

Dispensing with zero in the analysis of Sanskrit bahuvrīhi: Resurfacing, testing and assessing Pāṇini's model*

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ABSTRACT

In modern linguistics it is common to analyse bahuvrīhis as derived from an endocentric compound to which a zero suffix applies (Whitney 1889:501-502; Kiparsky 1982a:139; Gillon 2008:2-3). All these descriptions owe something to the systematization handed down to us by the later pāṇinian tradition. By contrast, the present contribution highlights how, despite his extensive use of zero devices, Pāṇini himself does not adopt any of them to explain bahuvrīhis. This study attempts to recover Pāṇini's original handling of compound analysis, namely the fact that he does not focus on the head, but rather on the so-called *upasarjana* constituent, characterized in the source-phrase by a frozen case ending expressing the syntactic relation with another constituent of the compound. A frozen syntactic relation is furthermore established between one of the constituents and the denotatum of the whole compound, and is reflected in the case ending of the pronoun used (in the traditional analysis) to signify this relation. It is exclusively the syntactic meaning conveyed by this case ending that is assumed to explain the final meaning of the bahuvrīhi. Such an analysis scales back the importance of the endo- vs. exocentric polarity in the classification of typologies in compounding, in line with some quite recent achievement of contemporary linguistics (Scalise-Bisetto 2009: 45).

1. Pāṇini's bahuvrīhi: what was the explanatory model?

The present inquiry stems from a simple question: given that Pāṇini makes extensive use of zero postulation in derivation and in phono-syntax, why does he not use it in the case of the so-called exocentric or bahuvrīhi compounds as in (7a) and (7b)? Nevertheless, before illustrating Pāṇini's model to account for exocentric compounds, we should first make a preliminary reflection on what data we can assume that Pāṇini knew (and, more cogently, what data he thought he should account for) and also on the aim that made such an account necessary.

1.1 Aims and linguistic target of Pāṇini's grammar

In the present work, we quote Vedic examples selected from the *R̥gveda-Saṃhitā*, a choice that, if not exhaustive, nevertheless grants us relevant data. The range of Vedic literature which Pāṇini might have been acquainted with and above all might have taken into account for his description, has been the subject of lengthy debate.¹ However, no one has ever questioned the fact that Pāṇini was acquainted with all the Saṃhitās and with the Black Yajurveda Brāhmaṇa tradition. There are over two hundred *Aṣṭādhyāyī* rules dealing with Vedic special features, explicitly referring to *chandās* (and *nigama*), i.e. plausibly to the four Vedic Saṃhitās, *yajus*, i.e. the sacrificial formulas in prose, *brāhmaṇa*, i.e. the homonymous class of works, *mantra*, i.e. Vedic stanzas and Vedic formulas as a whole. Some other rules are explicitly restricted to the common language (*bhāṣā*), while the bulk of the non-restricted rules, *de facto* apply to both, as convincingly shown by Deshpande (1985).² A crucial feature of Pāṇini's Vedic rules is that, despite their restricted domain of

* All translations are by the authors, unless explicitly stated otherwise. This paper is the result of joint research discussed and shared by the authors: for the sake of academic requirements, §§ 1-3 are attributed to Maria Piera Candotti, §§ 4-6 to Tiziana Pontillo. This paper was conceived as the first part of a wider project assessing the necessity and usefulness of ellipsis in the analysis of Sanskrit bahuvrīhis. The second part of the project, which was presented at the SALA 35 Conference (INALCO, Paris – 29-31 October 2019) by Davide Mocci, adopts the formal tools of theoretical linguistics to show that certain important generalisations would be missed if we were to make use of the ellipsis of possessive suffixes in Sanskrit bahuvrīhis.

¹ See, among the others, Goldstücker (1861: 130-149), Liebich (1891: 17–37) Thieme (1935: 74-76) and Kiparsky (2012).

² Several specific inquiries on single aspects of this grammar were focused on verifying its reliability. For instance, Cardona (2002: 236) states that “the tense system which Pāṇini describes for the speech of his time and area is actually attested in Vedic literature”, despite what some other scholars have maintained. See also Cardona (1999:216).

application, they are, on the other hand, often ‘generalizations rather than restrictions of Classical rules’ and ‘typically involve listing additional environments where a rule applies in Vedic’ (Kiparsky 1979:57). We believe that a convincing explanation of this feature was supplied by Bronkhorst in 1981 and by Kiparsky 2012, when they maintain that Pāṇini’s grammar might have assisted the editorial activity targeted on consolidating and normalizing the *R̥gveda*. In fact, such a role played in the editorial activity on the Vedic Canon, can properly explain the need to make ‘judgments of relative grammatical acceptability’, like those emerging in the variationist pattern discovered in Pāṇini’s architecture by Kiparsky in 1979.

This has also convinced us that Pāṇini’s model, rather than being defined as generative, is better described as distributional and variational, following, again, Kiparsky’s ground-breaking work. Pāṇini’s architecture of the word-formation-rules is based on a variationist pattern, one of the most evident applications being that denominal derivational nominal stems (*taddhitas*) and compounds are taught as alternants of meaning equivalent phrases (see below § 4). Furthermore, a number of regional variations of Sanskrit usage (see Deshpande 2019:11;16) and several other variants (which could today be labelled as diatopic, diastratic, diaphasic and diamesic variants) of several linguistic phenomena are also recorded and explained within a distributional morphology framework. We are therefore well informed by Pāṇini himself about the boundaries of these variants. Instead, despite several intriguing hypotheses, according to which for instance the main object of Pāṇini’s grammar could be a “frontier” language (Deshpande 1983; 2019; Hock 2012), a language spoken in a context of diglossia (Houben 2018), or a ‘semi-colloquial language of scholarly community’ (Kulikov 2013), we cannot indeed guess which kind of language is described by the non-restricted rules. This is why it could be quite risky to try and compare Pāṇini’s rules with Classical Sanskrit. On the contrary, Pāṇini’s rules must intentionally be equal at least to the task of accounting for the *R̥gvedic* linguistic forms we know.

1.2. Ellipsis and zero in Pāṇini

Endorsing Deshpande’s (1989:103) working definition, we are using “ellipsis” as a cover term under which – in the present framework at least – all the linguistic phenomena which involve ‘some sort of “incompleteness” of the surface structure or expression’ should quite rightly be encompassed. As is well known, both “natural” and “regulated” ellipsis play a great role in Pāṇinian descriptions of language. By natural and regulated ellipsis we refer on the one hand to ellipsis phenomena that are assumed as a fact but never obtain any specific provision in Pāṇini’s grammar and, on the other, to phenomena explicitly governed by rules. The two types of ellipsis on the whole match a distinction between syntactic ellipsis (assumed but not regulated by Pāṇini, as clearly pointed out by Kiparsky 1982c: 37) and morphological and phonic ellipsis.

A telling example of what is meant by Kiparsky may be found in rule A 1.4.105 teaching the occurrence of first and second verbal endings in co-occurrence with the pronouns *yuṣmad* ‘you’ and *asmad* ‘we’ with the specification *sthāniny api* ‘even as mere place-holder [as co-occurring word]’.³

(1) *pacasi/tvam pacasi* ‘(You) cook’

No rule in Pāṇini accounts for these two alternants. Nevertheless, the terminology used, in particular the mention of the technical term *sthānin* ‘place-holder’, puts this phenomenon against the background of the broader and technically determined concept of zero as a ‘substitute’ for something that is elsewhere overtly realized. But also in morphological derivation there is room for non-regulated or loosely regulated phenomena. An interesting example comes from Pāṇini’s device of using the meaning (*artha*) of a given constituent as a relevant morphological context, thus avoiding a biunivocal link between a given meaning and a specific and overt form. In some rules, the reference to the meaning is a means of widening the set of morphological constituents quoted.⁴ But the same

³ A 1.4.105: *yuṣmady upapade samānādhikaraṇe sthāniny api madhyamaḥ* ‘The second person verbal triplets are co-referential with a co-occurring second person (*yuṣmad*) personal pronoun even if merely understood (*sthāniny api* lit. “even when it is a place-holder”)', i.e. even when it is zero-replaced. Other interesting examples of syntactic ellipsis may be found in the above-mentioned contribution by Kiparsky.

⁴ See, e.g. A 1.4.25: ‘The actant called *apadāna* is used to signify the cause in verbal bases meaning “to fear” or “to protect”’: e.g. *caurebhyo bibheti/caurebhya udvijate* ‘he is scared of robbers’.

device may on the contrary hint at the absence of the specific morphological constituent conveying that meaning:

A 2.3.15: The dative is also used after a nominal base expressing a condition (*bhāva-vacanāi*) and having the meaning as the suffix *-tum* (*tum-arthāt*).

The above-mentioned suffix *-tum* is taught by A 3.3.10 and accounts for the infinitive competing forms such as (2b).

(2)	a. <i>pākāya</i>	<i>vrajati</i>	→ <i>pākāya vrajati</i>
	act of cooking-DAT. SG	to go-PRS. 3 SG	‘he goes to cook’
	b. <i>paktum</i>	<i>vrajati</i>	→ <i>paktum vrajati</i>
	to cook-INF.	to go-PRS. 3 SG	‘he goes to cook’

In the nominal derivate *pāka-* ‘act of cooking’ there is no morphological constituent conveying the meaning of the infinitive: the pure meaning of the constituent elsewhere used may in these cases act as a left-hand constituent constraint: the dative is used after an action noun provided this action noun has the meaning of an infinite, i.e. co-occurs with a finite verb as its object.⁵ The latter device is of particular relevance for us, as the most important rule regulating bahuvrīhi is formulated precisely with the constraint *anyapadārthe* ‘in the meaning of another word’. This will be discussed below, §§ 5-6. Alongside these examples of assumed yet non-regulated ellipsis, on the other hand, several morphological and phonic phenomena are analysed by Pāṇini by means of the notion of “zero” (*lopa*, defined as *adarśana* ‘non-perception’ in A 1.1.60), which indeed – and this is a crucial point, even though it is far from universally accepted in indological and in linguistic studies in general – is exclusively a specific kind of “substitution” (*ādeśa*, lit. ‘special teaching’).⁶ Such a “zero” is essentially targeted (as we have extensively discussed and hopefully proven elsewhere)⁷ on identifying the place where a given word-form is expected, because it is overtly perceived in analogous linguistic contexts. By the way, this is not exclusively proper to zero, rather it is a feature of the whole mechanism of substitution as a device to account for context-specific alternants.

It is well-known, in fact, that the descriptive method adopted by Pāṇini is consistently synchronic, with almost no concession to the diachronic dimension of language nor consequently to deletion. Bloomfield (1933: 209) himself (who was one of the first modern linguists who shed light upon ‘the apparently artificial but in practice eminently serviceable device of speaking of a zero element’ on the part of Indian grammarians) explained his English examples just in terms of “replacement”: ‘in *sheep* : *sheep* the plural-suffix is replaced by zero – that is by nothing at all’. Indeed structuralists generally recognize their debt to Pāṇini whose method they properly connect to the requirements of generalization in morphology.⁸ Yet modern linguistic studies rarely take into account the overall framework, despite the fact that they often refer to some specific aspects or, in any case, make use of the relevant terminology.⁹

Referring to our previous contributions for a comprehensive discussion of the data on Pāṇinian zero, we will focus here on what is strictly relevant both for interpreting Pāṇini’s approach to these phenomena and for highlighting its possible differences with other theories. Firstly, it is important to describe the breadth of linguistic phenomena dealt with by Pāṇini by means of this device that

⁵ This example allows us to highlight a feature that will be important for the next steps of our inquiry, namely the fact that the status of primary derivative stems is in-between verbal and nominal categories. This will prove fruitful in assessing the problems of unsaturated arguments in compounds (see above, fn. 20 and below § 6).

⁶ See e.g. the translations of the relevant Pāṇini *lopa* rules by Böhtlingk 1887 (‘Schwund’) Vasu 1891 (‘elision’), Renou 1947-1954 (‘amuïssement’). Sharma (1990-2003) does not translate the term sometimes uses the expression ‘zeroing’ to describe the operation. See also Renou 1942, s.v. ‘amuïssement, chute’; Varma 1978 (‘elision’); Dvivedi 1978:77 (‘elision’); Das 1985 (‘elision’); Sen 1999:102 (‘elision’); Roodbergen 2008, s.v. (‘deletion’), but Katre (1987:24) and Cardona (1997:46) interpret *lopa* as ‘zero-replacement’.

⁷ See Candotti-Pontillo (2013: 122-125); Candotti-Pontillo (2014: 64-68).

⁸ See e.g. Allen 1955:113; Pinault 1989:323; Zakharyin 2007:338. As regards some modern linguists who might have been aware of (and influenced by) such a device used by Pāṇini, see also Pontillo (2002:559-570).

⁹ e.g. in Allen 1955:109; Collinder 1962-68:15 only discuss examples of type (3) c; Meier (1961:140-143) on the other hand merely refers to the zero of single phonemes, here exemplified in (3a).

encompasses substitutions taught in phonic or almost phonic terms, such as (3a) and (3b) as well as substitutions with zero in place of affixes, whether declensional (3c) or derivational (3d):

- (3) a. **anañj-ti-* → *anakti* ‘he anoints’ (with Ø in the place of the nasal phoneme due to the specific present verbal class A 6.4.23)
 b. **sarit-s* NOM.SG → *sarit* ‘river’ (with Ø in the place of the NOM.SG monoconsonant ending –s A 6.1.68)
 c. **vyoman-i* LOC.SG → Vedic *vyoman* ‘in heaven’ (with Ø in the place of LOC.SG ending –i A 7.1.39),
 d. *bhās-* ‘to shine’ (vb. base) → *bhās* ‘light’ lit. ‘the shining one’ (with Ø in the place of the agentive abstract morpheme *KVIP* A 3.2.177).

With one single exception, namely rule A 5.3.82, Pāṇini does not teach zero-substitution of full words, even though early commentators already use this device and apply it in particular in the case of compounds.¹⁰ Pāṇini further organizes the vast domain of zero in place of affixes through a broad division between

a) zero of the *lopa*-type, characterized by the fact that the zero affix can trigger a specific ablaut on the base, as if it were the alternant overt affix (4)

b) *LU*-type zero (with three subtypes: *LUK*, *ŚLU* and *LUP*), whose affixes do not trigger ablaut modifications of the base, but might show syntactic effects. Particularly interesting for us is the opposition between *LUK* and *LUP* exemplified in (6). The starting point is the comparison between two derivatives, a more general one (5a) with the affix –*aÑ*, meaning the modification/part of (a plant) and the second, –*aÑ* (5b), explicitly restricted to naming the fruit of the plant. The *LUK*-zero-derivation *de facto* neutralizes the feminine affix of the base by assuring a generic nominal stem, suited to the application of the derivational affix, while the *LUP*-one maintains it, crucially freezing the nominal stem proper of the etymon. In both cases, the zero forms alternate (with or without syntactic and semantic restrictions) with overt forms, i.e. they precisely work as “zero-alternants” according to Bloomfield’s (1933: 215-216) terminology, as we can see in examples (5) and (6).

- (4) *a-* + *bi-* + *bhṛ-* ‘bring’ + Ø in the place of –*t* or –*s* → *abibhar* ‘you/he brought’. The alternants –*s* and –*t* as taught by A 7.3.84 trigger a specific ablaut (the so-called *guṇa*-ablaut of the verbal base).

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|--------|-------------------|-------------------------|---|
| (5) a. | <i>jambū-</i> | + <i>aÑ</i> | → <i>jāmbava</i> A 4.3.139 ¹¹ |
| | black plum tree F | modification of/part of | ‘produced from/part of the black plum tree’ |
| b. | <i>jambū-</i> | + optional <i>aÑ</i> | → <i>jāmbavá</i> A. 4.3.165 |
| | black plum tree F | modification of/part of | ‘black plum fruit’ |
-
- | | | | |
|--------|-------------------|--------------------------------------|------------------------|
| (6) a. | <i>jambū-</i> | <i>LUK</i> of <i>aÑ</i> → Ø | <i>jambú</i> A 4.3.163 |
| | black plum tree F | modification of/part of | ‘black plum fruit’ |
| b. | <i>jambū-</i> | optional <i>LUP</i> of <i>aÑ</i> → Ø | <i>jambū</i> A 4.3.166 |
| | black plum tree F | modification of/part of | ‘black plum fruit’ |

Both zero phenomena are thus to be interpreted in a wider substitution frame that links the zero affixes to their overt forms, seen as realized elsewhere. In the background of postulating a zero-affix in (6a) *jambú* and (6b) *jambū*, we have the matching overt forms *pālāśa-*, *jāmbava-* (with *aÑ*) – in the sense of a part of/modification of the relevant tree – and *pālāśá-* *jāmbavá-* (with *aÑ*) already meaning the fruit.¹² In (6a) the zero is justified by syntax, semantics and prosody while (6b) might seem to be based only on semantics. Nevertheless, the derivation through zero in the place of *jambū* ‘black plum fruit’ from *jambū* ‘black plum tree’ may be equated only superficially to the grammaticalisation of a metaphoric/metonymic transfer, since it enters a network of realisation with different levels of grammatical soundness: (6a) *jambú* is accepted, but preferably (5b) *jāmbavá* and (6b)

¹⁰ Vt. 12 as A 2.2.24: *saptamy-upamāna-pūrvapadasyottarapadalopaś ca* ‘And there is zero-substitution of the second constituent in [a bahuvrīhi] whose first constituent is either inflected in the locative case or a standard of comparison.’ – ex. *kañṭhekāla-* = *kañṭhe-* [+ Ø in the place of *sthaḥ*] *kālo* ‘*śya* = ‘black colour persists on his throat’; e.g., *uṣṭramukha-* = *uṣṭrasya* + [Ø in the place of *mukham*] *iva mukham asya* ‘his face is similar to a camel-face’.

¹¹ The final form is reconstructed but not attested.

¹² The zero being of the *LU*-type, there is no ablaut of the base.

jambū are used. It seems quite clear that, through a compelling Pāṇinian version of an ‘elsewhere principle’, not all metonymic transfers may be accounted for in the Pāṇinian system by postulating the zero in the place of some sort of affix.

3. Zero and exocentricity in modern linguistics

Exocentric compounds of the kind (7) are in fact a prototypical example of formations that, to use Kastovsky’s (1982:152) perspective, deviate from the natural morphology of motivated words founded on the identification-specification scheme relation, which may be a variant of Deshpande’s above-mentioned perception of ‘some sort of “incompleteness” of the surface structure or expression’.

(7)	a.	<i>archád-</i>	+	<i>dhūmá-</i>	→ <i>archáddhūma-</i> (RV 10.46.7)
		gleam-PRS.PTCP		smoke-M.SG	‘having gleaming smoke’-ADJ;
	b.	<i>á-mita-</i>	+	<i>krātu-</i>	→ <i>ámitakratu-</i> (RV 1.102.6)
		non-NEG-measure-PST.PTCP		strength-M.SG	‘having immense strength’-ADJ

This perception goes back as far as the first modern descriptions of Sanskrit, beginning with Bopp’s (1827 [1861: 455]) assumption that in bahuvrīhi compounds a specific notion is to be integrated in compound analysis.¹³ Almost a hundred years later, Wackernagel ([1905] 1957:288) still mentions the presence of a third notion as even a pre-condition for the formation of the most ancient compounds themselves. Besides this purely semantic level there are, albeit less studied, morphological traces of the specificities of exocentric compounding. A major landmark is Kiparsky’s 1982b contribution focused on the concept of (3)-level-ordered morphology. In this framework Kiparsky identifies two different morphological layers for endocentric and exocentric compounds, the latter showing the traces of a lower morphological level:

Consider e.g., *milk teeth* (endocentric) vs. *sabertooths* ‘sabertooth tigers’ (exocentric). [...] endocentric noun compounds are formed at level 2 by combining words, including words derived at level 1 such as *teeth*. Exocentric compounds however, must on our assumptions be assigned zero derivational suffixes since they would otherwise share the properties of their heads, i.e. be endocentric. But [...] derivational affixes cannot be added to derived plurals. Therefore exocentric compounds come out of level two with exclusively singular morphology and can receive plural endings only at level 3 where they are adjoined to the whole compound. (Kiparsky 1982b: 10-11)

Kiparsky’s model thus creates a very close link between exocentricity, zero-affixation, a lower morphological layer and accent. In particular the first two are mutually dependent: to be exocentric means to have a zeroed head. Nevertheless, as endocentric and exocentric compounds follow a completely different pattern of formation, zero-affixation, as proposed by Kiparsky, is not to be interpreted in terms of a conversion from a pre-existing endocentric compound.

3.1 Zero derivation patterns in exocentric compounds

Significantly, zero either of a suffix or of a word has often been posited both by traditional and by modern scholarship to account for this discrepancy between form and meaning. In fact, one may wonder whether Pāṇini’s descriptive strategy has some interesting clue to give on how to deal with these specific compounds and with the device of ellipsis itself, its power and its limits. Concerning the postulation of zero in the analysis of bahuvrīhi compounds in modern scholarship, two basic

¹³ The “incompleteness” of constituent analysis in bahuvrīhi compounds was pointed out by the first modern grammars and interpreted, besides Bopp’s ‘possessive Komposita’, either as ‘relative Komposita/relative compounds’ (see Monier Williams 1857:329-330): ‘for the obvious reason of their being *relatively* and not absolutely employed [...] translated into English by the aid of a relative pronoun’) – or as attributive compounds (see F. Kielhorn 1870:250): ‘[A bahuvrīhi] denotes something else than what is expressed by its members [and] has the nature of an adjective.’). For ancient criticism of these analyses, see § 6.

procedures may be identified, resorting to either the postulation of a zero-suffix¹⁴ or the zeroing of a lexeme.¹⁵

The first model is the most widespread and seems to account elegantly for the productivity of possessive bahuvrīhi compounds and for their attributive function. It is also widely used to account for Sanskrit bahuvrīhis, in particular of Classical Sanskrit, where e.g. Gillon (2008: 2) considers as a *natural hypothesis* that an exocentric compound is derived from a descriptive compound suffixed with a phonetically null suffix which converts it into an adjective.

A major argument often used to reinforce this interpretation in the specific case of Sanskrit bahuvrīhis is the fact that a parallel set of exocentric compounds with overt suffix is found in Sanskrit and, at least as far as the suffix *-ka* is concerned, is freely productive in Classical Sanskrit (see e.g., Gillon 2008:4). We will discuss this point in greater detail below but it suffices to point out, for the moment, that suffixation is originally very rare, almost excluded in R̥gvedic compounds,¹⁶ and most of the time lexically restricted. Moreover, suffixation makes it difficult to analyse compounding in syntactic terms, thus relegating to the margins some well-attested compounds such as the traditionally-called *a-samartha* compounds where an internal constituent may have a syntactic argument outside the compound itself. Gillon (2008:13) gives a tentative answer to this difficulty by postulating a special (zeroed) B suffix that does permit the transmission of unsaturated arguments of the initial constituent of a bahuvrīhi. Such a suffix is language-specific, as it is contrasted by Gillon himself with the matching *-ed* English suffix that allows the transmission of unsaturated arguments associated with *-ed* itself (*yellow garment-ed*) but not with the initial constituent of the compound (**drawn-cart-ed*). This accounts for occurrences such as the classic example *ūdharatha-* ‘by which a cart is drawn’. See below (22).

While we maintain that the original Pāṇinian model did not follow this zero-model, we are aware that it is the principal model against which it competes, not only in its modern variants but also in post-Pāṇinian traditional scholarship. Moreover, it may also be that the zero-model better accounts for later Sanskrit compounding (from which both Gillon and Lowe seem to draw their data) but, on the other hand, we contend that Pāṇini's description is better suited for Vedic data.

The second model, on the other hand, which freezes the reference of the exocentric compound to a specific zeroed denotatum, fails to account for some crucial features, such as its being a qualifier that can refer to more than one qualificand – e.g. Skt. *bahuvrīhi-* ‘much-rice-ed’ may qualify a man ‘wealthy in rice’ but also e.g., a field ‘yielding much rice’.

3.2 Alternative paths to account for exocentricity

Only recently other lexical-oriented approaches have tried alternative paths to zero-suffixation. For instance, Lowe (2015) concentrates on a specific syntax characterising compounding in Sanskrit, a syntax sharing only some of the features of ordinary syntax, but a syntax – at any rate – dealing with full words.¹⁷ Lowe's two crucial points concerning the analysis of Classical Sanskrit bahuvrīhis are, on the one hand, independent evidence for the existence of words that do not project phrases. This amounts to saying that some words, albeit words, cannot act as heads and cannot enter in syntactic relation with other words in the sentence. Of course, the distinctions between word and morpheme, and between word and phrase is consequently less sharp (Lowe 2015:91). On the other hand, in order to account for the passage from a projecting to a non-projecting category of the last

¹⁴ Marchand (1967 [1974]:335; 1969 [1960]:14) was ‘tempted to argue that the determinatum of a bahuvrīhi compound is zero’. The analysis (followed by many other authors) is of the type [[bird+brain]Ø-ed] : [[pig+tail]ed]

¹⁵ Štekauer (1998:148-149) resorts to the ‘formation of an auxiliary-complete syntagm’. The example of analysis he proposes is the abusive term [red+skin+man], in which he singles out an operation of “shortening” of word forms, consisting in cancelling the head of compounds. Nevertheless, the term is known to be also used to denote a variety of potatoes, similarly the prototypical.

¹⁶ In the RV, only one bahuvrīhi has a *-ka* suffix, *tryāmbaka-* ‘with three mothers’ (RV 7.59.2); see also Melazzo (2010:41).

¹⁷ Lowe (2015:71) stresses the role of the so-called *asamartha* compounds in calling for a syntactic analysis of compounds: ‘[...] it should be impossible for syntactic relations to hold between subparts of morphologically formed compounds and words external to the compound. The fact that in Classical Sanskrit such relations are relatively common provides strong evidence for the syntactic status of Sanskrit compounding processes [...].’

constituent¹⁸ of the compound, he uses the theory of *lexical sharing* which assumes that certain lexical items can instantiate two nodes in the phrase structure. Lowe (2015:104) defines these forms as *portemanteau words*, displaying a number of properties typical of single lexical elements and other features characteristic of two-word sequences, for example, the fact that they alternate with unambiguous two-word sentences. From Lowe's (2015:3) perspective, this is meant to account for the widely accepted fact that a noun form used at the end of a bahuvrīhi must be considered at least partially adjectival.

If we accept independent evidence for the existence of non-projecting words, bahuvrīhis are no longer disturbing exceptions but show a pattern that, though marginal, is recognized elsewhere. Other approaches however resort to the non-grammatical notion of metaphoric/metonymic usage: *red cap* would thus be a *pars pro toto* metonymy. This is explicitly stated for instance by Pennanen (1982:245-246), who indeed interpreted Marchand's proposal in this way, and later, e.g., by Booij 2005, Barcelona (2008:210) and Bauer (2008:59), as an alternative to the zero-reading. Nevertheless, since bahuvrīhis actually trigger a specific accent, it is not possible to get rid of any grammatical role of morphology or syntax, and to postulate a mere figurative relation between the whole compound and the constituent in the head position.

3.3 Open issues in modern models accounting for bahuvrīhi compounds

In short, there still seem to be room for discussion in the modern treatment of exocentric compounds, in particular we would like to recall some points here, which are relevant to a discussion on the morphological role of ellipsis.

First of all there is a still-unresolved issue at the basis of the constituent analysis of bahuvrīhi, which is whether their source must be identified as a matching endocentric compound (to be, so to say, "converted" into a bahuvrīhi)¹⁹ or as an independent string of constituents. A number of Ṛgvedic examples seem to favour the second line of reasoning: compounds such as (8) have no matching endocentric compound that could be used as a source.

- (8) a. *aja-aśva-* → *ajāśva-* (RV 1.138.4; 6.55.3, epithet of Pūṣan)
goat-STEM-horse-STEM 'having goats for horses'-ADJ
b. *go-mātr-* → *gomātr-* (RV 1.85.3, said of the Maruts, sons of Pṛṣṇi)
cow-STEM-mother-STEM 'having a cow for mother'-ADJ
c. *iheha-mātr-* → *ihehamātr-* (RV 6.59.2)
here and there-ADV-mother-STEM 'whose mothers are here and there'-ADJ

Endocentric formations of the same type are lexically restricted and non-productive. This is crucial in understanding up to what point compounding may be properly accounted for by syntax rather than by morphology. While the pattern starting from a matching endocentric compound seems to favour the postulation of an ellipsis of some morphological element, this is much less so in the competing pattern in which the two types of compounds are derived independently. In this sense, particularly interesting are those models, in particular Kiparsky's, which identify some specifically morphological traits characterising exocentric compounds (e.g., *milkteeth* vs *sabertooths*): these need to be accounted for by any model starting from an independent string of constituents. Some similar phenomena are in fact also attested in Sanskrit and are dealt with by Pāṇini through affixation in the context of exceptions to the more general pattern (see below § 3).

A crucial feature of modern debate on the bahuvrīhi in general is the contrast between exocentric and endocentric compounds, which is indeed rooted in any analysis based on the notion of head. In such a head-oriented framework, exocentric compounds, whose surface-constituents typically do not include a head, are interpreted as marginal forms of compounding and recourse to the postulation of a possessive zero-suffix is required by the presence elsewhere of overt forms:

¹⁸ Like most modern scholars, Lowe does not apply compounding rules to the last element of the compound itself.

¹⁹ Gillon limits its statement to the case of homodenotative compounds (such as *dīrgha-kaṇṭha* 'long neck' vs *dīrgha-kaṇṭha-* 'long neck-ed'); however he fails to see that the 'conversion' is less easy to postulate in the case of Noun + Noun homodenotative compounds, such as *candra-mukha* 'moon-face(d)' or *ayo-muṣṭi* 'iron-fist', where 'the predication relation may be metaphorical, instead of literal' (Gillon 2008:4) because the matching endocentric forms are not freely productive in Sanskrit and are lexically restricted by Pāṇini himself.

- [pig+tail] : [[pig+tail] + -ed] = [bird+brain] : [[bird+brain] + Ø -ed]
pigtail : pigtailed ('endowed with a pigtail') = *birdbrain : birdbrain/birdbrained ('endowed with a birdbrain')
- long leg-s : [[long+leg+Ø-s] + -(g)ed] : [[long+leg+-s] + Ø-ed] → longlegged X/daddy long-legs ('characterized by long legs');
- blue eyes : [[blue+eye+Ø-s] -ed] / [[blue+eye+-s] + Ø -ed] → blue-eyed Y/Y (= proper name) blue-eyes ('characterized by blue eyes')

Now, since the appropriateness of identifying a specific class of exocentric compounds was called into question in recent times, the link between exocentricity and the postulation of zero might become weaker.

3.4 The role of affixation in accounting for bahuvrīhis

A strong element in favour of an interpretation through the the postulation of a zero-suffix lies in the fact that some bahuvrīhis are sometimes endowed with affixes (above all *-ka*: freely productive in Classical Sanskrit). Moreover, Pāṇini himself devotes the final section of his chapters on secondary affixation to a number of phenomena concerning compound nominal bases in the so-called *samāsānta*-section (A 5.4.68-160) where secondary affixation to bahuvrīhis plays an important role (5.4.113-160). Gillon (2008:3-4) considers this datum as independent confirmation of the postulated null suffix, at least with specific reference to the *homodenotative* bahuvrīhis, even though he admits that the distribution of two alternants (with and without *-ka*) is *somewhat different* (A 5.4.151 ff.).

Nevertheless, at least in considering the most ancient data, we see that, as already pointed out by Wackernagel ([1905] 1957:102), such suffixes are extremely rare in the *R̥gveda-Samhitā* (only two occurrences of *-ka-* for instance) and in the *Atharvaveda*, while they are increasingly frequent in the *Yajurveda-Samhitā*, *Brāhmaṇas*, etc. Pāṇini himself labels the forms with *-ka* as marginal (see below under A 5.4.154). They can hardly be used to account for the need to postulate a zero suffix to form a bahuvrīhi. Moreover, the whole *samāsānta*-section is complex²⁰ and deserves further scrutiny. Yet we consider that some important basic facts can be safely stated and will help in understanding the phenomenon at stake. In the above-mentioned section:

- the suffixes themselves are said to be 'final constituents of compounds' (A 5.4.68),²¹
- their affixation is taught *prātipadikāt* 'after the last sound of a nominal base', like any secondary suffix of §§ 4-5,
- moreover, the nominal base is further specified as a compound nominal base and may consist of any compound or there may be rules that explicitly restrict affixation to specific compounds e.g., after a tatpuruṣa (A 5.4.86), a dvigu (A 5.4.99), a dvandva (A 5.4.106),
- compound nominal bases are further described in terms of listed final constituents or strictly phonic conditions; in other words, the affixation described is, for the most part, not productive.

These suffixes are added to compound verbal bases and in turn create compound verbal bases: in no way do they act as transcategorizers.²² Their functions are very rarely connected with semantic aspects; mostly, they are useful either in providing a shift towards vocalic declension for compound bases with a last constituent showing a rare declensional class and/or in dealing with some accentual issue. In Pāṇinian terms, end-of-compound suffixes are radical *svārtha*-suffixes inasmuch as, as pointed out by Cardona (1983:68), a *samāsānta*-suffix 'neither signifies nor cosignifies any particular meaning' (some exceptions may be found, e.g., A 5.4.114; 127). Moreover, as pointed out by Cardona (1983:53) they 'generally follow the gender and number of the bases to which they are added. The affix aC (10a), for example, taught by

A 5.4.78: The affix aC occurs after the nominal stem ending in *-varcas-* co-occurring with *brahman-* or *hastin-*

²⁰ Although affixation is predominant in this section, some specific substitution rules specifically restricted to compound nominal bases also find their place here.

²¹ They occur after the last part of a compound and are themselves the final part of that same compound; see K *ad* A 5.4.68 What seems crucial for commentators is to state explicitly that the condition of being a bahuvrīhi must concern both the constituent acting as left-conditioning and the end-constituent. These suffixes are added to compounds and have compounds as their output.

²² See also Wielńska-Soltwede (2019:10-13).

accounts for the final pitch of the whole compound (A 6.1.163-164), while affixes with marker P, such as *-kaP* in (9b), taught by A 5.4.154 (see below), are enclitic (A 3.1.4).

- | | | | | | |
|-----|----|---|---------------------------------------|---|--|
| (9) | a. | <i>brahma-</i> +
sacred knowledge-
STEM | <i>varcas-</i> +
eminence-
STEM | <i>-aC (-á)</i>
<i>samāsānta</i>
SUFFIX | → <i>brahmavarcasá-</i>
'eminence in sacred
knowledge' N.SG |
| | b. | <i>bahu-</i> +
many-STEM | <i>khaṭva-</i> +
bed-STEM | <i>-kaP</i>
<i>samāsānta</i>
SUFFIX | → <i>bahukhaṭvāka-</i>
'in which there are many
beds' ADJ. ²³ |

The most consistent group of rules of this section is specifically restricted to bahuvrīhis. The first rule of the section runs as follows:

A 5.4.113: The affix *ṣaC* occurs after a base ending in *sakthi-* 'thigh' or *akṣi-* 'eye' – meaning one's own limb – in the context of a bahuvrīhi (*bahuvrīhau*).²⁴

- | | | | | |
|------|-------------------------------|---------------------------------|--|---|
| (10) | <i>dīrgha-</i> +
long-STEM | <i>sakthi-</i> +
thighs-STEM | <i>-ṣaC</i>
<i>samāsānta</i> SUFFIX | → <i>dīrghasaktha-</i>
'having long thighs' ADJ. |
|------|-------------------------------|---------------------------------|--|---|

It is true that in most of these cases a contrastive value of the suffix is recognisable and has already been pointed out by commentators, in particular the KV *ad* A 5.4.113: Why [the mention] 'in case of a bahuvrīhi'? [cf.] *paramasakthiḥ* 'supreme, excellent thigh'/*paramākṣi* 'excellent eye'. Nevertheless, such suffixes are all lexically restricted and show no hint of productivity: they testify to lexicalisation phenomena much more than to conversion. The only significant exception is the already-mentioned rule:

A 5.4.154: After all the other [bahuvrīhi stems], marginally, the affix *-kaP* may occur.

In this case, besides some occurrences of lexicalized uses of *-ka* listed in the immediately preceding rules (A 5.4.151-153), both forms with and without *-ka* alternate freely, even though the form with *-ka* is dispreferred. Nevertheless, even more important is the restriction, seldom quoted in literature, taught in the following rule, a restriction which in fact limits the usage of *-ka* to non-lexicalized, merely attributive, contexts.

A 5.4.155: Not in the context of a conventional denotation.

- | | |
|------|---|
| (11) | <i>viśvadeva</i>
Viśvadeva- PROPER NAME (lit. 'having all the gods') |
|------|---|

Rather than disambiguating between an exocentric and a (problematic) matching homodenotative endocentric, this productive rule seems to account for the distinction between the original usage of bahuvrīhis as idionyms and a – probably later – expansion of the purely attributive function. This is not the right place to probe further, but this matches quite well with what we know of Indo-European naming practice and with the already-mentioned posteriority of suffixed bahuvrīhis.²⁵

4. The role of zero in Pāṇini to account for denominal and compound stems

As we have just seen, no special zero in the place of a derivational suffix is taught by Pāṇini for the bahuvrīhi compounds. Indeed, only a wide-ranging zero-substitution is adopted in bahuvrīhi analysis, as in any other class of compounds: it is a zero-substitution of case endings, in order to explain how each compound-internal constituent is used in its mere stem status, although each stem

²³ Alternating with *bahukhaṭvā-* in the same meaning.

²⁴ As already mentioned by commentators, the usage of the locative case is unexpected here: since the term qualifies the two bases ending in *sakthi* and *akṣi*, an ablative or a genitive is expected, as elsewhere in the section. See Sharma (1990-2003 vol. IV:734).

²⁵ Indeed, a similar disambiguation may, in ancient times, have been attributed to accent, a fact well known when it comes to nominal bases (see, e.g. Lazzeroni 1995) but that may also have had a role to play in the domain of bahuvrīhi compounds: see the almost homophonous pairs such as *ādeva/ādevā*, discussed by Melazzo (2010:121-137) albeit with a different interpretation.

represents precisely an inflected noun with its relevant meaning and syntactic behaviour in the final compound. In fact, as we already recalled above, Pāṇini's architecture of the word-formation rules is based on a variationist pattern teaching compounds (but also secondary derivatives, as we shall see) which alternate with a meaning equivalent phrase, with respect to which compounds are declared to be preferable (*vā*).²⁶ Each nominal constituent, i.e. each inflected nominal lexeme involved in the source-phrase taught in the formation of a secondary derivative or compound nominal stem is consequently obtained by means of a *LUK* zero-substitution of endings, according to the following rule:

A 2.4.71: [*LUK* zero-substitution] of a nominal case ending which occurs as a part of a verbal base (*dhātu*) or of a nominal stem (*prātipadika*).

And consistently with Pāṇini's whole system, where no derivation or compounding rule aims at forming a noun endowed with an ending, the final secondary derivative or compound form thus obtained is a pure nominal stem and will in turn obtain appropriate endings. For instance, the following rule teaches how to form endocentric compounds, such as *rājaputrā-* 'king's son', occurring as a NOM.M.DU form in RV 10.40.3 referring to the divine Aśvin twins (Ved. *rājaputrā* = Skt. *rāja-putrau*):

A 2.2.8: a noun inflected in the genitive case preferably (*vā*) combines with another inflected noun to obtain an endocentric tatpuruṣa compound.

Thus, the source-phrase taught by this rule, i.e. (12a) – which is made up of inflected nouns – has to be converted into the matching meaning-equivalent compound (12b) – which instead consists of pure nominal stems. To obtain (12b) from its source-phrase, the genitive ending (*-as*) of *rājnaḥ* and the nominative ending (*-as*) of *putraḥ* in (12a) are *LUK*-zero-replaced according to A 2.4.71, but the meaning conveyed by them in (12b) is maintained by their relevant zero-substitutes.

- | | | | |
|------|----|---|---|
| (12) | a. | <i>rājnaḥ</i>
(<i>rājnas</i>)
king-GEN.M.SG | <i>putraḥ</i>
(<i>putras</i>)
son-NOM.M.SG. |
| | | 'king's son (i.e. prince)' | |
| | b. | * <i>rājñ-(Ø-as)</i> → <i>rāja-</i> | <i>putrā-(Ø-s)</i> |
| | | <i>rāja-putrā-</i>
king-STEM-son-STEM | |
| | | 'king's son (i.e. prince)' | |

The first constituent shows a specific (and, we will see, frozen) syntactic relationship with the second constituent; the second constituent on the other hand shows a generic syntactic valence represented by the nominative that will be variously implemented in the specific linguistic contexts. In fact it is the compound stem that will receive the final case ending (in our case NOM.M.DU) required by the broader context of the sentence. Since the compound is endocentric, it will very often receive the same number, gender and case of the corresponding word in the meaning-equivalent phrase. Analogously, when we form a mandatory endocentric compound, such as *iṣu-kārā-* 'arrow-maker' – which is also a bound primary derivative stem – the left-hand constituent, i.e. the nominal lexeme bound with the primary derivative stem (*kr̥t*) *-kārā-* is subject to A 2.4.71.

²⁶ The present analysis of compounding relies on a couple of specific exegetic choices. We are here following Kiparsky's (1979:3) and Radicchi's (1988:56-58) overall interpretation of Pāṇini's compounding rules, in considering that the preferable option taught by *vā* in A 2.1.18 has to be continued in the following compounding rules. *vibhāṣā* 'marginally' is instead exclusively valid from A 2.1.11 to 2.1.17, where it is precisely dismissed by *vā*, and it is not to be continued in all the following compounding rules, as suggested by Patañjali, and commonly accepted – see e.g., Cardona (1997:219). As a consequence, the majority of compounding rules preferably apply because they are grouped together under the scope of *vā* (A 2.1.18-2.2.9), instead of *vibhāṣā*. Moreover, as for the relation between the compound and the source-phrase, we resort to A 2.1.1, interpreted according to Pontillo (2013: 111-118).

A 3.2.1: the primary derivative suffix $-ā^{27}$ applies to a verbal base, provided that an inflected noun playing the role of direct object co-occurs.

- (13) $iṣum + (*kṛ- \rightarrow) kār- + -ā$
iṣu-(Ø-m)-kār-ā-
 arrow-ACC.SG.-make-STEM+ SUFFIX
 ‘arrow-maker’

In *iṣu-kār-ā-* the accusative case ending of the bound lexeme is zero-replaced, but its meaning is maintained, so that the nominal stem *iṣu-* acts as the direct object of the action denoted by the verbal base of the primary derivative nominal stem, i.e. the bound morpheme *-kār-ā-*.

The secondary derivative nominal stem *vaiyākaraṇā-* (Nir. 1.12; 9.5 and 13.8) denotes a ‘grammarians’, i.e. one ‘who studies grammar, one who knows grammar’. It is formed by applying the secondary (*taddhita*) suffix $-āN$ (taught by A 4.2.59) to its etymon. In rule (14), which is also the source-phrase used to form our example, the demonstrative pronoun (i.e. *tād* ‘this’, in the present rule) plays the role of a sort of variable X in the rule itself, which can be read as in (14b). The variable has to be replaced by the due lexeme inflected according to the syntax taught in the rule itself, i.e. in the accusative case, in order to form the desired derivative lexeme (14c).

- (14) a. *tād* *ādhīte* *tād* *vēda*
 this-ACC.N.SG study-PRS.3SG this-ACC. N.SG see-PF.3SG(= he knows)
 ‘he studies this, he knows this’
 b. he studies X, he knows X
 c. *vyākaraṇam* *ādhīte/vēda*
 grammar-ACC.SG study-PRS.3SG/see-PF.3SG (=he knows)
 ‘he studies grammar, he knows grammar’

Therefore, provided that the final derivative lexeme denotes one who performs the action conveyed by the verbal forms *ādhīte* or *vēda* and the object of this action is denoted by the etymon of the derivative lexeme, the noun inflected in the accusative case is the starting point of the derivation. It is the accusative *vyākaraṇam*, envisioned as the object of these two above-mentioned verbal forms, that assures the right meaning of the derivative lexeme *vaiyākaraṇā-* and the right syntactic relation of the derivative lexeme with its etymon. Nonetheless, from a morphological point of view, a nominal stem (*vyākaraṇa-*) is required to which the suffix $āN$ has to apply (as taught by 4.1.1 and 4.1.82), so that a zero-substitution of the accusative case ending of *vyākaraṇam* is mandatory, even though its accusative meaning has to be kept in the final meaning of the relevant derivative lexeme.

The *LUK*-zero substitute that Pāṇini postulates in all the above-surveyed derivations or compounds is an effective device he adopts to assure the desired meaning of inflected words for the pure stems involved in the relevant formations. If Pāṇini merely dealt with all these formations only by paying attention to their morphological features, he would not be able to account for the specific meanings conveyed by such formations.

In his analysis of bahuvrīhi-compounds, Pāṇini also involves *LUK*-zero substitutes for all the constituents. We shall return below to the other crucial details in Pāṇini’s analysis of this type of compound, but let us first look at the constituents of a bahuvrīhi, such as the one occurring in (15a), as a qualifier of the goddess Aditi. Once again, all the case endings of the constituents explained in (15b) are *LUK*-zero-substituted according to A 2.4.71 in order to obtain a compound stem (15c).

- (15) a. *ādītī* *rāja-putrā-* (RV 2.27.3)
 Aditi-F.SGBAHUVRĪHI F.SG
 ‘Aditi whose sons are kings (i.e. “Aditi having kings as her sons”)
 b. *rājānaḥ* *putrāḥ*
 **rājñ-(Ø-as)*>*-rāja-* *putra-(Ø-as)*
 king-NOM.PL son-NOM.PL
 c. *rāja-putra-*
 king-STEM-son-STEM
 ‘sons who are kings’

²⁷ The marker N entails a *vṛddhi*-ablaut substitution of the penultimate short *a* vowel of the verbal base to which the primary derivational suffix applies (A 7.2.116).

Again, the compound stem will receive the final case endings required by the broader context of the sentence, more specifically, as we will see, required by another word in the sentence with which the compound is syntactically linked.

5. Pāṇini's analysis of bahuvrīhi compounds

The theoretical frame within which one must evaluate Pāṇini's description of bahuvrīhi is the general frame sketched above. Within this frame, his simple and almost laconic treatment of bahuvrīhi – about which Laurie Bauer (2010:175) complains – becomes fully significant. Indeed, after explaining a lot of details about endocentric compounding in dozens of rules of his grammar, Pāṇini only devotes two general rules to bahuvrīhi:

A 2.2.23: *śeṣo* *bahuvrīhih* [samāsaḥ 2.1.3]
 remainder-M.SG. bahuvrīhi (technical term)-M.SG compound-M.SG

'The remainder is the bahuvrīhi [compound].'

A 2.2.24: *an-ekam* *anyapadārthe*
 not-NEG=one-N.SG other-inflected.word-meaning-LOC.M.SG

'The combination of two or more inflected words when the denotatum (*artha-*) is that of another (*anya-*) inflected word (*pada-*) (i.e. of an inflected word other than the compound-internal constituents) [is a bahuvrīhi compound A 2.2.23]'

Nonetheless, read against the background of the previous compounding rules, what Pāṇini seems to advance by means of the first *sūtra* is to designate the bahuvrīhi as a sort of default case of compounding typology and this is not a trivial principle. In fact, in order to stick with the *modus operandi* that the *śeṣa* device typically triggers in his grammar, *śeṣa* denotes, within the set of combinations of inflected words forming a compound, those units 'that are other than' the combinations listed in the previous rules.²⁸ However broad this rule may seem, a restriction is thus provided by A 2.2.23: this is operatively based on the exclusion of all the specific combinations listed in the previous compounding section. In other words, with respect to the set containing all possible combinations of inflected words forming a compound, these previous combinations are considered as a subset, and *śeṣa* denotes the residual subset, containing all and only the members not included in the first subset. And since the relations conveyed by all the case endings – with the exception of the nominative case ending – are included in the previous rules, one of Patañjali's explanations for *śeṣaḥ* assumes that it might just refer to the relation conveyed by the nominative ending.²⁹ We shall try to understand what new scenario this exclusion plausibly opens, and consequently what this residual of compounding rules actually consists of.

Such a "default status" assumedly attributed to the bahuvrīhi type is indeed well-tuned to Wackernagel's already-mentioned opinion about the origin of these compounds. Wackernagel ([1905] 1957:288) indeed maintains that primigenial Indo-European compounds might have substantially been formed only when a third concept was to be designated by such a combination. Therefore, even though the analysis of exocentric compounds as derived from their endocentric counterparts is a common practice,³⁰ tatpuruṣas would have to be relegated to a secondary and especially diachronically later role, since bahuvrīhis are far more frequent than tatpuruṣas in the earliest stages of ancient Indian language, exactly as in ancient Greek. It is noteworthy that e.g., bahuvrīhi (15a), i.e. the feminine *rājaputrā* referring to the goddess Aditi, occurs in the so-called "Family Books", i.e. the most ancient sections of the RV, while tatpuruṣa (12b), i.e. *rāja-putrā-* is in the latest book and there is no further occurrence in the RV of the same combination of constituents as a compound.

A 2.2.24 *an-ekam anyapadārthe* is Pāṇini's most renowned rule on the structure of bahuvrīhis. The Western label "exocentric" might even have been inspired by its segment *anyapadārthe* (Sadowski 2002:352), although the term *artha* hardly matches the modern syntactic and semantic notion

²⁸ The present definition is tentatively modelled on a formula used for A 2.3.50 (*saṣṭhī śeṣe*) by Cardona (2013:104). Cf. Sharma (2010:1).

²⁹ See M 1.419 ll.7-8 *ad Vt. 2 ad A 2.2.23*, about which recently Kobayashi (2016:180).

³⁰ See, e.g., Gillon (2008:2) §1 above, but cf. § 6 below: in particular cf. (21a) with (21b), (21a), (22a), with (21b), and (23a), (23b), (23c), with (23d).

The indeclinable word *nis* – a prefix³⁴ treated in the same way as any inflected word in Pāṇini’s grammar, as revealed by the fact that he teaches the zero-substitution of its case ending – is mentioned in the wording of rule A 2.2.18 by means of a metalinguistic nominative and, moreover, it is placed first in compound (17b), so that it is expected to play the role of an *upasarjana*. By contrast, *nis* is not the *upasarjana* and in the traditional constituent-analysis of compound *niṣkauśāmbī* it is interpreted as ‘gone out of, departed from’, i.e., as if it were the past participle *niṣkrānta-* including *nis-* as a preverb, which merely makes it easier for grammarians to show the relevant case ending (zero-substituted in the indeclinable word *nis*).

c. <i>niṣkrāntaḥ</i> go out of-PAST.PTCP.NOM.M.SG ‘gone out of [the town named] Kauśāmbī’	<i>kauśāmbī</i> <i>kauśāmbī</i> (toponym)-ABL.F.SG
---	---

This is in fact the commentarial example used to explain the second rule defining the *upasarjana*, which states that it is recognisable even when, in a compound, it does not occupy the first slot (and is thus not mentioned in the nominative case):

A 1.2.44: And what has one single ending (*ekavibhakti*) is the *upasarjana*, even when, in a compound(-rule), it is not in the first place.

In the diagram below, following the above-mentioned traditional analysis, we can see how in the source-phrase of compound *niṣkauśāmbī-*, whatever the case ending applying to the resultant compound when used in a sentence, *niṣkrānta-* is inflected in several cases while *kauśāmbī* remains unchanged, i.e., has always ‘one single ending’:

d. <i>niṣkrāntaḥ</i> go out-NOM.M.SG	<i>kauśāmbī</i> Kauśāmbī-ABL.F.SG from Kauśāmbī	→ <i>niṣkauśāmbīḥ</i> gone out of-Kauśāmbī-NOM.M.SG
<i>niṣkrāntam</i> go out -ACC.M.SG		→ <i>niṣkauśāmbīyam</i> gone out of-Kauśāmbī-ACC.M.SG
<i>niṣkrāntena</i> go out-INS.M.SG		→ <i>niṣkauśāmbīnā</i> gone out of-Kauśāmbī-INS.M.SG. [...] ³⁵

Therefore, the second definition rule exclusively allows recognition of the *upasarjana* – not mentioned as a nominative in the formation rule, and not occupying the first slot in the compound – because the constituent *kauśāmbī* is linked to the other constituent by means of a frozen syntactic relationship. Thus, the *upasarjana* becomes a purely lexical subordinate constituent, just as the inflected noun *vyākaraṇam* ‘grammar’, used as a direct object in the source-phrase of *vaiyākaraṇā-* ‘who studies grammar, who knows grammar’, i.e. ‘grammarian’ – see above (14c), § 4 becomes a pure lexeme in its stem status (i.e. *vyākaraṇa-*, obtained by means of a LUK-zero-substitution according to A 2.4.71), to which the derivational affix *-ā* and a specific ablaut apply. This subordinate status also involves a different treatment of the lexeme (*prātipadika*) itself by determining, e.g., a shortening mechanism, such as the one explained by the following productive rule.

A 1.2.48: The final vowel of *go* or of a feminine-affixed noun applying to a nominal stem that is] termed *upasarjana* is replaced by a short vowel.

We have already seen the effect of this rule in (17), where the final long vowel of the feminine noun *kauśāmbī*, which is a final *prātipadika* and an *upasarjana*, is replaced by a short vowel. Now, since we are sure – as already emphasized at the beginning of the present chapter – that the combination of two or more inflected words of a bahuvrīhi have to be labelled *upasarjana-*, because *anekam* in A 2.2.24 is inflected in the nominative (see above, A 1.2.43), we must ponder the consequences of this analysis.

³⁴ *nis* is generally used as a verbal or nominal prefix, but sometimes it occurs as a preposition. See AVŚ 6.18.3: *ta īrṣyāṃ muñcāmi nīr* ‘I set your thought free from your jealousy’; AVŚ 7.115.3: *nīr itāḥ* ‘out from here’.

³⁵ Examples from KV ad A 1.2.44.

First of all, the *upasarjana*-status of the constituents affects some crucial morphological features in Pāṇini's formation of nominal compound or derivative stems. For instance, according to the just-mentioned rule A 1.2.48, the shortening of the final vowel of *go-*, e.g., in (18) *ariṣṭagu-* 'whose cows (*go-*) are unhurt (*ariṣṭa-*)' occurring in AVŚ 10.3.10, depends on this *upasarjana* label extended to the bahuvrīhi's *prātipadika*, i.e. to the combination of its surface-constituents.³⁶ Conversely, the shortening of the final vowel of *go-* does not apply either out of compound, when used as a fully syntactic word, or in several endocentric compounds where *go-* is not the *upasarjana*. See, e.g., the forms attested by the traditional lexicons, such as *bahusūtigo-* 'a cow that calves often'. Moreover, in the frequent tatpuruṣa type e.g., *gopati-* 'the lord of cows/of cowherds' (occurring several times in the RV), *go-* is also termed *upasarjana*, but the nominal stem (*prātipadika*) to which it belongs does not end with *go-* and its shortening does not apply.

6. In between morphology and syntax: the frozen relation of the constituents with the denotatum

Within such a framework of compounding, in our opinion, A 2.2.24 emphasizes the fact that, in the absence of a non-*upasarjana* constituent in the surface linguistic form of the bahuvrīhi, all its surface-constituents play an *upasarjana*-role and thus comply with A 1.2.44, characterizing them as having a single, frozen, case ending. As we can see in (18), in fact, each of these constituents is declined according to one single case ending, whatever the syntactic role of the compound in the sentence. Indeed, such a frozen syntactic combination of inflected nouns within the bahuvrīhi works as an etymon, contributing to its final meaning, which has to be *anyapadārtha*, i.e. it has to convey the denotatum of an inflected noun other than the compound-internal constituents. This final meaning crucially depends on the relationship of one single surface-constituent and the denotatum, because any other relation is realized through that constituent in a subordinate manner. Coming back to the already quoted example *ariṣṭagu-*, we propose the following analysis:

(18)				
	<i>ariṣṭā</i> (<i>ariṣṭāḥ</i>) unhurt-NOM.M.PL	<i>gāvo</i> (<i>gāvāḥ</i>) cows-NOM.M.PL	' <i>sya</i> (<i>asya</i>) that- GEN.M.SG	→ <i>ariṣṭagu-s</i> one whose cows are unhurt-NOM.M.SG
				→ <i>ariṣṭagu-m</i> one whose cows are unhurt-ACC.M.SG
				→ <i>ariṣṭagu-nā</i> by one whose cows are unhurt-INS.M.SG. [...]

The possessive relation expressed by the genitive *asya* in the traditional constituent analysis (*vigraha*) especially links *gāvāḥ* 'cows' to his possessor, who can thus be called *ariṣṭagu-* 'one whose cows are unhurt'. On the other hand, the relation between the denotatum (i.e. the possessor) and *ariṣṭāḥ* 'unhurt' is only indirectly assured by the relation between *gāvāḥ* and *ariṣṭāḥ*. In the source-phrase, in fact, both *upasarjanas*, i.e. *gāvāḥ* and *ariṣṭāḥ*, remain unchanged in their inflected form regardless of the case ending applying to the resultant compound when used in a sentence. The two frozen nominative cases play the role of subject and predicate in the nominal sentence constituting the source-phrase of the bahuvrīhi. They have the same function but a different scope. The nominative in *ariṣṭāḥ* signifies its syntactic-relation to the other constituent *gāvāḥ*, 'cows'; the nominative in *gāvāḥ* signifies its syntactic-relation with *ariṣṭāḥ* but also with an inflected-word other than the compound-internal constituents.

The specific shape of this relation between the etymon and the denotatum is expressed by the case of the demonstrative pronoun, a point we will tackle below. It is first necessary however to confirm that the internal structure of the *upasarjana* constituents matters, as can also be shown in the easiest examples of bahuvrīhis, e.g., the possessive ones, when the surface constituents do not

³⁶ Conversely, another set of provisions headed by A 4.1.14 concerns constituents that are not *upasarjana*. For instance, A 4.1.54 teaches an option between the derivational feminine affixes *-ā* and *-ī* for a specific set of nominal stems acting as *upasarjanas*. Accordingly, this option applies to the *upasarjana* compound nominal stem *candramukhī-/candramukhā-* 'moon-faced', but not to the negative tatpuruṣa stem *asīkhā-* 'without crest', where neither *śikhā* nor *asīkhā* is an *upasarjana*.

share the same case ending. In some bahuvrīhis, such as the Vedic *parjanya-retas-* (19), the constituent-analysis might be as follows:

- (19) a. *parjanya-retas-*
thunder-STEM-seed-STEM
'whose seed is from the thunder' (bahuvrīhi qualifying the feminine noun *iṣuḥ* 'an arrow/a reed' in RV 6.75.15)
- b. *parjanyaḍ* *reto* 'syāḥ (= *retah* + *asyāḥ*)
thunder-ABL.M.SG. seed-NOM.N.SG. that-GEN.F.SG.
'her seed is from the thunder'

No direct syntactic relation holds between the denotatum of the bahuvrīhi (i.e. 'an arrow' typically made of reed growing in muddy soil) and the left-hand constituent of the compound (i.e. 'the thunder'), but only between the denotatum and the right-hand constituent (i.e. 'the seed'). The left hand constituent is fully encapsulated in the source phrase, as shown by the ablative case ending; the nominative of the right-hand constituent however makes it available to the relation with its denotatum. The specific nature of this relationship is further specified by the case of the pronoun in the constituent-analysis.

The new method we here propose to explain Pāṇini's approach to bahuvrīhi is indeed inspired by the original descriptive method Pāṇini himself often used in explaining the source-phrase of secondary derivative nouns (*taddhitas*). In several *taddhita*-rules, indeed, besides using the pronoun *tad*, as a sort of pure place-holder, i.e. as something to be replaced by the lexeme actually used in the derivation – as we have just recalled above (§ 4) – Pāṇini employs a second pronoun, namely *idam*. He uses this second pronoun as a sort of anonymous "coat stand", on which a specific case ending may be hung, in order to convey the syntactic relation between the *upasarjana* of the secondary derivative stem (which is also its etymon)³⁷ and the denotatum (expressed or understood) of the secondary derivative stem. In fact, in the final surface-form of the derivative stem, no lexeme replaces or represents *idam*, but the meaning of the case-relation it conveys is indeed the distinctive trait of the final meaning of the *taddhita*, i.e., its specific (= non-generic) relationship with its etymon. We shall continue to label the variable expressed by *tad* (to be replaced by a specific lexeme) as X – as we did above (14c) – and instead, we shall call the second assumed variable Y, expressed in Pāṇini's rules by *idam*. Let us now focus on an easy example in rule A 5.2.94, which teaches the application of the affix *-mat* or *-vat* in the sense explained in the following source-phrase, in order to form two RV *taddhita* examples, *gómat* 'rich in cows' (20b¹) and *puṣpavat-* 'full of flowers' (20b²):

- (20) *tad* *asyāsty* *asmin*
a¹. *tad* *asya* *asti*
this-NOM.N.SG. that-GEN.M./N.SG. be-PRS.3SG
'X belongs to Y'
- a². *tad* *asmin* *asti*
this-NOM.N.SG. that-LOC.M./N.SG. be-PRS.3SG
'X in Y'
- b¹. *gavo 'sya santi*
(*gavaḥ*) (*asya*) *santi*
cow-NOM.M.PL that-GEN.M./N.SG. be-PRS.3PL
'cows (= X = *upasarjana*) belong to Y,'
i.e. cows belong to one who (or to an object that) can be called *gómat-* 'rich in cows' by using the matching secondary derivative nominal stem)
- b². *puṣpāny asmin santi*
(*puṣpāni*) (*asmin*) *santi*
flower-NOM.N.PL that-LOC.N.SG. be-PRS.3PL
'there are flowers (=X= *upasarjana*) within Y,'

³⁷ From some of Pāṇini's rules, we learn that *upasarjana* is a technical term which also indicates the non-head constituent in secondary derivation. According to A 6.2.104, for example, *pāṇini-* is termed "*upasarjana*" of the *taddhita* derivative stem *pāṇinīya-* 'disciple of Pāṇini' in the compound *pūrvāpāṇinīyāḥ* 'earlier disciples of Pāṇini'.

i.e. there are flowers within a place³⁸ which can be called *púṣpavat-* ‘full of flowers’ by using the matching secondary derivative nominal stem.

Above, in (14a) no second variable Y is involved, simply because *vaiyākaraṇá-* ‘grammarian’ is one ‘who studies grammar’ (*tád ádhīte*), i.e. the relation between the denotatum and the etymon *vyākaraṇam* (see 14c) is conveyed by the verbal ending of *ádhī-te* ‘he studies’, signifying the agent of the relevant action.

The present comparison between taddhita and bahuvrīhi patterns is not a ungrounded proposal, since the wording of two specific bahuvrīhi rules, i.e. A 2.2.27-28,³⁹ involve the mentioned demonstrative pronouns in the same way as taddhita rules to restrict the generic relation of the etymon with the denotatum. The earliest indigenous commentators, as we have seen, used to adopt either the pronoun *idam* in their constituent-analysis of the bahuvrīhi compound or the relative pronoun, which finally prevailed in the traditional commentaries.

Moreover, the relation between the etymon (more precisely: a specific constituent of the etymon) and the denotatum cannot be mechanically identified in a possessive relation: even though compound rules (with the notable exception of the already mentioned A 2.2.27-28) do not specify the exact nature of the postulated relationship, it is undeniable that different syntactic relations, besides the most common possessive genitive, may account for the final meaning of a bahuvrīhi. In particular, the earliest commentaries (Vt. 17-19 ad A 2.2.24) already identify two classes of bahuvrīhis: on the one hand, those characterized by a genitive or even by a locative relation with the denotatum (21) and, on the other, generally with a verbal noun as first constituent, characterized by a relation consisting of any verbal actant with the exception of the agent (22). The syntactic relation between the right-hand constituent (*mātaṅgās*) and the denotatum (here expressed as *vana* ‘forest’) is conveyed by means of the locative case. In the example (22), the frozen syntactic relation – expressed by means of the instrumental case – intervenes between the left-hand constituent (*ūdhas*, which is in its turn combined with *rathas*) and the denotatum (here expressed as *anaḍvān* ‘ox’). In the bahuvrīhi-analysis, Pāṇini does not actually teach the variable Y by means of a pronoun, but merely puts a meaning constraint on its constituent-combination, which has to convey the denotatum of another inflected word. Nevertheless, we maintain that this is indeed the ‘residual’ of the compounding rules (see above § 5: A 2.2.23 *śeso bahuvrīhih*). It is operatively based on the adoption of the whole range of specific combinations listed in the previous compounding sections, provided with the new constraint – unexplored in the previous rules⁴⁰ – namely *anyapadārthe*. Moreover, we consider it noteworthy that Pāṇini, just as we have seen in example (2a), involves the mere *artha* of the external constituent in the scheme of the bahuvrīhi source-phrase. In fact, such ‘another inflected noun’ can be expressed or understood: the identification of a specific external constituent is not required.⁴¹

In this context, the fact that Pāṇini’s compounding rule pattern does not aim at identifying the *pradhāna* (lit. ‘principal’, i.e. head constituent), as on the other hand Patañjali and later tradition suggest, becomes fully significant. Indeed, the concept of *upasarjana* from Pāṇini’s point of view is sufficient to account for all types of compounds, and even though the *upasarjana* is not independent at the morphological and syntactic level, it is effective in bringing about the construction of the final meaning of the resultant (compound or derivative) nominal stem.

If this interpretation of compounds is accepted, both the derivation through the zero-substitution of the affix and the explanation through the conversion of bahuvrīhis are proven to be completely extraneous to Pāṇini’s original model. In fact, the present interpretation of bahuvrīhi compounds does not entail a recursive application of the previous rules by adding something and eventually replacing it with zero at the surface morphology level. It is not the output of the previous rules, to be merely embedded in the new exocentric compound, as if the endocentric compounds were to be used as a “substrate” for the matching exocentric ones. In fact, we have to bear in mind that it is

³⁸ In the RV there is a single feminine plural occurrence, referring to plants ‘where there are plenty of flowers’ (*oṣadhīh [...] púṣpavatīh* RV 10.97.3).

³⁹ See, e.g., A 2.2.27: *tatra tenedam iti sarūpe* ‘Two inflected nouns having the same linguistic form combine with one another to form a bahuvrīhi denoting “it (Y) is in this (X)” or “it (Y) is by means of this (X)” to account for forms such as *keśā-keśi* (*yuddham*) ‘fight where there is mutual pulling of the hair’.

⁴⁰ With the exception of rule A 2.1.21, teaching the same constraint for indeclinable compounds such as *lohita-gāṅgām* ‘where Ganges river (*gāṅgā*) is red (*lōhitā*)’.

⁴¹ The expression *vibhaktyarthe* involved in Vt. 7 ad A 2.2.24 seems to hint at this interpretation.

only one of the surface-constituents of the bahuvrīhi, in a privileged syntactic relation with the bahuvrīhi's denotatum.

To illustrate this point, let us focus again on *ūdha-ratha-*. The denotatum of the whole compound *ūdha-ratha-* is the agent (*kartr̥*) of the action expressed by the past participle *ūdha-*, which occupies the left slot in the compound; by contrast, no direct relation links *ratha-* 'cart' (i.e., the right-hand constituent) with such a denotatum. This is reflected in the traditional source-phrase (22a) of *ūdha-ratha-*, where *anena* (which is the representation of the denotatum of the whole bahuvrīhi) combines with (or is in a constituency relation with) the past participle *ūdha-* and not with *ratha-*.

On the other hand, since no possessive relation holds between the denotatum of *ūdharatha-* and (one of) its surface-constituents, this bahuvrīhi cannot be explained as a mere transformation of (22c) by postulating that a zero affix conveying the sense of possessing applies to such a karmadhāraya.

- (21) a. *mattā bahavo mātāṅgā yasmin*
 (*mattās*) (*bahavas*) (*mātāṅgās*) (*yasmin*)
 excited-ADJ. many-NOM.M.PL elephant-NOM.M.PL which-LOC.N.SG
- tad mattabahumātāṅgam [vanam]*
 (*tat*) (*mattabahu-mātāṅgam*) (*vanam*)
 that-NOM.N.SG BAHUVRĪHI forest- NOM.N.SG
- b. *mattās + bahavas + mātāṅgā = X; yasmin = Y*
- (22) a. *ūdho ratho 'nenodharatho 'naḍvān*
 (*ūdhas*) (*rathas*) (*anena*) (*ūdharathas*) (*anaḍvān*)
 drive-PAST.PTCP.NOM.M.SG cart-NOM.M.SG that-INS.M.SG BAHUVRĪHI ox- NOM.M.SG
 'A cart is drawn by that,' i.e. [it is] an ox [which can be called] *ūdharatha-* 'by which a cart is drawn' (by using the matching bahuvrīhi compound).
- b. *ūdhas + rathas = X; anena = Y*
 c. **ūdha-* -*ratha-*
 drive-PAST.PTCP.STEM cart-STEM
 'drawn cart'

Brugmann (1905-6:75) had already underlined that such a transformation is not correct, and it does not suffice to consider such a typology of compounds as a sort of exception, as Whitney (1889: 510) suggested. There are many ancient examples of bahuvrīhi compounds comparable to *ūdha-ratha*, i.e. compounds whose denotatum is in a privileged syntactic relation with the left-hand constituent. For instance, *ṛtābrahman-* occurs three times in the RV, always as NOM.M.SG (*ṛtābrahmā*), on each occasion with a different syntactic role played by the denotatum of the whole compound with respect to the *upasarjana*-constituent *ṛtā-*:

- in RV 2.25.1 (21a) the denotatum of masculine *ṛtābrahmā* is a man who won the favour of the god Bṛhaspati, since he was the agent (*kartr̥*) of the action expressed by the past participle *ṛtā*;
- in RV 6.20.3 (21b), it is the recipient (*sampradāna*) of the action, i.e. the god Indra, mentioned in the same hemistich;
- in RV 7.70.6 (21c), it is the substratum (*adhikaraṇa*) of the action, namely an (explicitly mentioned) sacrifice.

The relevant constituent analysis of these three occurrences might be as follows. None of these three occurrences of the same bahuvrīhi can be obtained 'by adding *having* or *possessing* to the meaning of the determinative' (Whitney 1889:501), which could be assumed as "substrate" of bahuvrīhis (23a), (23b), (23c), made up of the two surface-constituents *ṛtām* and *brāhman* – merely because no possessive relation holds between the denotatum of the assumed karmadhāraya, and the denotatum of the bahuvrīhi itself.

- (23) BAHUVRĪHIS
- a. *ṛtām brāhman anena ṛtābrahmā*
 create-PAST.PTCP.NOM.N.SG sacred formulation- NOM.N.SG that-INS.N.SG BAHUVRĪHI
 'One by whom the sacred formulation is created is a *ṛtābrahmā*'
- b. *ṛtām brāhman asmaḥ ṛtābrahmā + indras*
 create-PAST.PTCP.NOM.N.SG sacred formulation- NOM.N.SG that-DAT.N.SG BAHUVRĪHI Indra-NOM.M.S

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