derived from animate concrete substantives (m./f.); forms with plausible contextual diminutive meaning = **bold**

Derivative	Meaning	Base	
-jihvi-kā f.	‘little tongue’	<i>jihvā</i> f.	‘tongue’
? <i>trī-kadru-ka-</i> (m.pl.)	‘three <i>Kadrū</i> vessels’	<i>kadrū</i> f.	soma vessel
jyā-kā f.	‘little bowstring’	<i>jyā</i> f.	‘bowstring’
<i>sūcī-ka-</i> m.	some kind of worm (?)	<i>sūcī</i> f.	‘needle’
<i>urvāru-kā-</i> n.	squash	<i>urvārū-</i> , <i>-ū-</i> (AV)	‘cucumber; squash’
<i>ānta-ka-</i>	PN (m.)	<i>ānta-</i> m.	‘end’
<i>avi-kā-</i> m., <i>-kā</i> f.	‘sheep’ m.; ‘ewe’ f.	<i>āvi-</i> m./f.	‘sheep’
kumāra-kā- m.	‘little boy’	<i>kumārā-</i> m.	‘boy’
<i>kuṣumbha-kā-</i> m.	type of insect	<i>kuṣumbha-</i> m. (AV)	insect poison (?)
marya-kā- m.	‘little man’	<i>mārya-</i> m.	‘man, mortal’
pāda-kā- m.	‘little foot’	<i>pāda-</i> m.	‘foot’

Substantives from substantives

- (6) Concrete substantives in -ka- derived from animate concrete substantives (m./f.)
cont'd

Derivative	Meaning	Base	
putra-ká- m.	‘little son, sonny’	<i>putrá-</i> m.	‘son’
rāja-ká- m.	‘little king, kinglet’	<i>rājan-</i> m.	‘king’
<i>śāṇḍi-ka-</i> m.	descendant of Śāṇḍa	<i>śāṇḍa-</i> m.	PN
<i>sóma-ka-</i> m.	PN	<i>sóma-</i> m.	Soma
déva-ka- m.	‘(little) god’	<i>devá-</i> m.	‘divine; god’
ulūkhala-ka- m.	‘little mortar’	<i>ulūkhala-</i> m.	‘mortar’
usri-ká- m.	‘little bull’	<i>usrá-</i> m. (* <i>usrí-</i> ?)	‘bull’
vamra-ká- m.	‘little ant’ (PN)	<i>vamrá-</i> m.	‘ant’
<i>nāsi-kā-</i> f.	‘nostril; nose’ (Du.)	<i>nās-</i> f.	‘nose’ (Du.)
vīra-ká- m.	‘little hero’	<i>vīrá-</i> m.	‘hero’
<i>arma-ká-</i> n.	‘rubbish, ruins’	<i>árma</i> (m.pl.?) (VS, TS)	‘rubbish, ruins’
<i>kaśikā-</i> f.	‘weasel; small animal’	<i>kaśa-</i> m., <i>kásā-</i> f.	‘small animal’

- One instance of a ka-derivative from a n. mass noun: *uda-ká-* n. ‘(amount of) water’ ← *udá(n)-* n. ‘water’; synchronically suppletive to *udá(n)-* (in the nom-acc.)

Digression on the derivational base

A few cases that suggest the well-known “replacement” pattern $-a/-\bar{a} \rightarrow -i-$ (PIE $*-o-/*-eh_2- \rightarrow *-i-$ (Schindler 1980; Nussbaum 1999; Fellner and Grestenberger 2016; Grestenberger 2017, 2021) was at play in these formations:

- ▶ *śītá-* ‘cold’ \rightarrow *śīta-ka-*, f. *śīti-kā-* ‘cool’
- ▶ *jihvā-* f. ‘tongue’ \rightarrow *jīhvi-kā* f. ‘little tongue’ (in *upa-jīhvikā-* f. ‘termite’, RV 8.102.21a)
- ▶ *sámana-* ‘together; meeting’ (n.) \rightarrow *samanī-ká-* n. ‘competition, fight’
- ▶ *śāṇḍa-* m. PN \rightarrow *śāṇḍi-ka-* m. descendant of Śāṇḍa
- ▶ *usrá-* m. ‘bull’ \rightarrow *usri-ká-* m. ‘little bull’ (*usríya-* ‘reddish’; ‘cow-ish’)
- ▶ *kaśa-* m., *kásā-* f. ‘small animal’ \rightarrow *kaśī-kā-* f. ‘weasel; small animal’

Adjectives from pronouns

- (7) Rigvedic *ka*-stems from personal, demonstrative, and relative pronouns

Derivative	Meaning	Base	
<i>sa-ká-</i>	‘that (pej.)’	<i>sá-</i>	dem. pron., ‘that’
<i>ta-ká-</i>	‘that (pej.)’	<i>tá-</i>	dem. pron., ‘that’
<i>ya-ká-</i>	‘which’	<i>yá-</i>	rel. pron.
<i>máma-ka-</i> , <i>māma-ká-</i> a.	‘my’	<i>máma</i> (gen.); <i>ahám</i>	1sg. pron.
<i>asmā-ka-</i> a.	‘our’	<i>asma(n)-</i>	1pl. pron.
<i>tāva-ká-</i> a.	‘your’ (sg.)	<i>táva</i> (gen.); <i>tav-</i>	2sg. pron.
<i>yuṣmā-ka-</i> a.	‘your’ (pl.)	<i>yuṣmā(n)-</i>	2pl. pron.

Other

A few additional forms (listed as “other” in (2)) seem to form possessive or other “relational” adjectives from substantives:

(8) possessive/relational -ka-forms (?)

Derivative	Meaning	Base
<i>pāvaká-</i> (metr. <i>*pavāká-</i>) a.	‘bright, clear’	<i>pāvá-</i> a.; <i>pavā́</i> f. ‘brightness’?
<i>vailasthāna-ká-</i> a.	‘situated in a hole’*	<i>vailasthāná-</i> n. ‘hole, hiding place’
<i>viṣpuliṅga-ká-</i> a.	‘(having?) little sparks’	<i>viṣphulíṅga-</i> m. ‘sparks’

*RV 1.133.3c; Jamison and Brereton 2014: ‘Place of Hostility’, place name.

Discussion

- ▶ Taken together, -ka- mostly forms *adjectival* derivatives — like all adjectives, these can be substantivized without an overt derivational morpheme.
- ▶ The derivation of animate *substantives* (from nominal bases) could therefore be a secondary extension of the function of -ka- based on such substantivizations.
- ▶ Among the Rigvedic substantives, there are only a few that show contextual diminutive meaning (attenuative, pejorative, ‘small’, etc.) — about 12 in Tables (5)–(6)
- ▶ Additionally, there are a few adjectives in Table (4) that could be interpreted as having diminutive meaning (attenuative, ‘-ish’), but most of the adjectives in this class are semantically indistinguishable from their base (= pleonastic use of -ka-).
- ▶ The diminutive use is moreover contextually restricted and only occurs in a few passages, where it is often pejorative-contrastive, as in (9)–(10).
- ▶ Jamison (2009) argues that this use is highly register-specific and typical of vernacular registers; that is, it is used in these passages to mark vernacular, non-standard speech.

Rigvedic diminutive -ka-

- (9) *citra* *íd* *rājā* *rāja-**kā*** *íd* *anya-**ké***
 Citra.NOM EMPH König.NOM König-DIM.NOM.PL EMPH andere-DIM.NOM.PL
*ya-**ké*** *sārasvatīm* *ānu*
 REL-DIM.NOM.PL Sarasvatī.AKK entlang

“Citra is the only king; the other petty little ones who (live) along the Sarasvatī are only kinglets” (RV 8.21.18; transl. Jamison & Brereton 2014)

Rigvedic diminutive -ka-

- (10) *iyatta-káḥ* *kuṣumbha-kás* *ta-ká-m* *bhinad-mi*
 so.little-DIM.NOM.SG bug-DIM.NOM.SG that-DIM-ACC.SG split.PRS-1SG.ACT
áśmanā
 rock.INSTR
 “Such a little teeny kuṣumbha-bug – I split that itty bitty thing with a rock.”
 (RV 1.191.15a-b; transl. Jamison & Brereton 2014)

Summary

- ▶ The majority of synchronically transparent *ka*-derivatives with identifiable bases are adjectives (and adjectival substantivizations)
- ▶ Diminutive meaning is contextually restricted and associated with passages that characterize vernacular speech
- ▶ -*ka*- usually does not change the category (adj. vs. substantive) or gender of the derivational base.

-ka- in Avestan

The lack of diminutive meaning of -ka- is even more conspicuous in Avestan:

- (11) AV: 34 *ka*-forms with identifiable bases (+ 38 with unclear/onomatopoetic bases)

Derivative	Base	# of forms	%
verbal adjective	✓	11	32%
(attenuative) adj.	adj.	6	18%
m./f. substantive	m./f. subst.	10	29%
adj.	pron.	2	6%
possessive/relational adj.	m./f./n. subst.	5	15%
Total		34	

Verbal adjectives

(12) Root-/verbal stem-derived -ka-adjective (& their substantivizations)

Derivative	Meaning	√/Verb	
YAv. <i>aini-ka-</i> m.	‘face’	<i>an</i>	‘breathe’
YAv. <i>ə-uuərəz-ika-</i>	‘not working, lazy’	<i>varz</i>	‘work’
YAv. <i>pac-ika-</i>	‘cooking’	<i>pak/pac</i>	‘cook’
OAv. <i>maržd-ika-</i>	‘gracious; grace (n.)’	<i>mərəžd</i>	‘be gracious’
OAv. <i>mərəžd-ika-</i>	‘gracious; grace (n.)’	<i>mərəžd</i>	‘be gracious’
YAv. ⁺ <i>vid-aka-</i>	‘finding’	<i>vaēd</i>	‘find’
YAv. <i>rap-aka-</i>	‘supporting’	<i>rap</i>	‘support’
YAv. <i>sao-ka-</i> n., <i>-kā-</i> f.	‘use, benefit’	<i>sū, sao</i>	‘increase, prosper’ (?)
YAv. <i>huš-ka-</i>	‘dry; dry land’ (n.)	<i>haoš</i>	‘dry (out)’
YAv. <i>zina-ka-</i>	‘damaging’ (?)	<i>zīnā-</i> (?)	‘damage’
YAv. <i>apa.xraosa-ka-</i>	‘quarrelsome’	<i>xraos</i> ‘yell’ / * <i>apa.xraosa-</i> m. ‘yelling’	

Attenuative adjectives

- (13) Attenuative or pleonastic -ka-adjectives (& their substantivizations) from adjectival bases

Derivative (all YAv.)	Meaning	Base	
<i>a-pərənāiiǐ-ka-</i>	‘minor; child’ (m.)	<i>a-pərənāiii-</i>	‘young, minor’
<i>a-nāma-ka-</i>	‘nameless’	* <i>a-nāman-</i>	‘nameless’
<i>kasuu-ika-</i>	‘(very) small’	<i>kasu-</i>	‘small’
<i>mūra-ka-</i> m.	name of a daeva	? <i>mūra-</i>	‘dumb’
<i>siiāma-ka-</i> m.	name of a mountain	* <i>siiāma-</i>	‘dark’
<i>hum-aiia-ka-</i> m.	PN	<i>hu-māiiiā-, -maiia-</i>	‘blessed’

Attenuative adjectives

- ▶ Once again excluded are forms that were derived from directional adjectives in -*āk*- from (13), namely: ⁺*paitika*- ‘opposite, across’ (*paityank*-, *paitik*-) ‘against, towards’); *paraka*- ‘far away, distant’ (*parānk*-, *parāk*- ‘turned away’); *fraka*- ‘turned towards, forward’ (*frānk*- ‘turned forward’), *haθrā-ka*- ‘united in one place’ (*haθrānk*- ‘united in one place’).

Substantives from substantives

(14) (m./f.) substantives in -ka- from animate concrete substantives (m./f.)

Derivative	Meaning	Base	
YAv. <i>carāiti-kā-</i> f.	‘young woman’	<i>carāiti-</i> f.	‘young woman; wife’
YAv. <i>kaini-kā-</i> f.	‘girl’	<i>kainiiā-</i> , <i>kaini-</i> f.	‘young girl’
YAv. <i>nāiri-kā-</i> f.	‘(house)wife’	<i>nāirī-</i> f.	‘wife’
YAv. <i>jahi-kā-</i> f.	‘bad woman’	<i>jahi-</i> f.	‘bad woman’
YAv. <i>arša-ka-</i> m.	PN	<i>aršan-</i> m.	‘male, man’*
OAv. <i>daiti-ka-</i>	‘wild animal’	* <i>da(n)t-</i> m. (?)	‘tooth’
YAv. <i>daha-ka-</i> m.	a daeva	* <i>daha-</i> m.	‘enemy, demon’
YAv. <i>mašiiā-ka-</i> m.	‘human’	<i>mašiiā-</i> m.	‘mortal; human’
YAv. <i>zəma-ka-</i> m.	‘winter storm’	<i>ziām-</i> m.	‘winter’
YAv. <i>vauuža-ka-</i> m.	a daevic animal	?* <i>vauuža-</i> m.	‘wasp’

*Cf. Mayrhofer (1977: 17) against **arša-* m. ‘bear’.

Adjectives from pronouns

(15) *ka*-adjectives derived from pronouns

Derivative	Meaning	Base	
OAv. <i>ahmā-ka-</i>	‘our’ (adj.)	<i>ahma-</i>	1pl pron.
OAv. <i>yūšmā-ka-</i> , <i>xšmā-ka-</i>	‘your’ (pl.; adj.)	<i>yūšma-</i> , <i>xšma-</i>	2pl pron.

Relational/possessive adjectives

Interestingly, Avestan & Old Persian have more and better examples of $N \rightarrow A$ with relational/possessive meaning:

(16) Possessive/relational adjectives (& their substantivizations)

Derivative	Meaning	Base	
YAv. <i>pūiti-ka-</i>	‘purifying’ (a.)	* <i>pūiti-</i> f.	‘purification’
YAv. <i>spa-ka-</i>	‘dog-like’	<i>spa(n)-</i> m.	‘dog’
YAv. <i>ni-uuaia-ka-</i> (m.)	‘fearsome (one)’	* <i>ni-uuaia-</i> m.	‘fear, terror’ (?)
YAv. <i>ni-pašna-ka-</i>	‘envious’	* <i>ni-pašna-</i>	‘envy’ (?)
OAv. <i>pasu-ka-</i> m.	‘domesticated animal’	<i>pasu-</i> m.	‘livestock’ (coll.); ‘domesticated animal’

- ▶ OP *vazar-ka-* ‘great, big’ ← **vazar-* ‘greatness’ (instr. sg. *vašnā* ‘by the grace (of)’)
- ▶ OP *ārštika-* ‘spearman’, *huv-ārštika-* ‘good spearman’ ← *aršti-* ‘spear’
- ▶ Maybe also OP *ba(ṇ)da-ka-* ‘subject’ < *‘bound’; ‘with bands’ ← *baṇda-* m. ‘band, fetter’ (or *baṇd-* ‘bind’?)

Relational adjectives

Context shows that these are indeed relational, not diminutive, e.g.:

- (17) *baēuuarə* *ažingm* *udarō-θraśanqm*
 ten.thousand.N snake.GEN.PL belly-crawling.GEN.PL
ava-janiiāt *baēuuarə* *ažingm* ***spa-ka-nqm***
 down-strike.OPT.3SG.ACT ten.thousand.N snake.GEN.PL dog-like-GEN.PL
kahrpunanqm *ava-janiiāt*
 K.GEN.PL down-strike.OPT.3SG.ACT
 “Let him strike down ten thousand belly-crawling snakes, let him strike down
 ten thousand **dog-like** *Kahrpuna*-snakes” (V.14.5)

Cf. Hdt. 1.110.1:

τῷ οὔνομα ἦν Μιτραδάτης, συνοίκεε δὲ ἑωυτοῦ συνδούλῃ, οὔνομα δὲ τῇ γυναικὶ ἦν τῇ συνοίκεε
 Κυνῶ κατὰ τὴν Ἑλλήνων γλῶσσαν, κατὰ δὲ τὴν Μηδικὴν **Σπακῶ**: τὴν γὰρ κύνᾱ καλέουσι
σπάκα Μῆδοι.

“His name was Mitrdates and he lived in wedlock with his co-slave, and the name of the
 woman he lived with was Kyno in the language of the Greeks, but Spako in the language of
 the Medes, for the Medes say ‘spaka’ for ‘dog’.”

Relational adjectives

- (18) *azəm yō* *ahurō* *mazdā* *tā* *haθra*
 I.NOM who.NOM.SG Ahura.NOM Mazda.NOM DEM.PRON.ACC.PL.N together
fra-frāuuaiiāmi *auui zraiiō* ***pūitikəm***
 PRVB-flow.CAUS.PRS.1SG.ACT to sea.ACC purifying.ACC
 “I, Ahura Mazda, make these flow together to the Pūitika-/purifying sea.”
 (V. 5.18)

Discussion

- ▶ The Avestan nominal system is often more archaic than the Vedic one, so it is not implausible that Avestan would have preserved remnants of the older uses of *-ka-*.
- ▶ Caveat: This is a preliminary evaluation of the material in Bartholomae (1904) & Edgerton (1911c); a more detailed analysis will undoubtedly excavate a few more transparent/etymologizable examples.
- ▶ As always in Avestan, the contexts are often difficult to interpret, so diminutive meaning cannot be completely excluded based on this survey of forms.
- ▶ Evidence from personal names? *-(v)ka-* not too common in Avestan, but this could again be due to register — *-uka-* is more common in Old Persian personal names, and generally in women's names (Mayrhofer 1973; Remmer 2006: 199–200); Bactrian hypocoristics (*-xo*, *-yo*; Sims-Williams 2010: 11), e.g., *φρουαχο* < **friya-* 'dear, friend', etc.
 - ▶ But both appurtenance and diminutive morphology is associated with hypocoristic use cross-linguistically, so either way this wouldn't be too surprising.

-ka- in Middle Indic and Middle Iranian

- ▶ The Middle Indic (Pāli, Prakrits ...) and Middle Iranian (Middle Persian, Khotanese, Sogdian, Bactrian...) languages have treated -ka- and the suffix variants -(a/i/u)ka- in a remarkably parallel fashion
- ▶ These suffixes were generalized especially to masculine and neuter nominal stems and turned into an all-purpose nominal stem-forming suffix or *nominalizer* (abbreviated *n*), usually without any discernible semantic difference to the base (in those case where it still exists synchronically).

-ka- in Middle Indic/Prakrit

- ▶ -ka-, -ga-, -(y)a- becomes a semantically bleached all-purpose suffix (Pischel 1900: 95, 405)
- ▶ No (discernible) difference to the base: *bahu* ‘much, many’ & *bahu-ka* ‘much, many’, *nāti*- & *nāti-ka*- ‘relatives’, etc. — regional/dialectal variation, cf. (20).
- ▶ -ika-/ -iya- vs. -aka- vs. -uka-, e.g., *viṃc(h)ua*- < *-uka- vs. *viṃchia*- < *-ika- (Skt. *vṛśc-ika*- ‘scorpion’); *macciya*- < **martyika*- vs. *martyaka*- ‘mortal, man’ (AiG II,2: 310)
- ▶ “Hyperpleonastic” forms, e.g., *bahuaya*- ‘much, many’ as if < **bahu-ka-ka-*

(19) Variation in the use of -ka- in the Aśoka-edicts, Jamison (2009: 316)

Eṛṇaguḍi	jane ba[hu] ...	aṃbakaja[nikā] ba[hu]
Kalsi	jane bahu	abakajani[yo] bahu
Mansehra	jane] bahu	abakajanika bahu
Shazbazgarhi	jano ba	striyaka bahu
Sopārā	jane bahū	aṃbakajanik[ā] bahū
Girnar	jano ucāvacam ...	mahidāyo bahukam
Dhauḷi	j[a]ne bahukam	ithi b[ahuka]m
Jaugada	jane [ba]hu[ka]m ...	

“Menfolk (perform) many (ceremonies), womenfolk ... many ...”

-ka- in Middle Iranian

The same is basically the case in Middle Iranian:

- (20)
- a. Sogdian: *pāδ* ‘foot’ & *pāδ-ē* ‘foot’ < **pāda-ka-* (e.g., Gershevitch 1954: 144–52; Sims-Williams 1989b)
 - b. Bactrian: *αγγαργο* ‘possessions’ < **ham-kāra-ka-*, *βαργο* ‘riding animal’ < **bāra-ka-*; *κασοχο* ‘small’ < **kasu-ka-*, etc. (Sims-Williams 1989a, Gholami 2009)
 - c. Parthian: *nw’g* /*nawāg*/ ‘new’ < **nawāka-*
 - d. Manichean MP: *mwrđ*, pl. *mwrđ’n* /*murdān*/ ‘the dead’ & *mwrđg* /*murdag*/ ‘dead’ < **mṛta-ka-*; *byš’z* /*bēšāz*/ & *byš’z’g* /*bēšāzāg*/ ‘doctor, healer’ < **bišazāka-* (also productive deverbal agent noun suffix)

- ▶ In the Middle Iranian languages, the sequence *-a-k(a/i/ō)-* was moreover contracted to **-ai* in the nominative (e.g., Khot. *-ai*) and further to *-ē*; acc. **-aku* > **-a’u* > *-ō*, cf. Sogdian, (21).

- ▶ Though the suffix also survives as *-(a)k-*, apparently restored
- ▶ This gave rise to different declension classes → reanalysis of nominal stem-forming morphology as nominal inflectional morphology

Reanalysis & directionality

Which direction of change should we expect for the reflexes of **-ka-*?

- ▶ Change in/reanalysis of *synthetic* word forms and affixes such as *-ka-* (e.g., the change of nominalizers into verbalizers, denominal adjectives > deverbal adjectives, participles, etc.) is understudied from a theoretical perspective and not discussed in the traditional grammaticalization literature (e.g., Hopper & Traugott 2003)
- ▶ The literature on morphological **reanalysis** and **resegmentation** does discuss these types of changes (e.g., Haspelmath 1995, Rainer 2015), but unlike in grammaticalization, changes in affixes are usually not expected (or predicted to be unidirectional)
 - ▶ And this is also the case in formal/“morphology-as-syntax” approaches: Diertani 2011 argues explicitly against unidirectionality in morphological reanalysis, Mathieu 2012 implicitly. Explicitly *for* assuming unidirectionality: Grestenberger 2023

Reanalysis & directionality

- ▶ Grammaticalization processes & syntactic change, on the other hand, are usually treated as *unidirectional*.
 - ▶ Especially in generative approaches, e.g., van Gelderen 2004, 2009, 2013; Breitbarth 2017, Biberauer 2019, Biberauer & Roberts 2017.
- ▶ Occam's razor: assuming unidirectionality makes stronger & falsifiable predictions and should therefore be preferred.

Assumptions:

- ▶ Changes in categorizing/derivational morphology are unidirectional, parallel to syntactic changes.
- ▶ This directionality moreover follows from the same underlying principles as in syntactic change
 - ▶ In “syntactico-centric” approaches to morphological (Distributed Morphology, Nanosyntax, Exoskeletal...), this actually follows from the assumption that morphology maps to syntactic structure
- ▶ Change occurs when children arrive at a different form-to-meaning mapping during L1-acquisition than the previous/input generation
 - FWF V 850-G “Verbal categories and categorizers in diachrony” (<https://lauragrestenberger.com/categorizers-in-diachrony>)

-ka- and unidirectionality

- ▶ The grammaticalization path CHILD > SMALL > DIM (Jurafsky 1996, Kuteva et al. 2019) does not adequately describe the development of Indo-Ir. *-ka-*:
 - ▶ *-ka-* never meant ‘child’ (as far back as we can reconstruct) and is not particularly often found on nouns that mean ‘child’ (or young animals, etc.)
 - ▶ it does not explain the inherited denominal adjective-forming function, most clearly seen in the variant **-i-ko-*; (21) & Fortson (2010: 135)
 - ▶ Nor the root-derived verbal adjectives in IIr., which Jurafsky doesn’t address at all.
 - ▶ There are too many nominal derivatives that cannot easily be explained as (former) diminutives

- (21) Latin adjectives of appurtenance in **-i-ko-* (Weiss 2020: 313–5)
- a. *bellicus* ‘bellicose, war-mongering’ : *bellum* ‘war’
 - b. *publicus/pūblicus* ‘(belonging to the) public’ : *populus* ‘people, public’
 - c. *Gallicus* ‘Gallic’ : *Gallia* ‘Gaul’
 - d. *modicus* ‘moderate, measured’ : *modus* ‘measure’

-ka- and unidirectionality

Classical Sanskrit adjectives/substantives of appurtenance in -ika- (AiG II,2: 308ff.; Lühr 2008: 218) — *vrddhi* seems to be a post-Vedic innovation.

- (22)
- a. *pántha-* ‘path’ — *páthi-ka-* ‘wanderer’
 - b. *akṣá-* ‘dice’ — *ākṣ-iká-* ‘dice-player’
 - c. *mṛgá-* ‘wild animals, deer’ - *mārg-iká-* ‘hunter’
 - d. *rátha-* ‘chariot’ — *ráth-ika-* ‘riding on a chariot’

Ancient Greek adjectives of appurtenance in -ικός (Schwyzer 1939: 497; no Myc. examples):

- (23)
- a. Ἀχαιικός ‘Achaean’
 - b. Τρωικός ‘Trojan’
 - c. ἵππικός ‘of a horse, horse-related’

-ka- and unidirectionality

- ▶ Reanalysis of *-i-stem bases, e.g., **hosti-ko-* ‘of/related to the enemy’ → *host-icus* (Weiss 2020: 315, fn. 150)
- ▶ Cf. Ved. *usri-ká-* (*usrá-* ‘red(ish)’; ‘bull’), *śīti-kā-* (*śītá-* ‘cold’) — originally via **i*-abstracts **usrí-* ‘redness’, *śītí-* ‘cold’?
- ▶ With subsequent reanalysis as deverbal/root-derived in contexts with ambiguous segmentation:
 - ▶ **hlādi-ká-* ‘related to/with freshness’ → **hlād-iká-* ‘refreshing’
 - ▶ **muhu-ká-* ‘related to/of something sudden’ (RV 4.20.9 *mūhu* adv. ‘suddenly’) → *muh-uká-* ‘startling, in an instant’
 - ▶ **[suš-]_N-ka-* (Av. *huška-*, Gk. αῦω ‘to dry’, Lith. *saūšas*, etc.) ‘of/with dryness’ (root noun, cf. Skt. *parṇa-suš-* ‘leaves-drying’ → **suš-ka-* ‘dry’ (» Ved. *śúṣ-ka-*))

Crucially, diminutive meaning is impossible as a starting point for these reanalyses/resegmentations - both morphologically and semantically.

-ka- and unidirectionality

An alternative grammaticalization path:

(24) Partitive/“genitival” > diminutive > nominalizer > inflectional morpheme

- ▶ on “genitival” cf. Nussbaum 2009; adjectives of appurtenance as in (23).
 - ▶ Original function of **-ko-* in PIE: relational adjectives/adjectives of appurtenance from (concrete/abstract) substantives
 - ▶ Note that this also explains why **-ko-* plays practically no role in the Caland system - Caland adjectives are primary adjectives, whereas **-ko-* originally only formed relational/“secondary” adjectives.
 - ▶ Substantival function = secondary via substantivizations of *ko*-adjectives (probably already in PIE)
- Original function of *(*)-ka-* in Indo-Iranian: forming contextually salient partitions from the denotation of the base; creating countable atoms.
- ▶ No change of category of the base

Semantics of *-ka-*

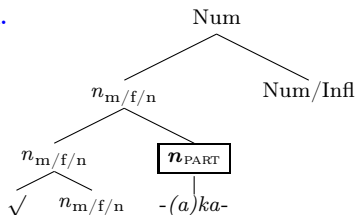
Semantics of *ka-*derivatives (in IIr.):

- ▶ Base = mass noun or collective: singulative (Nurmio Forthcoming; Dali and Mathieu 2021) with a KIND or UNIT reading
 - ▶ Ved. *uda-ká-* ‘water’; Av. *pasu-ka-* ‘domesticated animal’
- ▶ Base = animate count noun: only the KIND-reading is available; “type of x”/“kind of x” > attentuative/**diminutive** meaning (a kind of x is not an x).
 - ▶ Ved. *jyā-kā-* ‘a type of bowstring’; *rāja-ká-* ‘a type of king’
- ▶ Base = adjective: *-ka-* expresses the *degree* to which the property expressed by the adjectival base characterizes the modified entity.
 - ▶ e.g., *arbha-ká-* express the degree to which something is *árbha-* ‘small’, etc. → attentuative meaning
- ▶ With animate substantives and with adjectives, the “type of”- and gradation-reading could develop attentuative or pejorative readings (depending on the context) via pragmatic implicature → **diminutives**; this meaning was also canonized for *-ka-* in the Classical Sanskrit of Pāṇini.
 - ▶ Cf. the examples in Nussbaum (2009), e.g., Old Latin *serv-os* ‘Sklave’ : *servo-lu-s* ‘a slave not worth very much; a young slave’
- ▶ Further developments: The $n_{\text{PART}/\text{DIM}}$ -modifier then developed into a categorial head on the way to Middle Indic and Middle Iranian, (25b), and eventually into nominal inflectional morphology in East Middle Iranian, (25c).

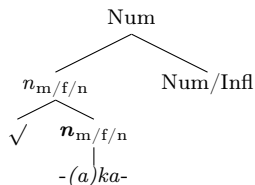
Summary: reanalysis of *-ka-*

(25)

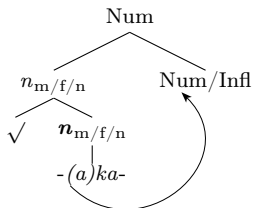
a.



→ b.



→ c.



Conclusion

- ▶ The grammaticalization path proposed here (partitive/genitival (> diminutive) > *n* > INFL) preserves the unidirectionality hypothesis of grammatical change, which is also a core tenet of Jurafsky (1996).
- ▶ It does not invalidate the cross-linguistically common path CHILD > DIMINUTIVE — different paths for diminutives (as for other grammatical markers, e.g., passives, middle markers)
 - ▶ And recall there may also be evidence for CHILD > PARTITIVE, so maybe here too we're actually dealing with CHILD > PARTITIVE > DIMINUTIVE
- ▶ It can account for the (inherited) (de)verbal adjective-forming function of *-ka-* (reanalysis *n*-derived → $\sqrt{\text{ }}$ -derived), which is difficult to derive from an original attentuative/diminutive function

Final disclaimer: the analysis proposed here is in no way intended as an argument against the observation that the use of diminutive morphology is often pragmatically marked and register-specific, or perceived as vernacular or non-standard (for *-ka-* cf. Jamison 2009). In this approach, this actually follows from the pragmatic implicature “type of *x*”/“not *x*” → “less than *X*”)

Thank you!



FWF V850-G “The diachrony of verbal categories and categorizers”

References I

- AiG II,2 = Debrunner, Albert. 1954. *Altindische Grammatik*, volume II,2: Die Nominalsuffixe. Göttingen: Vandenhoeck & Ruprecht.
- Bartholomae, Christian. 1904. *Altiranisches Wörterbuch*. Strassburg: Karl J. Trübner.
- Biberauer, Theresa. 2019. Children always go beyond the input: The Maximise Minimal Means perspective. *Theoretical Linguistics* 45(3-4):211–224.
- Biberauer, Theresa, and Ian Roberts. 2017. Parameter setting. In *The Cambridge handbook of historical syntax*, ed. A. Ledgeway and I. Roberts, 134–162. Cambridge: Cambridge University Press.
- Breitbarth, Anne. 2017. Jespersen's Cycle = Minimize Structure + Feature Economy. In *Studies on negation: Syntax, semantics, and variation*, 21–47. Göttingen: Vandenhoeck & Ruprecht / University of Vienna Press.
- Brugmann, Karl. 1892. *Grundriss der vergleichenden Grammatik der indogermanischen Sprachen*. 2. Band: Wortbildungslehre (Stammbildungs- und Flexionslehre). Strassburg: Trübner.
- Dali, Myriam, and Éric Mathieu. 2021. Historical changes in sub-word formation: The case of Arabic *-a(t)*. *Journal of Historical Syntax* 5:1–34.
<https://doi.org/10.18148/hs/2021.v5i16-25.61>.
- Diertani, Chaya Eliana Ariel. 2011. Morpheme boundaries and structural change: Affixes running amok. Doctoral Dissertation, University of Pennsylvania, Philadelphia, PA.
- Edgerton, Franklin. 1911a. The K-suffixes of Indo-Iranian. Part I: The K-suffixes in the Veda and Avesta. *Journal of the American Oriental Society* 31(2):93–150.
- Edgerton, Franklin. 1911b. The K-suffixes of Indo-Iranian. Part I: The K-suffixes in the Veda and Avesta. *Journal of the American Oriental Society* 31(3):296–342.
- Edgerton, Franklin. 1911c. *The k-suffixes of Indo-Iranian, Part I: The k-suffixes in the Veda and Avesta*. Leipzig: Drugulin.

References II

- Fellner, Hannes A., and Laura Grestenberger. 2016. Greek and Latin verbal governing compounds in *-ā- and their prehistory. In *Etymology and the European Lexicon. Proceedings of the 14th Fachtagung der Indogermanischen Gesellschaft, 17–22 September 2012, Copenhagen*, ed. B. S. S. Hansen, B. Nielsen Whitehead, T. Olander, and B. A. Olsen, 135–150. Wiesbaden: Reichert.
- Fortson, Benjamin W. IV. 2010. *Indo-European Language and Culture: an Introduction*. Blackwell, 2 edition.
- van Gelderen, Elly. 2004. *Grammaticalization as economy*. Amsterdam: John Benjamins.
- van Gelderen, Elly, ed. 2009. *Cyclical change*. Amsterdam: John Benjamins.
- van Gelderen, Elly. 2013. The linguistic cycle and the language faculty. *Language and Linguistics Compass* 7/4:233–50.
- Gershevitch, Ilya. 1954. *A grammar of Manichaean Sogdian*. Oxford: Blackwell.
- Gholami, Saloumeh. 2009. Selected features of Bactrian grammar. Doctoral Dissertation, Georg-August-Universität Göttingen.
- Grestenberger, Laura. 2017. On “*i*-substantivizations” in Vedic compounds. In *Usque ad radices: Indo-European studies in honour of Birgit Anette Olsen*, ed. B. S. S. Hansen, A. Hyllested, A. R. Jørgensen, G. Kroonen J. H. Larsson, B. Nielsen Whitehead, Th. Olander, and T. M. Søbørg, 193–206. Copenhagen: Museum Tusculanum.
- Grestenberger, Laura. 2021. The *in*-group: Indo-Iranian *in*-stems and their Indo-European relatives. In *Lyuke wmer ra.in lyuke wmer ra: Indo-European Studies in Honor of Georges-Jean Pinault*, ed. Hannes A. Fellner, Melanie Malzahn, and Michaël Peyrot, 164–182. Ann Arbor: Beech Stave.
- Grestenberger, Laura. 2023. The diachrony of verbalizers in Indo-European: Where does *v* come from? *Journal of Historical Syntax*.
- Haspelmath, Martin. 1995. The growth of affixes in morphological reanalysis. In *Yearbook of Morphology 1994*, ed. Geert Booij and Jaap van Marle, 1–29. Dordrecht: Kluwer.

References III

- Hopper, Paul J., and Elizabeth Closs Traugott. 2003. *Grammaticalization*. Cambridge University Press, 2nd edition.
- Jamison, Stephanie W. 2009. Sociolinguistic remarks on the Indo-Iranian *-ka-suffix: A marker of colloquial register. *Indo-Iranian Journal* 52:311–329.
- Jamison, Stephanie W., and Joel P. Brereton. 2014. *The Rigveda: The Earliest Religious Poetry of India, vol. I-III*. Oxford University Press.
- Jurafsky, Daniel. 1996. Universal tendencies in the semantics of the diminutive. *Language* 72:533–578.
- Kuteva, Tania, Bernd Heine, Bo Hong, Haiping Long, Heiko Narrog, and Seongha Rhee. 2019. *World lexicon of grammaticalization*. Cambridge: Cambridge University Press, 2 edition.
- Lühr, Rosemarie, ed. 2008. *Nominale Wortbildung des Indogermanischen in Grundzügen. Band II: Hethitisch, Altindisch, Altarmenisch, bearbeitet von Joachim Matzinger*. Hamburg: Kováč.
- Mathieu, Éric. 2012. Flavors of division. *Linguistic Inquiry* 43:650–679.
- Mayrhofer, Manfred. 1973. *Onomastica Persopolitana: Das altiranische Namengut der Persepolis-Täfelchen*. Wien: Verlag der Österreichischen Akademie der Wissenschaften.
- Mayrhofer, Manfred. 1977. *Zum Namengut des Avesta*. Wien: Verlag der Österreichischen Akademie der Wissenschaften.
- Nurmio, Silva. Forthcoming. Towards a typology of singulatives: definition and overview of markers. Ms.
- Nussbaum, Alan. 2009. So how's the little woman? Genitivals, diminutives, and PIE **g^wénh₂* etc. Paper presented at the GSAS Workshop on Indo-European Linguistics (Harvard University).
- Nussbaum, Alan J. 1999. **Jocidus*: An account of the Latin adjectives in *-idus*. In *Compositiones Indogermanicae: In Memoriam Jochem Schindler*, ed. H. Eichner/ H.C. Luschützky. Prague: Enigma.
- Pischel, Richard. 1900. *Grammatik der Prākrit-Sprachen*. Strassburg: Trübner.

References IV

- Rainer, Franz. 2015. Mechanisms and motives of change in word-formation. In *Word-formation. An international handbook of the languages of Europe, vol. 3.*, ed. Peter O. Müller, Ingeborg Ohnheiser, Susan Olsen, and Franz Rainer, Handbücher zur Sprach- und Kommunikationswissenschaft 40/3, 1761–1780. Berlin: de Gruyter.
- Remmer, Ulla. 2006. *Frauennamen im Rigveda und im Avesta. Studien zur Onomastik des ältesten Indischen und Iranischen*. Wien: Österreichische Akademie der Wissenschaften.
- Schindler, Jochem. 1980. Zur Herkunft der altindischen *cvi*-Bildungen. In *Lautgeschichte und Etymologie. Akten der V. Fachtagung der indogermanischen Gesellschaft*, ed. M. Mayrhofer, M. Peters, and O.E. Pfeiffer, 386–393. Wiesbaden: Reichert.
- Schwyzer, Eduard. 1939. *Griechische Grammatik*, volume I. München: Beck.
- Sims-Williams, Nicholas. 2010. *Bactrian personal names*. Iranisches Personennamenbuch vol. II,7. Wien: Verlag der Österreichischen Akademie der Wissenschaften.
- Sims-Williams, Nicolas. 1989a. Bactrian. In *Compendium Linguarum Iranicarum*, ed. Rüdiger Schmitt, 230–235. Wiesbaden: Reichert.
- Sims-Williams, Nicolas. 1989b. Sogdian. In *Compendium Linguarum Iranicarum*, ed. Rüdiger Schmitt, 173–192. Wiesbaden: Reichert.
- Weiss, Michael. 2020. *Outline of the historical and comparative grammar of Latin*. Ann Arbor: Beech Stave, 2 edition.