Pāṇini and the Non-Head (*upasarjana*) of Attributive Endocentric Compounds

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Abstract   This study aims at contributing to our understanding of Pāṇini's classification of compounds. In particular, this study investigates the notion *upasarjana* – roughly translatable as 'non-head' – in attributive endocentric (so-called *karmadhāraya*) compounds like *nava-jvāra-* 'new suffering', by addressing the following questions: do the units that Pāṇini designated as *upasarjana* in subordinate endocentric (so-called *tatpuruṣa* 'proper') compounds like *aśva-śapha-* 'horse's hoof' share any feature with the units that he designated as *upasarjana* in *karmadhārayas*? More generally, what is the hallmark of the units designated as *upasarjana*? To answer these questions, we shall delve into several rules of Pāṇini's grammar – the *Aṣṭādhyāyī* – which conceal such powerful grammatical tools as silent case endings and the operation of case-copying.

Keywords   Case-copying. Compounding. Derivational levels. Headedness. Sanskrit.

1 Introduction

The ancient Indian grammarian Pāṇini (ca. fourth century B.C.) came up with a fine-grained classification of compounds, involving such compound-classes as *tatpuruṣa*, *karmadhāraya*, *dvandva*, *bahuvrīhi*, *avyayībhāva*. Some of these terms still survive in contemporary treatments of compounding: see, e.g. Scalise, Bisetto 2009; Bauer 2017. Nevertheless, the criteria on which Pāṇini grounded his classification of compounds are still poorly understood. For instance, Tribulato's (2015, 53) claim that Pāṇini's classification is a semantic one is certainly not correct (see also Bauer 2017, 107-12), as revealed by Pontillo's findings on the so-called *upasarjana* (Pontillo 2003b).[1]

In the present study, I address a puzzle posed by Pāṇini's analysis of *karmadhāraya* compounds (i.e. attributive endocentric compounds, in the terms of Bisetto, Scalise 2005; Scalise, Bisetto 2009). The resolution of this puzzle will shed some light on the criteria that a compound must satisfy to count as *karmadhāraya*, and hence, on the criteria underlying Pāṇini's classification of compounds more broadly.

The present study is organised as follows. In section § 2, I provide a simplified illustration of the puzzle that this study attempts to solve. In section § 3, I discuss in some detail Pāṇini's model of compounding with a focus on the notion of *upasarjana*. This will allow me to rephrase the puzzle informally illustrated in § 2 in more precise terms. In section § 4, I capitalise on the rule governing present participles to advance a solution to the puzzle described in § 2. Finally, in section § 5 I sum up the preceding discussion and draw some conclusions.

2 The Puzzle

Consider *aśva-śapha-* 'horse's hoof' (ŚB 13.3.4.4), a Sanskrit compound formed from the nouns *aśva-* 'horse' and *śapha-* 'hoof'. This compound is equivalent in meaning to both *śaphād aśvasya* 'from the horse's hoof' (1a) and *aśvasya śapham* 'the horse's hoof' (1b).[2]

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[1] See also Candotti, Pontillo 2019; 2022; Mocci, Pontillo 2019; Pontillo 2021.

[2] I shall mark accents in textual examples only.

(1a) ṚV 1.117.6

śaphā́d	*áśvasya*	*śatáṃ* [...]	*kumbhā́n*	*asiñcatam*	*mádhūnām.*
hoof.ABL.SG.M	horse.GEN.SG.M	hundred	pot.ACC.PL.M	pour.IND.IMPF.2DU	honey.GEN.PL.N

'You two poured a hundred pots of honey from the horse's hoof'.[3]

(1b) (Invented example)[4]

aśvasya	*śapham*	*paśyāmi.*
horse.GEN.SG.M	hoof.ACC.SG.M	see.IND.PRS.1SG

'I see a horse's hoof'.

Interestingly, *aśva-* has one single case ending in (1), in the sense that the case ending of *aśva-*, unlike that of *śapha-*, remains unchanged in these sentences: *śapha-* is inflected in the ablative in (1a), where the noun phrase headed by *śapha-* (i.e. *śaphād aśvasya*) fulfills the function of circumstantial complement of place, but is inflected in the accusative in (1b), where the noun phrase headed by *śapha-* (i.e. *aśvasya śapham*) fulfills the function of direct object; on the other hand, *aśva-* remains inflected in the genitive in both (1a) and (1b).

Pāṇini noted this asymmetry between the changeable case ending of *śapha-* and the unchangeable case ending of *aśva-* in (1).[5] Thus, in his grammar (the *Aṣṭādhyāyī* or "A" for short), he designates *aśva-* as the *upasarjana* of *aśva-śapha-* (rule A 2.2.8, to be considered in combination with A 1.2.43);[6] then, he defines the *upasarjana* as the unit that, when embedded in a sentence pair like (1a-b), results as being *ekavibhakti* (rule A 1.2.44). In keeping with work by Tiziana Pontillo and Maria Piera Candotti (see especially Pontillo 2003b; Candotti, Pontillo 2019, 22-4; Pontillo 2021, 505-9), *ekavibhakti* means 'having one single case ending', hence 'having an unchangeable case ending'. Therefore, the *upasarjana* is for Pāṇini the compound-member that, when embedded in a sentence pair like (1a-b), results as having (i.e. being inflected in) an unchangeable case-ending. Accordingly,

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3   Unless otherwise stated, all translations are by the Author.

4   For a textual example, cf. *só 'śvasyāvāntaraśaphò 'bhavat* 'this became the intermediate hoof of the horse' in TS 5.2.6, where *śapha-* is inflected in the nominative (*śaphaḥ*, which shows up as *śapho* in compliance with the euphonic combinatory rules going under the rubric "sandhi"). The comparison of examples like this from TS or (1b) with examples like (1a) shows that the ordering of an inflected form of *śapha-* with respect to an inflected form of *aśva-* is not fixed.

5   Note that 'changeable' and 'unchangeable' are used in this paper merely to refer to the ability or inability of an inflected noun that belongs to a noun phrase (NP) to display different case endings when a NP fulfils different grammatical functions.

6   A 1.2.43 and 2.2.8 will be examined in detail in § 3 below. At this stage of the paper, the discussion will be kept at an informal level.

the asymmetry between the changeable case ending of *śapha-* and the unchangeable case ending of *aśva-* in a sentence pair like (1a-b) is brought out, in Pāṇini's grammar, by the fact that *aśva-*, as opposed to *śapha-*, gets the designation *upasarjana*.

Consider now so-called *karmadhāraya* compounds – which correspond to attributive endocentric compounds in the classification of Bisetto, Scalise 2005; Scalise, Bisetto 2009 – such as *nava-jvāra-* 'new suffering'. In A 2.1.49 (to be considered in combination with A 1.2.43), Pāṇini designates *nava-* 'new' as the *upasarjana* of *nava-jvāra-*. Then, by the rule-segment *ekavibhakti* occurring in A 1.2.44, we expect *nava-* to be a unit U such that, when U is embedded within an appropriate sentence pair, such as the invented examples (2a-b), the case ending of U results as being unchangeable. And yet, the case ending of *nava-* changes in (2a-b) just like the case ending of *jvāra-* 'suffering': both *nava-* and *jvāra-* are inflected in the nominative in (2a), where the noun phrase headed by *jvāra-* (i.e. *navo jvāraḥ*) fulfils the function of subject of the predication; both *nava-* and *jvāra-* are inflected in the accusative in (2b), where the noun phrase headed by *jvāra-* (i.e. *navaṃ jvāram*) fulfils the function of direct object.

(2a) (Adapted from ṚV 1.42.8ab)

navo	*jvāro*	*adhvane*.
new.NOM.SG.M	suffering.NOM.SG.M	road.DAT.SG.M

'New suffering is on the road'.

(2b) (Invented example)

navaṃ	*jvāram*	*paśyāmi*.
new.ACC.SG.M	suffering.ACC.SG.M	see.IND.PRS.1SG

'I see new suffering'.

Therefore, there seems to be no asymmetry between *nava-* and *jvāra-* in *nava-jvāra-* when it comes to case endings: neither of these compound-members, when it is embedded within an appropriate sentence pair, results in being *ekavibhakti*, i.e. results in having an unchangeable case ending.

We are thus faced with a puzzle. On the one hand, A 2.1.49 teaches that *nava-* (and not *jvāra-*) gets the designation *upasarjana* in *nava-jvāra-*. On the other hand, A 1.2.44 defines the *upasarjana* as the *ekavibhakti* unit, but *nava-* is not *ekavibhakti* in *nava-jvāra-*: *nava-* does not have an unchangeable case ending when it is embedded in a sentence pair like (2a-b). Thus, A 1.2.44 is in apparent contradiction with A 2.1.49 when it comes to *karmadhāraya*s like *nava-jvāra-*. Let us, however, note that the contradiction only arises if we read *ekavibhakti* as 'having an unchangeable case ending'. In this paper, I

argue for an ambiguous reading of *ekavibhakti* that eschews the contradiction between A 2.1.49 and 1.2.44.

In the next section (§ 3), I shall provide a more detailed account of how the *upasarjana*-based model of compounding devised by Pāṇini works. This will make it possible to rephrase the puzzle outlined in this section in more precise terms.

3 Pāṇini's Model of Compounds

A whole section of Pāṇini's grammar, namely A 2.1-2.2, is dedicated to specifically to compounding; in addition, other rules from other sections provide ancillary information and definitions regarding compounds and compound-members. In what follows, I will briefly illustrate how the compounding phenomenon is modelled in Pāṇini's rules, concentrating on the notion of *upasarjana*.

3.1 The Morphological Status of Compound-Members

In this subsection we shall consider three rules: A 2.1.4, 1.2.46, and 2.4.71. Building on Cardona (1997, 21-3, 186, 207), Kiparsky (2009, 67, 81-2), Candotti and Pontillo (2019, 31; 2022, 10), I will present a reading of these rules whereby they are strictly interconnected.

To start with, the general rule that governs compounding is A 2.1.4:

A 2.1.4: *saha supā* [*sup* 2.1.2] [*samāsaḥ* 2.1.3].
'a nominal inflected word (*sUP*) combines with another nominal inflected word in order to form a compound'.

In accordance with this rule, compound-members are nominal inflected words. Interestingly, A 1.2.46 teaches that a compound, which is made up of two inflected words, indeed qualifies as a nominal stem (*prātipadika*).[7]

A 1.2.46: *kṛttaddhitasamāsāś ca* [*prātipadikam* 1.2.45].
'Nominal deverbal derivatives (*kṛt*), nominal denominal derivatives (*taddhita*), and compounds also go under the rubric 'nominal stem' (*prātipadika*)'.

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[7] *prātipadika* is also translated as 'nominal base'. For our purposes, nominal stem and nominal base can be taken to be equivalent notions: both refer to what is left when the case ending of a nominal inflected word is dropped (see, among others, Wackernagel 1905, 10).

At first sight, the information that a compound is a (nominal) stem – as taught by A 1.2.46 – is incompatible with the information that compound-members are (nominal) inflected words (as taught by A 2.1.4). For example, given the compound stem *aśva-śapha-* 'horse's hoof', it does not seem to be possible to consider the compound-members *aśva-* and *śapha-* as inflected words: from a morphological point of view, *aśva-* and *śapha-* are stems, not inflected words. The question then arises as to how we can reconcile the information taught by A 1.2.46 with the information taught by A 2.1.4. The answer to this question is suggested by another rule:

> A 2.4.71: *supo dhātuprātipadikayoḥ* [*luk* 2.4.58].
> 'A case ending that is part of a verbal or nominal stem (*dhātuprātipadikayoḥ*) is zero-replaced'.

In accordance with A 2.4.71, any case ending contained within a nominal stem is zero-replaced.[8] But we have just seen that compounds qualify as nominal stems (*prātipadika*s) in compliance with A 1.2.46. Accordingly, any case ending contained within a compound is zero-replaced. That is, *aśva-śapha-* (a compound stem) derives from *aśvasya śaphaḥ* 'horse's hoof' (a combination of run-of-the-mill inflected words) via the zero-replacement of the case endings attached to *śaphaḥ* and *aśvasya*. Formally:

(3)

aśva-sya śapha-ḥ   → *aśva-Ø śapha-Ø*   = *aśva-śapha-*
horse-GEN hoof-NOM
'horse's hoof'.

Crucially, zero is always an allomorph of an overt morpheme in the *Aṣṭādhyāyī* (Pontillo 2003a, 139-40; Kiparsky 2009, 80). Thus, the zero attached to *aśva-* in (3) is a silent allomorph, and the *-sya* attached to *aśva-sya* an overt allomorph, of the abstract morpheme SYA that represents the genitive case ending of the thematic declension. Likewise, the zero attached to *śapha-* in (3) is a silent allomorph, and the *-ḥ* attached to *śapha-ḥ* an overt allomorph, of the abstract morpheme S that represents the nominative case ending of the thematic declension. In other words, the zero attached to *aśva-* in (3) qualifies as a genitive case ending on a par with the *-sya* attached to *aśva-sya*,

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[8] *Contra* Sharma (1999-2003, 221), I am taking the case ending of the compound *dhātuprātipadikayoḥ* to be locative, rather than genitive. In this way, *dhātuprātipadikayoḥ* informs us that the locus in which the case ending (*sUP*) to be zero-replaced occurs is a verbal or nominal stem.

whereas the zero attached to *śapha-* in (3) qualifies as a nominative case ending on a par with the *-ḥ* attached to *śapha-ḥ*. Therefore, (3) is best represented as in (4), where *aśva-Ø*ᴳᴱᴺ *śapha-Ø*ᴺᴼᴹ is a combination of nominal inflected words marked with a specific (albeit silent) case ending.

(4)
aśva-sya śapha-ḥ → *aśva-Ø*ᴳᴱᴺ *śapha-Ø*ᴺᴼᴹ = *aśva-śapha-*
horse-ɢᴇɴ hoof-ɴᴏᴍ
'horse's hoof'.

Generalising the results that we have just reached, we may say that, according to Pāṇini, compound-members are nominal inflected words of a special sort: like run-of-the-mill nominal inflected words, they are endowed with a case ending (rule A 2.1.4), but – unlike in run-of-the-mill nominal inflected words – such a case ending is silent (rule A 2.4.71).[9] Owing to the silent character of the case endings attached to compound-members (e.g. *aśva-Ø*ᴳᴱᴺ *śapha-Ø*ᴺᴼᴹ), compound-members are – at least at the surface level of language – non-distinct from nominal stems (e.g. *aśva-* and *śapha-*). What is more, the combination of a nominal inflected word whose case ending is silent (e.g. *aśva-Ø*ᴳᴱᴺ) with another nominal inflected word whose case ending is also silent (e.g. *śapha-Ø*ᴺᴼᴹ) is – again at the surface level of language – non-distinct from a new nominal stem (e.g. the nominal stem *aśva-śapha-* is superficially non-distinct from the combination of inflected words *aśva-Ø*ᴳᴱᴺ *śapha-Ø*ᴺᴼᴹ). This allows Pāṇini to designate a compound like *aśva-śapha-* (= *aśva-Ø*ᴳᴱᴺ *śapha-Ø*ᴺᴼᴹ) as a nominal stem (rule A 1.2.46). Qua nominal stem, *aśva-śapha-* behaves like any non-compound nominal stem taken from the lexicon: *aśva-śapha-* 'horse's hoof' has its own accent (on the last syllable, i.e. *aśva-śaphá-* – see ŚB 13.3.4.4), its own inherent gender (masculine), and its own inflectional class (thematic declension), just like the non-compound nominal stem *putrá-* 'son'.

Thus, a convenient way of characterising Pāṇini's model of compounding is involving two levels of representation: a deep level, in which case-endings are represented even when they are silent (e.g.

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*aśva-Ø*ᴳᴱᴺ *śapha-Ø*ᴺᴼᴹ), and a surface level, in which case endings are represented only when they are overt. In this two-tiered model, the information that a compound is a nominal stem – as taught by A 1.2.46 – does not conflict with the information that a compound is a combination of nominal inflected words (as taught by A 2.1.4): since the case-endings attached to compound-members are silent in keeping with A 2.4.71, a compound appears as a combination of inflected words (*aśva-Ø*ᴳᴱᴺ *śapha-Ø*ᴺᴼᴹ) only at the deep level of representation, while showing up as a nominal stem (*aśva-śapha-*) at the surface level of representation, where silent case endings are never represented.

At this point, one may wonder whether the semantic import of suffixing a null case ending to a certain nominal stem is the same as the semantic import of suffixing an overt case ending to that nominal stem. In other words, does the meaning of, e.g. *aśva-śapha-* (= *aśva-Ø*ᴳᴱᴺ *śapha-Ø*ᴺᴼᴹ) – where *aśva-* and *śapha-* are endowed with a silent case ending – differ from the meaning of *aśvasya śaphaḥ*, where *aśva-* and *śapha-* are endowed with an overt case ending? Indeed, Pāṇini directly addressed this question in A 2.1.1:[10]

> A 2.1.1: *samarthaḥ padavidhiḥ*.
> 'A provision that depends on nominal inflected words has the same meaning [as the output of the provision]'.

The gist of A 2.1.1 can be simplified along the following lines: let C be a compound (e.g. *aśva-śapha-* = *aśva-Ø*ᴳᴱᴺ *śapha-Ø*ᴺᴼᴹ); let W1 + W2 be the combination of nominal inflected words from which C derives via the zero-replacement of the case endings attached to W1 and W2 (e.g. *asvasya sapha*); let R be the rule which outputs C and directly or indirectly mentions W1 and W2 (e.g. A 2.2.8, examined in detail in § 3.2 below); then, A 2.1.1 teaches that C is synonymous with W_1 + W_2 (see Pontillo 2018 for relevant discussion). Therefore, in light of A 2.1.1 interpreted *à la* Pontillo (2018), I conclude that the meaning of a compound (i.e. the meaning of a combination of inflected words endowed with silent case endings, such as *aśva-śapha-* = *aśva-Ø*ᴳᴱᴺ *śapha-Ø*ᴺᴼᴹ) does not differ from the meaning of the corresponding combination of inflected words endowed with overt case endings (*aśvasya śaphaḥ*) in Pāṇini's model of compounding.

In sum, a distinctive property of Pāṇini's model of compounding is the idea that silent case endings are suffixed to compound-members. This idea makes it possible to reconcile the information that a compound is a stem (A 1.2.46) with the information that a compound

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[10] I am following Pontillo 2018's interpretation of A 2.1.1, which differs substantially from the traditional interpretation going back to Kātyāyana. On the advantages of her new interpretation over the traditional one, see Pontillo 2018, 132-5.

is a combination of inflected words (A 2.1.4): at the surface level of representation, the combination of two compound-members endowed with silent case endings is non-distinct from a compound-stem; at a deeper level of representation, however, those selfsame compound-members endowed with a silent case ending are in all relevant respects inflected words.

3.2   *Upasarjana* Inside and Outside Compounding

Let us now examine a crucial notion for Pāṇini's model of compounding, namely the notion of *upasarjana*. Pāṇini introduces this notion in A 1.2.43:

> A 1.2.43: *prathamānirdiṣṭaṃ samāsa upasarjanam*.
> 'What is mentioned in the nominative in a compound[-rule] goes under the rubric *upasarjana*'.

This is a meta-rule, in the sense that it provides instructions as to how (segments of) other rules should be properly read. Specifically, A 1.2.43 informs the reader that, whenever Pāṇini mentions a form X in the nominative in a compound-rule, the reader must identify X as an *upasarjana*. The nominative case in which X is mentioned in a compound-rule is dubbed as 'metalinguistic nominative'. To illustrate how A 1.2.43 works with a concrete example, let us consider A 2.2.8, which is a compound-rule.

> A 2.2.8: *ṣaṣṭhī* [*samāsaḥ* 2.1.3] [*saha supā* 2.1.4] [*vā* 2.1.18] [*tatpuruṣaḥ* 2.1.22].
> 'a noun inflected in the genitive preferably combines with a nominal inflected word to form a tatpuruṣa compound'.[11]

This rule teaches to form, for example, *aśva-śapha-* from *aśvasya śaphaḥ*, i.e. from the combination of the run-of-the-mill inflected forms of *śapha-* 'horse' and *aśva-* 'hoof' (technically, such a combination is an NP). Specifically, *ṣaṣṭhī-* 'noun inflected in the genitive' of A 2.2.8 refers to *aśvasya* 'horse.GEN', because *aśvasya* is inflected in the genitive. But *ṣaṣṭhī-* is in turn inflected in the metalinguistic nominative in A 2.2.8, i.e. as *ṣaṣṭhī*. Thus, while being inflected in the metalinguistic nominative inside a compound-rule, *ṣaṣṭhī-* refers to

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[11]   Simplifying somewhat, *tatpuruṣa* compounds correspond to subordinate endocentric compounds (e.g. English *truck-driver*) in Scalise and Bisetto's classification: see Bisetto, Scalise 2005; Scalise, Bisetto 2009. As for the involvement of *vā* in A 2.2.8, I am following Kiparsky 1979, 3; Radicchi 1988, 56-8; Candotti, Pontillo 2022, 10 fn. 26 in taking *vā* to continue from A 2.1.18 through 2.2.9 by the so-called mechanism of *anuvṛtti*.

a form that, outside compound-rules, is inflected in the non-metalinguistic genitive case (*aśvasya*). At this point, the reader is instructed by A 1.2.43 to identify *aśvasya* as *upasarjana* in the NP *aśvasya śaphaḥ*, insofar as *aśvasya* is referred to by a noun inflected in the metalinguistic nominative (*ṣaṣṭhī*) in a compound-rule.

By means of A 1.2.43, one may construct a set of the units that count as *upasarjana* within the *Aṣṭādhyāyī*: e.g. all the units that are referred to by the rule-segment *ṣaṣṭhī* figuring in A 2.2.8 belong to such a set. However, A 1.2.43 does not tell us what linguistic features the elements inserted in that set (call it the '*upasarjana* set') share; that is, A 1.2.43 does not provide us with a genuinely linguistic criterion that justifies the membership of those units to the *upasarjana* set (see Pontillo 2003b: 21 and the references quoted therein). Such a criterion is indeed offered by Pāṇini in A 1.2.44: the *upasarjana* is the *ekavibhakti* unit, i.e. the unit that has an unchangeable case ending (see Pontillo 2003b; Candotti, Pontillo 2019, 22-4; Pontillo 2021, 505-9).[12]

> A 1.2.44: *ekavibhakti cāpūrvanipāte* [*upasarjanam* 1.2.43].
> 'And what has an unchangeable case ending also goes under the rubric *upasarjana*, even when it does not occupy the left-hand slot [of a compound]'.

Now, the *ekavibhakti* unit may be a compound-member (e.g. *aśva-* in *aśva-śapha-*) or an NP-internal inflected word (e.g. *aśvasya* in *aśvasya śaphaḥ*).[13] Let us consider how, starting with the case in which the *ekavibhakti* unit is an NP-internal inflected word.

Indeed, *śaphaḥ* is not *ekavibhakti* in the NP *aśvasya śaphaḥ*, insofar as the case ending displayed by *śaphaḥ* (i.e. nominative) varies depending on the grammatical function fulfilled by the NP *aśvasya*

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12   It may reasonably be contended that the main purpose of A 1.2.44 is to extend the designation *upasarjana* to units other than those that satisfy the requirement imposed by A 1.2.43, i.e. to units that, while not being referred to by a form inflected in the metalinguistic nominative in a compound-rule, display an unchangeable case ending (*ekavibhakti*). However, the contention that A 1.2.44 primarily aims at extending the designation of *upasarjana* is not by any means incompatible with – and hence does not undermine – the claim that A 1.2.44 also provides a genuinely linguistic criterion for defining the *upasarjana* (namely, that it displays an unchangeable case ending). What is necessary to undermine the latter claim is a case in which units designated by Pāṇini as *upasarjana* fail to comply with the genuinely linguistic criterion imposed by A 1.2.44. In what follows I shall argue that attributive endocentric (*karmadhāraya*) compounds do not provide such a case; see Pontillo 2003b for evidence that other compound types, too, do not provide such a case. I am indebted to one of the anonymous reviewers for drawing my attention to this point.

13   For the sake of simplicity, I shall disregard here the case in which the *ekavibhakti* unit is a member of *taddhita*s (i.e. nouns derived from other nouns), which also involve an *upasarjana*. See Candotti, Pontillo 2019, 25; 2022, 16-17 in this connection.

śaphaḥ in a given pair of sentences. For instance, *śaphaḥ* is inflected in the ablative in (1a) (repeated below as (5a)), where the NP *aśvasya śaphaḥ* fulfils the function of circumstantial complement (the so-called *apadāna* 'source' of the Indian grammatical tradition); but *śaphaḥ* is inflected in the accusative in (1b) (repeated below as (5b)), where the NP *aśvasya śaphaḥ* fulfills the function of direct object.

(5a) ṚV 1.117.6

śaphā́d	*áśvasya*	*śatáṃ*	[…]	*kumbhā́n*	*asiñcatam*	*mádhūnām.*
hoof.ABL.SG.M	horse.GEN.SG.M	hundred		pot.ACC.PL.M	pour.IND.IMPF.2DU	honey.GEN.PL.N

 'You two poured a hundred pots of honey from the horse's hoof'.

(5b) (Invented example)

aśvasya	*śapham*	*paśyāmi.*
horse.GEN.SG.M	hoof.ACC.SG.M	see.IND.PRS.1SG

'I see a horse's hoof'.

On the other hand, *aśvasya* does qualify as *ekavibhakti* in the NP *aśvasya śaphaḥ*, insofar as the different grammatical functions fulfilled by the NP *aśvasya śaphaḥ* in (5a-b) (i.e. the functions of direct object and circumstantial complement) do not result in *aśvasya* displaying different case endings: the case ending displayed by *aśvasya* is the same (i.e. genitive) in (5a) and (5b). Since *aśvasya* qualifies as *ekavibhakti* in the NP *aśvasya śaphaḥ*, *aśvasya* gets the designation *upasarjana* in the NP *aśvasya śaphaḥ* in compliance with A 1.2.44. In this way, A 1.2.43 and 1.2.44 converge in identifying *aśvasya* as *upasarjana* in the NP *aśvasya śaphaḥ*.

Let us now proceed with showing how a compound-member may be the *ekavibhakti* unit. Recall that both *aśva-Ø*GEN *śapha-Ø*ABL and *aśvasya śaphaḥ* qualify as NPs made up of nominal inflected words in Pāṇini's model of compounding. Now, owing to this parallelism between *aśva-Ø*NOM *śapha-Ø*NOM and *aśvasya śaphaḥ*, (5a-b) may be rewritten as (6a-b), which are abstract grammatical representations not yet belonging to the set of well-formed sentences of Sanskrit. In order for (6a-b) to become well-formed sentences of the Sanskrit language, an overt case ending should attach to the whole NP *aśva-Ø*GEN *śapha-Ø*NOM or to its variants (*aśva-Ø*GEN *śapha-Ø*ABL and *aśva-Ø*GEN *śapha-Ø*ACC), which may all be notated as *aśva-Ø*GEN *śapha-Ø*X for convenience.[14] For example (6c), where an overt accusative case ending attaches to the NP *aśva-Ø*GEN *śapha-Ø*ACC (6b) is a well-formed sentence in Sanskrit.

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14 Recall that *aśva-Ø*GEN *śapha-Ø*X is superficially non-distinct from the stem *aśva-śapha-*. See § 3.1 above.

(6a) (adapted from ṚV 1.117.6)

*aśva-Ø*GEN	*śapha-Ø*ABL	*śatáṃ*	*kumbhā́n*	*asiñcatam*	*mádhūnām.*
horse.GEN.SG.M	hoof.ABL.SG.M	hundred	pot.ACC.PL.M	pour.IND.IMPF.2DU	honey.GEN.PL.N

'You two poured a hundred pots of honey from the horse's hoof'.

(6b) (Invented example)

*aśva-Ø*GEN	*śapha-Ø*ACC	*paśyāmi.*
horse.GEN.SG.M	hoof.ACC.SG.M	see.IND.PRS.1SG

'I see a horse's hoof'.

(6c) (Invented example)

aśva-śapha-m	[= *aśva-Ø*GEN*-śapha-Ø*ACC*-m*]	*paśyāmi.*
horse-hoof.ACC.SG.M		see.IND.PRS.1SG

'I see a horse's hoof'.

In (6a-b), *aśva-Ø*GEN – but not *śapha-Ø*ˣ – qualifies as *ekavibhakti*: regardless of the different grammatical functions fulfilled by the NP *aśva-Ø*GEN *śapha-Ø*ˣ in these sentences (circumstantial complement in (6a); direct object in (6b)), the silent case ending of *aśva-Ø*GEN remains unchanged (i.e. genitive). Qua *ekavibhakti* unit, *aśva-Ø*GEN gets the designation *upasarjana* in the NP *aśva-Ø*GEN *śapha-Ø*ˣ in keeping with A 1.2.44. But such an NP is the representation of compound *aśva-śapha-* in Pāṇini's model of compounding. Hence, in this model, both a compound-member – e.g. *aśva-* (= *aśva-Ø*GEN) included in *aśva-śapha-* (= *aśva-Ø*GEN *śapha-Ø*ˣ) – and an ordinary inflected word – e.g. *aśvasya* included in *aśvasya śaphaḥ* – may be designated as *upasarjana* (see Mocci, Pontillo 2019, 5-6 fn. 14).

Thus, A 1.2.44 provides a specific criterion whereby certain elements (e.g. *aśva-* = *aśva-Ø*GEN) and not others (e.g. *śapha-* = *śapha-Ø*ˣ) are included in the *upasarjana* set: all the elements of the *upasarjana* set share a specific feature, namely that their case ending remains unchanged regardless of the grammatical function fulfilled by the NP to which they belong. I suggest translating the technical term *upasarjana* as 'non-head', on the understanding that the NP-internal unit whose case ending remains unchanged when the grammatical function fulfilled by the NP changes typically coincides with the NP-internal unit that does not serve as the head of the NP.

In the present subsection, I confined my attention to an example in which A 1.2.43 and 1.2.44 converge in identifying a certain unit as *upasarjana*: *aśva-* (= *aśva-Ø*GEN) is the *upasarjana* of *aśva-śapha-* (= *aśva-Ø*GEN *śapha-Ø*ˣ) in keeping with both A 1.2.43 and 1.2.44. In the next subsection (§ 3.3), instead, I shall focus on an example in which

the *upasarjana*, as identified on the basis of A 1.2.44, does not coincide with the *upasarjana* as identified on the basis of A 1.2.43.

3.3 On the Segment *apūrvanipāte*

The wording of A 1.2.44 was given in § 3.2 and is repeated below for convenience.[15]

> A 1.2.44: *ekavibhakti cāpūrvanipāte* [*upasarjanam* 1.2.43].
> 'And what has an unchangeable case ending also goes under the rubric *upasarjana*, even when it does not occupy the left-hand slot [of a compound]'.

While I spent some time discussing the meaning of *ekavibhakti* (i.e. 'having an unchangeable case ending'), I have not yet said anything on the other segment of this rule, namely, *apūrvanipāte*, which I translated as 'even when what has an unchangeable case ending (*ekavibhakti*) does not occupy the left-hand slot of a compound'.[16] As pointed out by Candotti and Pontillo (2019, 24), the *apūrvanipāte* segment acknowledges that there are exceptions to the general rule governing the position of the *upasarjana* inside compounds, i.e. A 2.2.30.

> A 2.2.30: *upasarjanaṃ pūrvam*.
> 'A constituent termed *upasarjana* occupies the left-hand slot [in a compound]'.

To wit, according to A 2.2.30 the canonical position occupied by the *upasarjana* is the left-hand slot of the compound: for instance, the left-hand slot of *aśva-śapha-* (= *aśva-Ø*ᴳᴱᴺ *śapha-Ø*ˣ) is occupied by *aśva-* (= *aśva-Ø*ᴳᴱᴺ), which we have said is designated as *upasarjana* in this compound (see § 3.2 above). However, there are cases in which the *upasarjana* occupies the right-hand slot of the compound. Thus, KV *ad* A 1.2.44 gives the following example of a *tatpuruṣa*:

(7)
niṣ-kauśāmbi-
out.of-Kauśāmbī-
'(One) who is out of the city termed *Kauśāmbī*'.

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[15] The following discussion will heavily draw on Pontillo's work on A 1.2.44 and its subsequent elaborations by Candotti and Pontillo (see especially Pontillo 2003b; Candotti, Pontillo 2019; Candotti, Pontillo 2022).

[16] Of course, *apūrvanipāte* results from breaking down *cāpūrvanipāte* into *ca* and *apūrvanipāte*. I am taking *apūrvanipāte* to be a concessive locative.

This compound is taught by A 2.2.18, which features the segment *prādi-* 'the list beginning with *pra-*':

A 2.2.18: *kugatiprādayaḥ* [*samāsaḥ* 2.1.3] [*saha supā* 2.1.4] [*sup* 2.1.9] [*tatpuruṣaḥ* 2.1.22] [*nityam* 2.2.17].
'The indeclinable word *ku-*, the units termed *gati* or included in the list beginning with *pra-* mandatorily combine with an inflected word to form a *tatpuruṣa* compound'.

Since the list beginning with *pra-* (*prādi-*) includes *nis-* (namely the left-hand member of *niṣ-kauśāmbi-* (7)),[17] *nis-* is referred to by *prādi-*, which is mentioned in the nominative in A 2.2.18.[18] Let us now recall that what is referred to by a word that is inflected in the nominative in a compound-rule is designated as *upasarjana* in keeping with A 1.2.43 (see § 3.2 above). Accordingly, *nis-* should be designated as *upasarjana* in *niṣ-kauśāmbi-*. Nevertheless, *nis-* does not receive the designation *upasarjana* in *niṣ-kauśāmbi-*. Instead, it is *kauśāmbī-* (i.e. the right-hand member of *niṣ-kauśāmbi-*) that is designated as *upasarjana*, owing to A 1.2.44.[19] Let us consider how.

In the system of the *Aṣṭādhyāyī*, the compound *niṣ-kauśāmbi-* is analysed as *nis-Ø*ˣ *kauśāmbī-Ø*ᴬᴮᴸ, i.e. as an NP made up of inflected words whose case endings are silent.[20] Let us now embed NP *nis-Ø*ˣ *kauśāmbī-Ø*ᴬᴮᴸ in a sentence pair where such an NP fulfills different grammatical functions: see (8a-b), where I am instantiating x, i.e. the value of the silent case ending attached to *nis-*, as nominative and accusative. For concreteness, I provide the surface realisation of (8a-b) in (8c-d), respectively.

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17 The form *nis-* shows up as *niṣ-* (with retroflex *ṣ*) in *niṣ-kauśāmbi-* due to sandhi. *nis-* is an indeclinable word that may be used as a prefix to nouns and verbs, or as a preposition accompanying nouns (Candotti, Pontillo 2022, 14 fn. 34).

18 More precisely, it is the whole segment *kugatiprādi-*, of which *prādi-* is a subsegment, that is mentioned in the nominative (*kugatiprādayaḥ*) in A 2.2.18. Technically, *kugatiprādi-* is a *dvandva* (i.e. coordinative) compound, and *prādi-* is one of the three members of such a compound, the other members being *ku-* and *gati-*.

19 On the shortening that the final vowel of *kauśāmbī-* undergoes (*ī > i*) when *kauśāmbī-* is part of the compound *niṣ-kauśāmbi-*, see below.

20 By specifying *nityam* 'mandatorily' in A 2.2.18, Pāṇini informs us that *niṣ-kauśāmbi-* (= *nis-Ø*ˣ *kauśāmbī-Ø*ᴬᴮᴸ) has no counterpart in which the case endings attached to both *nis-* (= *nis-Ø*ˣ) and *kauśāmbī-* (= *kauśāmbī-Ø*ᴬᴮᴸ) are overt; put another way, *niṣ-kauśāmbi-* lacks a non-compounded counterpart (e.g. *nis kauśāmbyāḥ). To be noted that indeclinable words such as *nis-* are treated by Pāṇini as nouns on a par with, for example, *aṣvaḥ* 'horse.ɴᴏᴍ.ꜱɢ', the only difference between *nis-* and *aṣvaḥ* being that the case ending attached to *nis-* is zero-replaced in compliance with A 2.4.82 (*avyayād āpsupaḥ* [*luk* 2.4.58]), while the case ending of *aṣvaḥ* (i.e. *-ḥ*) is not zero-replaced. On A 2.4.82, see Cardona 1997, 212.

(8a)   (Invented example)

*nis-Ø*NOM   *kauśāmbī-Ø*ABL   *vājaṃ*   *jayati.*
out.of.NOM.SG.M   Kauśāmbī.ABL.SG.F   award.ACC.SG.M   win.IND.PRS.3SG

'One who is out of the city termed Kauśāmbī is winning the award'.

(8b) (Invented example)

nis-ØACC   *kauśāmbī-Ø*ABL   *paśyāmi.*
out.of.ACC.SG.M   Kauśāmbī.ABL.SG.F   see.IND.PRS.1SG

'I see one who is out of the city termed Kauśāmbī'.

(8c) (Invented example)

niṣ-kauśāmbi-r   [= *nis-Ø*NOM- *kauśāmbī-Ø*ABL–*r*]   *vājaṃ*   *jayati.*
out.of-Kauśāmbī.NOM.SG.M   award.ACC.SG.M   win.IND.PRS.3SG

 'One who is out of the city termed Kauśāmbī is winning the award'.

(8d) (Invented example)

niṣ-kauśāmbi-m   [= *nis-Ø*ACC- *kauśāmbī-Ø*ABL–*m*]   *paśyāmi.*
out.of-Kauśāmbī.ACC.SG.M   see.IND.PRS.1SG

 'I see one who is out of the city termed Kauśāmbī'.

In these invented examples, the silent case-ending attached to *nis-* changes according to the grammatical function fulfilled by the NP *nis-Ø*X *kauśāmbī-Ø*ABL: *nis-* takes on nominative (*nis-Ø*NOM) in (8a), where the NP *nis-Ø*X *kauśāmbī-Ø*ABL fulfills the function of subject, but takes on accusative (*nis-Ø*ACC) in (8b), where that NP fulfills the function of direct object. By contrast, the silent case-ending attached to *kauśāmbī-* is unchangeable: despite the different grammatical functions fulfilled by the NP *nis-Ø*X *kauśāmbī-Ø*ABL in (8a-b), *kauśāmbī-* remains inflected in the ablative in these sentences (*kauśāmbī-Ø*ABL).

Since by A 1.2.44 the *ekavibhakti* unit (i.e. the unit whose case ending is unchangeable) is designated as *upasarjana*, *kauśāmbī-* (= *kauśāmbī-Ø*ABL) – but crucially not *nis-* (= *nis-Ø*X) – gets the designation *upasarjana* in *niṣ-kauśāmbi-*. The *upasarjana* status of *kauśāmbī-* in *niṣ-kauśāmbi-* is further confirmed by the shortening of the final <ī> of *kauśāmbī-* in *niṣ-kauśāmbi-*: as pointed out by Pontillo (2003b, 24) (see also Candotti, Pontillo 2019, 24), A 1.2.48 ensures that this shortening is only possible insofar as *kauśāmbī-* is designated as *upasarjana* in the compound *niṣ-kauśāmbi-*.

A 1.2.48: *go-striyor upasarjanasya* [*hrasvaḥ prātipadikasya* 1.2.47]. 'The final vowel of *go-* or of nouns ending in a feminine affix, such that *go-* and the nouns ending in a feminine affix are nominal stems as well as *upasarjana*s, is replaced by a short vowel'.

To sum up, A 2.2.30 provides that the *upasarjana* is canonically allocated to the left-hand slot of a compound. Nevertheless, some compounds exist in which the *upasarjana* is allocated to the right-hand slot; a relevant example in this regard is *niṣ-kauśāmbi-* '(one) who is out of a village termed Kauśāmbī', where *kauśāmbī-* is the *upasarjana* and the right-hand member of the compound at the same time. To license the formation of compounds like *niṣ-kauśāmbi-*, in which the *upasarjana* is allocated to the right-hand member (as opposed to the left-hand member) of a compound, Pāṇini includes the segment *apūrvanipāte* 'even when what has an unchangeable case ending (*ekavibhakti*) does not occupy the left-hand slot of a compound' in rule A 1.2.44 (*ekavibhakti cāpurvanipāte*).

In this way, A 1.2.44 serves two purposes. First, it provides a genuine linguistic criterion to decide whether a certain unit belongs to the *upasarjana* set: a unit U belongs to the *upasarjana* set if and only if, when the grammatical function fulfilled by the NP to which U belongs changes, the case ending of U remains unchanged. Second, by providing a specific criterion for the membership of a unit to the *upasarjana* set, A 1.2.44 supersedes (i.e. licenses exceptions to) both A 1.2.43 and 2.2.30: even when the *upasarjana* is not mentioned in the nominative (as an exception to A 1.2.43, which provides for the *upasarjana* to be mentioned in the nominative in a compound-rule) or when the *upasarjana* does not occupy the left-hand slot of a compound (as an exception to A 2.2.30, which provides for the *upasarjana* to be allocated to the left-hand slot of a compound), the *upasarjana* can still be identified as the unit U such that, when the grammatical function fulfilled by the NP to which U belongs changes, the case ending of U remains unchanged (Candotti, Pontillo 2022, 14).

3.4 Rephrasing the Puzzle

In § 2 above, I presented a puzzle posed by *karmadhāraya* compounds to Pāṇini's *upasarjana*-based classification of compounds. However, that presentation of the puzzle was a mere sketch, as I had not yet analysed, at that point of the paper, the fundamental rules which underpin Pāṇini's model of compounding. In this section, I restate the puzzle in more precise terms, capitalising on the discussion in §§ 3.1-3.3 above.

Let us start with the rule that defines *karmadhāraya* compounds:

A 1.2.42: *tatpuruṣaḥ samānādhikaraṇaḥ karmadhārayaḥ*.
'A *tatpuruṣa* compound whose members are *samānādhikaraṇa* is called *karmadhāraya*'.

In accordance with this rule, the *tatpuruṣa* compound type may be broken down into two subtypes: compounds whose members are *samānādhikaraṇa*, and compounds whose members are not *samānādhikaraṇa*. But what does *samānādhikaraṇa* really mean?

From the morphological point of view, *samānādhikaraṇa* is a *bahuvrīhi* compound formed from *samāna-* 'same' and *adhikaraṇa-* 'substratum', and properly means 'having the same substratum'. Although it is not easy to find a good term to render *samānādhikaraṇa* in English,[21] the phenomenon which this expression is meant to capture is clear enough. Thus, I have deliberately chosen not to translate *samānādhikaraṇa* in this paper, but I do provide a precise definition of this expression: let W_1 and W_2 be nominal inflected words, which include compound-members such as *aśva-* (= *aśva-Ø*GEN) in the compound *aśva-śapha-* (= *aśva-Ø*GEN *śapha-Ø*x) 'horse's hoof', as well as run-of-the-mill inflected words such as *aśvasya* in the NP *aśvasya śaphaḥ*; if, in a given sentence, W_1 cannot refer to an entity other than the one referred to by W_2, then W_1 is *samānādhikaraṇa* with W_2. For example, in *navo jvāraḥ* 'the new suffering', *navaḥ* (lit. new.NOM. SG) cannot refer to a new entity that is not simultaneously a form of suffering (i.e. an entity referred to by *jvāraḥ* 'suffering.NOM.SG').[22] Accordingly, *jvāraḥ* and *navaḥ* are *samānādhikaraṇa* in *navo jvāraḥ*.[23]

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21   Some terms suggested in the literature to render *samānādhikaraṇa* are: 'coreferential' (Cardona 1997, 217); 'homo-denotative' (Gillon 2008, 2); 'coindexed' (Kiparsky 2009, 54); 'predicated' (Lowe 2015a, 331). Among these, 'coreferential' is possibly the most popular, but it is nonetheless problematic as it interferes with the way this self-same term is used in binding theory (see, e.g. Chomsky 1981). In this theory, coreferentiality is technically the relationship that holds between a pronominal category (a pronoun or an anaphor) and its antecedent: e.g. *John* is said to be coreferential with the anaphor *himself* in the English sentence *John admires himself*.

22   It may be worth noting that Pāṇini's grammar lacks the distinction between adjective and noun: *navaḥ* and *jvāraḥ* are both categorised as nominals – more precisely, as the outcome of attaching a case ending to a *prātipadika*, i.e. to a nominal stem – by Pāṇini (see, e.g. Joshi 2015, 349). Therefore, from the perspective of Pāṇini's grammar, it comes as no surprise that *navaḥ*, which in modern linguistics would be categorised as an adjective, is as capable as *jvāraḥ* of referring to an entity (I am indebted to one of the anonymous reviewers for drawing my attention to this point). See Candotti, Pontillo 2011 on how Pāṇini dealt with grammatical features that, in modern linguistics, would be referred to as adjectival; see also Alfieri 2014 on the birth of the adjectival part of speech in the Western grammatical tradition.

23   Thus, the *sāmānādhikaraṇya* relation (i.e. the relation holding between two units that are *samānādhikaraṇa*) does not coincide with the modern linguistic notion of agreement (see Hock 2015, 8, 13; Joshi 2015). The definition of *samānādhikaraṇa* adopted

Thus, A 1.2.42 labels a *tatpuruṣa* whose members are *samānādhikaraṇa* as *karmadhāraya*. *Karmadhāraya*s correspond to the attributive endocentric compounds (also known as "appositive/ attributive endocentric compounds") of Bisetto, Scalise 2005; Scalise, Bisetto 2009. Let us now consider a concrete example of *karmadhāraya*: *nava-jvāra-* 'new suffering'. This compound, occurring in ṚV 1.42.8, is governed by A 2.1.49, which opens up the section of rules given over to *karmadhāraya*s (i.e. A 2.1.49-72):

> A 2.1.49: *pūrvakālaikasarvajaratpurāṇanavakevalāḥ samānādhikaraṇena* [*samāsaḥ* 2.1.3] [*saha supā* 2.1.4] [*sup* 2.1.9] [*vā* 2.1.18] [*tatpuruṣaḥ* 2.1.22]
> 'A nominal inflected word X such that X denotes something which precedes in time, or such that X is *eka-* 'one', *sarva-* 'all', *jarat-* 'old', *purāṇa-* 'ancient', *nava-* 'new', and *kevala-* 'alone', combines with a nominal inflected word Y such that Y is co-referential with X, to form a *tatpuruṣa karmadhāraya* compound'.

This rule, considered in conjunction with A 1.2.43, teaches the following constraints on *nava-jvāra-*: that *nava-* be *samānādhikaraṇa* with *jvāra-*; and that *nava-* (which is mentioned in the nominative in A 2.1.49, which is a compound-rule) be the *upasarjana*.[24] We can easily verify that the constraint that *nava-* be *samānādhikaraṇa* with *jvāra-* is satisfied in *nava-jvāra-*. Consider how.

Since compound-members are nominal inflected words with silent case endings in Pāṇini's model of compounding, *nava-jvāra-* should be represented as *nava-Øˣ jvāra-Øˣ*, which therefore behaves exactly like the combination of run-of-the-mill inflected words *navo jvāraḥ* – see (9) below.[25] Thus, the compound-member *nava-* (= *nava-Øˣ*) 'the new one' cannot refer to a new entity that is not also a form of suffering (i.e. an entity referred to by *jvāra-* = *jvāra-Øˣ* 'suffering'). Then, in accordance with the definition of *samānādhikaraṇa* adopted here, *nava-* is *samānādhikaraṇa* with *jvāra-* in *nava-jvāra-*.

here owes much to the suggestions and corrections advanced by one of the anonymous reviewers.

24 More precisely, it is the whole segment *pūrvakālaikasarvajaratpurāṇanavakevala-*, of which *nava-* is a part, that is mentioned in the nominative in A 2.1.49.

25 The notation *nava-Øˣ jvāra-Øˣ* stands for any combination of *nava-* and *jvāra-* in which *nava-* agrees in case with *jvāra-* and both *nava-* and *jvāra-* are endowed with a silent case ending. In this way, *nava-Øˣ jvāra-Øˣ* includes such NPs as *nava-Ø*ᴺᴼᴹ *jvāra-Ø*ᴺᴼᴹ, *nava-Ø*ᴬᶜᶜ *jvāra-Ø*ᴬᶜᶜ, *nava-Ø*ᴵᴺˢ *jvāra-Ø*ᴵᴺˢ, etc.

(9)

navo jvāraḥ → *nava-Ø^x jvāra-Ø^x* = *nava-jvāra-*
new.NOM suffering.NOM
'new suffering'

Let us consider now the second constraint imposed by A 2.1.49 – in conjunction with A 1.2.43 – on *nava-jvāra-*, namely that *nava-* be *upasarjana*. As discussed in § 3.2 above, the *upasarjana* is the *ekavibhakti* unit in accordance with A 1.2.44, i.e. the unit U such that the case ending of U remains unchanged when the noun phrase to which U belongs fulfils different grammatical functions. Therefore, to verify that *nava-* (= *nava-Ø^x*) is indeed the *upasarjana* in *nava-jvāra-* (= *nava-Ø^x jvāra-Ø^x*), we need to construct a sentence pair in which an NP that contains *nava-* performs different grammatical functions. A good example of such a sentence pair is (10a-b), which features the NP *nava-Ø^x jvāra-Ø^x*, where *nava-Ø^x* and *jvāra-Ø^x* are, as usual, nominal inflected words with a silent case ending. At the surface level of language, where an overt case ending attaches to the whole NP *nava-Ø^x jvāra-Ø^x* (i.e. to *nava-jvāra-*), (10a-b) show up as (10c-d), respectively.

(10a) (Adapted from ṚV 1.42.8ab)

nava-Ø^{NOM}	*jvāra-Ø^{NOM}*	*adhvane.*
new.NOM.SG.M	suffering.NOM.SG.M	road.DAT.SG.M

 'New suffering is on the road'.

(10b) (Invented example)

nava-Ø^{ACC}	*jvāra-Ø^{ACC}*	*paśyāmi.*
new.ACC.SG.M	suffering.ACC.SG.M	see.IND.PRS.1SG

 'I see new suffering'.

(10c) (Adapted from ṚV 1.42.8ab)

nava-jvāra-ḥ	[= *nava-Ø^{NOM}-jvāra-Ø^{NOM} -ḥ*]	*adhvane.*
new-suffering.NOM.SG.M		road.DAT.SG.M

 'New suffering is on the road'.

(10d) (Invented example)

nava-jvāra-m	[= *nava-Ø^{ACC}-jvāra-Ø^{ACC} -m*]	*paśyāmi.*
new-suffering.ACC.SG.M		see.IND.PRS.1SG

 'I see new suffering'.

When the NP *nava-Ø^x jvāra-Ø^x* fulfils the grammatical function of subject, as in (10a), a silent nominative ending applies to both *nava-* (*nava-Ø^{NOM}*) and *jvāra-* (*jvāra-Ø^{NOM}*). By contrast, when NP *nava-Ø^x jvāra-Ø^x* fulfils the grammatical function of direct object, as in (10b), a silent accusative ending applies to *nava-* (*nava-Ø^{ACC}*) as well as to *jvāra-* (*jvāra-Ø^{ACC}*). It appears, then, that neither *nava-* nor *jvāra-* is an *ekavibhakti* unit: when the grammatical function of NP *nava-Ø^x jvāra-Ø^x* changes, the case ending of both *nava-* and *jvāra-* also changes.

Since A 1.2.44 defines the *upasarjana* as the *ekavibhakti* unit (see § 3.2 above), the fact that *nava-* (*nava-Ø^x*) and *jvāra-* (*jvāra-Ø^x*) are not *ekavibhakti* units in *nava-jvāra-* (= *nava-Ø^x jvāra-Ø^x*) entails that neither *nava-* nor *jvāra-* gets the designation *upasarjana* in *nava-jvāra-*. Therefore, the second constraint imposed by A 2.1.49 (in conjunction with A 1.2.43) on *nava-jvāra-*, i.e. that *nava-* be *upasarjana*, appears to be violated.

We are therefore faced with a puzzle: on the one hand, A 2.1.49, in conjunction with A 1.2.43, teaches that *nava-* is the *upasarjana* in the *karmadhāraya* compound *nava-jvāra-*; on the other hand, the definition of *upasarjana* as an *ekavibhakti* unit (A 1.2.44) leads us to consider *nava-* as non-*upasarjana* in *nava-jvāra-*.[26] In brief, the puzzle arising in connection with *nava-jvāra-* is the fact that rule A 1.2.44 appears to contradict rule A 2.1.49 (considered in conjunction with A 1.2.43). At this point, two possibilities suggest themselves to solve this puzzle, i.e. to avoid the contradiction between the rules at stake.

According to the first possibility, A 1.2.44's definition of the *upasarjana* as an *ekavibhakti* unit is required to be complied with only in compounds like *niṣ-kauśāmbi-*, i.e. in compounds in which the *upasarjana* occupies the right-hand slot of the compound itself (see § 3.3 above). Since there is no clear reason to maintain that the *upasarjana* of *nava-jvāra-* is the right-hand member *jvāra-*, the *upasarjana* of *nava-jvāra-* need not be an *ekavibhakti* unit, i.e. need not satisfy the definition of *upasarjana* provided by A 1.2.44. This, then, makes it possible to designate *nava-* as the *upasarjana* of *nava-jvāra-* without incurring any contradiction between A 2.1.49 and 1.2.44. Among the supporters of this first possibility are Böhtlingk (1887, 17) and Kiparsky (1979, 232).

According to the second possibility, A 1.2.44's definition of the *upasarjana* as an *ekavibhakti* unit must be satisfied in any compound, including *nava-jvāra-*, regardless of the position occupied by the *upasarjana* inside the compound (left-hand slot versus right-hand slot). Indeed, in accordance with this second possibility, the contradiction between A 2.1.49 and 1.2.44 should be resolved by capitalising

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26 The reader can easily verify that this puzzle is not confined to *nava-jvāra-* but indeed extends to any other *karmadhāraya*.

on the ambiguity of *ekavibhakti* in A 1.2.44, in a sense to be made precise below.

The first possibility listed above was already discussed by Pontillo (2003b), who eventually dismissed it on the grounds that A 1.2.44's definition of the *upasarjana* as an *ekavibhakti* unit is demonstrably satisfied in compound types other than those whose right-hand member is designated as *upasarjana* (see especially Pontillo 2003b, 30).[27] I also reject the first possibility: indeed, if A 1.2.44's definition of the *upasarjana* as an *ekavibhakti* unit were to be confined to compounds like *niṣ-kauśāmbi-* (as suggested by the first possibility), we would merely have the *upasarjana* set (i.e. the set of units designated as *upasarjana* in compliance with A 1.2.43), but no genuine linguistic feature that is shared by all members of the set and that justifies the membership of a certain unit to that set (see § 3.2 above). I consider the idea that all members of the *upasarjana* set share a specific linguistic feature that justifies their membership to the set – as well as the exclusion of other units from the set – much more interesting and insightful: if confirmed, this idea would return a new picture of Pāṇini's model of compounding, whereby such a model is much deeper and much more complicated than has been thought before.

For these reasons, in the next section (§ 4) I pursue the second of the two possibilities listed above. Specifically, I shall capitalise on the *Aṣṭādhyāyī* rule governing present participles to argue in favour of a novel understanding of the *ekavibhakti* segment featuring in A 1.2.44.

4 The Ambiguity of *ekavibhakti*

In the present section I argue that the notion of *ekavibhakti* is ambiguous between the meaning 'having an unchangeable case ending' and the meaning 'having the same case ending [as another nominal inflected word]'. I specify the latter meaning in terms of the syntactic operation of case-copying: a unit U_1 has the same case ending as another unit U_2 in the sense that U_1 copies the case ending of U_2. I provide evidence for case-copying in the *Aṣṭādhyāyī* by capitalising on A 3.2.124, namely the rule teaching the formation of present participles.

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27 Indeed, Pontillo (2003b, 27) explicitly claims that A 1.2.44's definition of *upasarjana* as an *ekavibhakti* unit is satisfied in *karmadhāraya*s like *nava-jvāra-* and *sad-vaidya-* 'good physician', too. However, she does not address the puzzle discussed in the present subsection.

4.1   A Rule for Present Participles

In rule A 3.2.124, Pāṇini teaches the formation of present participles. Yet, this rule is of interest for reasons that go beyond present participles. Let us examine its wording:

> A 3.2.124: *laṭaḥ śatṛśānacāv aprathamāsamānādhikaraṇe* [*pratyayaḥ* 3.1.1] [*paraś ca* 3.1.2 *dhātoḥ* 3.1.91] [*varttamāne* 3.2.123].
> 'The participial suffix *-nt-* or *-(m)āna-* is introduced after a verbal base in place of LAṬ when an ongoing verbal action is to be signified and when LAṬ is *samānādhikaraṇa* with a nominal word inflected in a case other than nominative'.

To properly grasp the content of this rule, we need to understand the segment *laṭ-* that here shows up in the genitive (*laṭaḥ*). Following Sharma (1999-2003), I have graphically rendered *laṭ-* in all capitals in my translation of the rule: LAṬ.

LAṬ is, in essence, the placeholder standing for the whole set of finite verbal endings that attach to the present tense-aspect verbal stem: e.g. *-mi, -si, -ti, -mas, -tha, -nti*, etc. attach to the present tense-aspect verbal stem *naya-* (from the first-class verbal base *nī-* 'to lead') to yield the indicative present active forms *nayā-mi, naya-si, naya-ti, nayā-maḥ, naya-tha, naya-nti*, etc.[28] Interestingly, LAṬ is a meaningful unit in the *Aṣṭādhyāyī* – let us consider how. LAṬ is one of the ten abstract affixes, concisely referred to by Pāṇini as LA, which are deputed to convey tense, aspect, and mood (see, e.g. Cardona 1997, 148; Sharma 1999-2003, 646); this means that whatever Pāṇini teaches for LA also holds for LAṬ. Thus, since Pāṇini teaches in A 3.4.69 that LA signifies an agent (*kartṛ*), a patient (*karman*), or an eventuality (*bhāva*),[29] we automatically understand that LAṬ also signifies an agent, a patient, or an eventuality. In other words, while in accordance with such modern linguistic theories as generative grammar the semantic roles of agent and patient are properties of nominals (more precisely, nominals are 'assigned' those roles by the verb), in Pāṇini's grammar those roles are properties of verbal endings, in the

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28   For the sake of simplicity, I shall not discuss how the present tense-aspect verbal stem *naya-*, which involves the thematic vowel (*-a-*) and the *guṇa*-grade of *nī-*, is formed from the verbal base *nī-* according to Pāṇini.

29   A 3.4.69 reads as follows: *laḥ karmaṇi ca bhāve cākarmakebhyaḥ* [*dhātoḥ* 3.1.91] [*kartari* 3.4.67] 'Any verbal ending (LA) attaches to a verbal base when: i) an agent or a patient is to be signified; ii. an agent or an eventuality is to be signified, provided an objectless verbal base is used'. On the term 'eventuality', which I am using to translate *bhāva-*, see Lowe 2015a, 95 fn. 1.

sense that verbal endings signify the agent or the patient.[30] For instance, given the invented pair of sentences *devadattaḥ senām nayati* 'Devadatta is leading the army' (active) and *devadattena senā nīyate* 'The army is led by Devadatta' (passive), the active verbal ending *-ti* signifies the agent of the action of leading, and the middle-passive verbal ending *-te* signifies the patient of the action of leading from the perspective of the *Aṣṭādhyāyī*; from the perspective of generative grammar, instead, *devadatta-* is assigned the agent role by the active verb *nayati*, and the patient role by the passive verb *nīyate*.[31]

Now that we know what LAṬ is, we may proceed with considering the consequences of A 3.2.124, with the help of an invented example:

(11) (Invented example)

odanam	*pac*-LAṬ	*devadattam*	*paśyāmi.*
rice.ACC.SG.M	cook-LAṬ	Devadatta.ACC.SG.M	see.IND.PRS.1SG

 Intended meaning: 'I see Devadatta cooking rice'.

In (11), LAṬ signifies the agent of the action of cooking (the action of cooking being signified by *pac-* 'to cook'). In addition, LAṬ is *samānādhikaraṇa* with *devadattam* in (11): to wit, LAṬ (more precisely, the verbal endings that LAṬ stands for) cannot refer to a cook (i.e. an agent of the action of cooking) that is not simultaneously the individual whose name is Devadatta (i.e. the entity referred to by *devadattam*) in this sentence.

Now, since LAṬ is *samānādhikaraṇa* with a nominal word inflected in a case other than nominative (i.e. *devadattam*) in (11), LAṬ cannot be replaced by a finite verbal ending in accordance with A 3.2.124, witness the ill-formedness of (12a). Indeed, A 3.2.124 prescribes that LAṬ of (11) must be replaced by the participial suffix *-nt-* or *-(m)āna-*, as in (12b), which is well-formed in Sanskrit (for further details see Cardona 1997, 171-2; Sharma 1999-2003, 427; Lowe 2015a, 331, 334-5).

(12a) (Invented example)

*odanam	*pacati*	*devadattam*	*paśyāmi.*
rice.ACC.SG.M	cook.IND.PRS.3SG	Devadatta.ACC.SG.M	see.IND.PRS.1SG

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30 For the sake of simplicity, I am disregarding the case in which verbal endings signify an eventuality.

31 The question then arises as to what the nominative-marked word (e.g. *devadattaḥ* and *senā*) signifies in the system of the *Aṣṭādhyāyī*. The answer to this question is contained in A 2.3.46, for which see Mocci, Pontillo 2020. On the codification of semantic roles in generative grammar, see Hale, Keyser 2002.

(12b) (Invented example)

odanam	pacantaṃ	devadattam	paśyāmi.
rice.ACC.SG.M	cook.PTCP.PRS.ACC. SG.M	Devadatta.ACC.SG.M	see.IND.PRS.1SG

'I see Devadatta cooking rice'.

To be noted that we cannot know that LAṬ of (11) is to be replaced by -*nt*- (12b) rather than by -*ti* (12a), unless we first know that *devadatta*- is inflected in the accusative (i.e. in a case other than nominative) in (11). But this means – crucially – that the case ending of *devadatta*- must be determined before and independently of the replacement of LAṬ by -*nt*-. Moreover, an accusative ending attaches to *devadatta*- as well as to *pacat*- in (12b).[32] Crucially, however, *pacat*- does not yet exist before the replacement of LAṬ by -*nt*- takes place in *pac-LAṬ* (11). Therefore, the replacement of LAṬ by -*nt*- in *pac-LAṬ* logically precedes the assignment of the accusative ending to *pacat*-.[33]

4.2 An Instance of Case-Copying in the *Aṣṭādhyāyī*

Let us now combine the two conclusions reached at the end of the previous subsection, namely: i) that the attachment of an accusative ending to *devadatta*- precedes the replacement of LAṬ by -*nt*- in *pac-LAṬ*; ii) that the replacement of LAṬ by -*nt*- in *pac-LAṬ* precedes the assignment of an accusative ending to *pacat*-. By transitivity, it follows from (i)-(ii) that the assignment of the accusative ending to *devadatta*- precedes the assignment of the accusative ending to *pacat*-. The picture emerging from A 3.2.124 and (11)-(12) is then the following: in the derivation that eventually leads to (12b), there is a stage at which *devadatta*- is inflected in the accusative (*devadattam*), whereas *pacat*- lacks a case ending. Put another way, the derivational stage at which *devadatta*- takes on accusative case (call it S_1) does not coincide with the derivational stage at which *pacat*- takes on accusative case (*pacantam*) – call it S_2 – insofar as S_1 necessarily precedes

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[32]   *pacat*- is the stem of the present active participle that is obtained by attaching the participial suffix -*nt*- to *pac*-. I shall abstract away from the sound rules needed to obtain *pacat*- from the combination of *pac*- with -*nt*-.

[33]   Indeed, before the replacement of LAṬ by -*nt*- takes place in *pac-LAṬ*, *pac-LAṬ* does not even qualify as a nominal form: in fact, *pac-LAṬ* is ambiguous between a nominal form and a verbal form in (11), depending on whether *LAṬ* is replaced by a participial suffix (-*nt*- or -*[m]āna*-) or a finite verbal ending (e.g. -*ti*). But only nominal forms can take on case endings. Therefore, the fact that *pac-LAṬ* does not qualify as a nominal form in (11) ensures that *pac-LAṬ* cannot be the recipient of any case ending in (11). This further upholds the conclusion that the replacement of LAṬ by -*nt*- in *pac-LAṬ* precedes the attachment of the accusative ending to *pacat*-.

S_2. For concreteness, we may equate S_1 and S_2 with (13) and (12b), respectively:

(13) (Invented example)

odanam	*pacat-?*	*devadattam*	*paśyāmi.*
rice.ACC.SG.M	cook.PTCP.PRS.?	Devadatta.ACC.SG.M	see.IND.PRS.1SG

Intended meaning: 'I see Devadatta cooking rice'.

The question now arises as to how the existence of these two different derivational stages (i.e. S_1 and S_2) interacts with the rules for case assignment. Specifically, I am interested in the following question: does the rule governing the assignment of accusative case to *devadatta-* at S_1 (see (13)) also govern the assignment of accusative case to *pacat-* at S_2 (see (12b))? To answer the latter question, let us consider A 2.3.2:

> A 2.3.2: *karmaṇi dvitīyā* [*anabhihite* 2.3.1].
> 'An accusative case ending [attaches to a nominal stem] in order to signify a patient (*karman*), provided that the patient is not otherwise signified'.

In accordance with this rule, the accusative case ending *-m* attaches to, e.g., *devadatta-* in (13) in order to signify that *devadatta-* 'Devadatta' is the patient of the action of seeing (the action of seeing being denoted by the verbal base *paś-*). This rule also features the segment *anabhihite*.

anabhihite is in essence a constraint that whatever is signified by a nominal ending be only signified once (Cardona 1997, 155; Kiparsky 2009, 50): in the specific context of A 2.3.2, an accusative ending cannot attach to a nominal stem to signify the patient of a certain action if that patient has already been signified. Thus, if the patient of the action of seeing has already been signified by the accusative ending attached to *devadatta-* in (13), the accusative ending cannot attach to *pacat-* 'the one who cooks' to signify the patient of the action of seeing, lest the *anabhihite* constraint be violated. Analogously, if the accusative ending attaches to *pacat-* in (13) (thereby yielding *pacantam*) in order to signify the fact that *pacat-* is the patient of the action of seeing, the accusative ending cannot attach to *devadatta-* in (13) in order to signify the patient of the action of seeing, lest the *anabhihite* be violated.

Therefore, when two accusative endings apply to two nominal stems to signify the patient of one and the same action, only the first assignment of the accusative ending can be governed by A 2.3.2; the second assignment of the accusative ending will necessarily violate the *anabhihite* constraint. But we have already seen that the

assignment of the accusative ending to *devadatta-*, which takes place at derivational stage S_1, logically precedes the assignment of the accusative ending to *pacat-*, which instead takes place at derivational stage S_2. Accordingly, only the assignment of the accusative ending to *devadatta-*, illustrated in (13) (= S_1), can be governed by A 2.3.2: if the assignment of the accusative ending to *pacat-*, illustrated in (12b) (= S_2), were governed by A 2.3.2, the *anabhihite* constraint would be violated. How can we account, then, for the assignment of the accusative ending to *pacat-* in (12b)? To the best of my knowledge, there is no rule, in the whole *Aṣṭādhyāyī*, that governs the assignment of the accusative ending to *pacat-* in (12b) (see also Joshi 2015, 350). For this reason, I assume that there must be an implicit mechanism that takes care of the accusative case of *pacat-* in (12b). I suggest that such an implicit mechanism has to do with the *sāmānādhikaraṇya* relation.[34] Consider how.

As we know from A 3.2.124, the participial stem *pacat-*, which features in (12b)-(13), is formed by substituting the participial suffix *-nt-* for LAṬ in *pac-LAṬ*. Now, A 1.1.56 provides that the substitutes of a linguistic unit U trigger the same rules as U (provided that the rules in question do not mention sounds); put another way, the substitutes of U are viewed as if they were U by the rules.[35] Thus, the participial suffix *-nt-* which replaces LAṬ is viewed by A 3.2.124 as if it were LAṬ. This means that, when A 3.2.124 enjoins the constraint that LAṬ be *samānādhikaraṇa* with *devadattam* in (11), this constraint is inherited, as it were, by *-nt-* (i.e. the substitute of LAṬ), which is thus also required to be *samānādhikaraṇa* with *devadattam*. Therefore, *-nt-* has to be taken as *samānādhikaraṇa* with *devadattam* in (12b)-(13), just like LAṬ in (11) (see Sharma 1999-2003, 428). Simplifying somewhat, I shall say in what follows that the present participle *pacat-* of (12b)-(13) is *samānādhikaraṇa* with *devadattam*, although it would be more precise to say that suffix *-nt-*, which is involved in *pacat-* and signifies the agent of the action of cooking, is *samānādhikaraṇa* with the accusative-marked word *devadattam*, which signifies the patient of the action of seeing.

Building on the systematic correlation between the *sāmānādhikaraṇya* relation and case-sharing (i.e. the fact that two units share the same case) in Sanskrit, I would like to suggest that

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34 The suggestion is not new, as it was already proposed by Patañjali (2nd century B.C.) in M 1.442.5 *ad* A 2.3.1 (see Joshi 2015, 349-51 for discussion). *sāmānādhikaraṇya* is an abstract noun – derived from the adjective *samānādhikaraṇa* – denoting the relation between two units that are *samānādhikaraṇa* with one another.

35 A 1.1.56 reads *sthānivad ādeśo 'nalvidhau* 'The substitute is as if it were the placeholder, except in respect to a provision mentioning a sound [of the placeholder]'. For a recent overview of Pāṇini's substitution framework, see Candotti, Pontillo 2021 and the references cited therein.

the assignment of accusative case to *pacat-* in (12b) is indeed the result of *pacat-* copying the accusative case of *devadatta-* (i.e. of the unit with which *pacat-* is *samānādhikaraṇa*). That is, at stage S_1 – i.e. the stage, represented in (13), at which an accusative ending attaches to *devadatta-* (thereby returning *devadattam*) to express the patient of the action of seeing in compliance with A 2.3.2 – *pacat-* lacks a case ending, but is *samānādhikaraṇa* with *devadattam*; at stage S_2 – i.e. the stage represented in (12b) – *pacat-* copies the accusative case attached to *devadattam*, thereby showing up as *pacantam*.[36]

4.3 Case-Copying in *karmadhāraya*s

Let us consider again the problematic sentence pair in (10a-b), repeated below as (14a-b). *nava-* and *jvāra-* are endowed with a silent accusative ending in (14b) and are thus represented as *nava-Ø*ᴬᶜᶜ and *jvāra-Ø*ᴬᶜᶜ, respectively.

(14a) (Adapted from ṚV 1.42.8ab)

*nava-Ø*ᴺᴼᴹ	*jvāra-Ø*ᴺᴼᴹ	*adhvane*.
new.NOM.SG.M	suffering.NOM.SG.M	road.DAT.SG.M

 'New suffering is on the road'.

(14b) (Invented example)

*nava-Ø*ᴬᶜᶜ	*jvāra-Ø*ᴬᶜᶜ	*paśyāmi*.
new.ACC.SG.M	suffering.ACC.SG.M	see.IND.PRS.1SG

 'I see new suffering'.

Now, if the assignment of accusative case to *jvāra-* is governed by A 2.3.2 in (14b), the assignment of accusative case to *nava-* cannot be similarly governed by A 2.3.2 in (14b), lest the *anabhihite* constraint be violated (see § 4.2 above). In other words, when an overt accusative ending – to be subsequently replaced by a silent accusative ending – attaches to *jvāra-* in order to signify the fact that suffering (*jvāra-*) serves as the patient of the action of seeing, the following result is automatically effected: that no accusative ending can attach to *nava-* in order to signify the fact that some new entity (*nava-*) serves as the patient of the selfsame action of seeing. Analogously, if the assignment of accusative case to *nava-* is governed by A 2.3.2

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36 The operation of case-copying has been formalised in contemporary linguistics. For example, such an operation is used in the framework of generative grammar to explain the fact that subject and predicate share the same case (Moro 1997, 41-2).

in (14b), the assignment of accusative case to *jvāra-* cannot be governed by A 2.3.2 in this very same sentence, lest the *anabhihite* constraint be violated.

In order to avoid violating the *anabhihite* constraint in (14b), I submit that only the assignment of accusative case to *jvāra-* is governed by A 2.3.2, the assignment of accusative case to *nava-* being dealt with via the operation of case-copying. Specifically, I assume that the derivation of (14b) involves two stages – S_1 and S_2 – much like the derivation of (12b) (see § 4.2 above): at stage S_1, represented in (15), an accusative ending attaches to *jvāra-* (returning *jvāra-Ø*ᴬᶜᶜ via the zero-replacement of the case ending) to express the patient of the action of seeing in compliance with A 2.3.2, while *nava-* lacks a case ending, but is *samānādhikaraṇa* with *jvāra-Ø*ᴬᶜᶜ. At stage S_2, which coincides with (14b), the *sāmānādhikaraṇya* relation holding between *nava-* and *jvāra-Ø*ᴬᶜᶜ allows *nava-* to copy the accusative ending attached to *jvāra-Ø*ᴬᶜᶜ, so that *nava-* becomes *nava-Ø*ᴬᶜᶜ.

(15) (Invented example)

nava-?	*jvāra-Ø*ᴬᶜᶜ	*paśyāmi.*
new.?	suffering.ACC.SG.M	see.IND.PRS.1SG

 Intended meaning: 'I see new suffering'.

Note that the assumption that the derivation of (14a-b) involves a case-copying operation at derivational stage S_1 is not ad hoc, insofar as it is independently needed to account for the case-marking of present participles, as discussed in § 4.2 above in connection with A 3.2.124. We shall see in the next subsection that this asymmetry between *jvāra-* (= *jvāra-Ø*ᴬᶜᶜ) and *nava-* (= *nava-Ø*ᴬᶜᶜ) in (14), whereby *nava-* copies the case ending of *jvāra-* but not vice versa, is the key to the problem of the purported contradiction between A 2.1.49, which requires in conjunction with A 1.2.43 that *nava-* be *upasarjana*, and A 1.2.44, which defines the *upasarjana* as the *ekavibhakti* unit.

4.4   Uncovering the *ekavibhakti* Unit in *karmadhāraya*s

I would like to entertain the hypothesis that *ekavibhakti* of A 1.2.44 does not simply mean 'having one case ending' in the sense of 'having an unchangeable case ending'. Rather, *ekavibhakti* of A 1.2.44 means 'having one case ending with respect to certain units Z' in the sense of 'having the same case ending as certain units Z', somewhat like *eka-rūpa-* (lit. 'one-colour') as occurring in *āraṇyāḥ paśava ekarūpāḥ* (JB 1.89.16), which translates as 'the forest animals are of one colour with respect to one another' (see Bodewitz 1973), but also as 'the forest animals are of the same colour as one another'. Now,

crucially, this reading of *ekavibhakti* as 'having one case ending with respect to (i.e. having the same case ending as) certain units Z' is ambiguous, insofar as it contains a variable, namely Z. I submit that Z may range: i) over the units that are said to be *ekavibhakti*; as well as ii) over units other than those that are said to be *ekavibhakti*. Let us see some examples.

aśva- (= *aśva-Ø*ᴳᴱᴺ) 'horse' is *ekavibhakti* in *aśva-śapha-* (= *aśva-Ø*ᴳᴱᴺ *śapha-Ø*ˣ) 'horse's hoof' insofar as *aśva-*, as occurring, e.g., in sentence (6a), has one case ending with respect to (i.e. has the same case ending as) the token of *aśva-* in another sentence (6b): see § 3.2 above. On the other hand, *nava-* (= *nava-Ø*ˣ) is *ekavibhakti* in *nava-jvāra-* (= *nava-Ø*ˣ *jvāra-Ø*ˣ) not because *nava-*, as occurring, e.g. in (14b), has one case ending with respect to (i.e. has the same case ending as) the token of *nava-* in another sentence, say (14a): in fact, the case ending of *nava-* in (14a) (i.e. *nava-Ø*ᴺᴼᴹ) differs from the case ending of *nava-* in (14b) (i.e. *nava-Ø*ᴬᶜᶜ). Rather, *nava-* is *ekavibhakti* in *nava-jvāra-* merely because *nava-* has one case ending with respect to (i.e. has the same case ending as) *jvāra-* in (14b), precisely in the sense that *nava-*, which lacks a case ending in (15) (i.e. *nava-?*), copies its case ending from *jvāra-* (= *jvāra-Ø*ᴬᶜᶜ) in (14b), thereby showing up as *nava-Ø*ᴬᶜᶜ.

Indeed, the idea that *ekavibhakti* means 'having the same case ending as certain units Z' is compatible with Pāṇini's *usus scribendi*. There are only two occurrences of the term *ekavibhakti-* in the *Aṣṭādhyāyī*: besides A 1.2.44, *ekavibhakti-* also recurs in A 1.2.64, the rule introducing the so-called *ekaśeṣa* device (*sarūpāṇām ekaśeṣa ekavibhaktau*). Borghero and Pontillo (2020, 69) take *ekavibhaktau* here as a right-hand-context locative conveying the meaning 'before a single nominal ending', and translate the whole rule as follows: "In the place of constituents having the same form (*sarūpāṇām*), only one remains (*ekaśeṣa*) before a single nominal ending (*ekavibhaktau*)" (69). However, following Böhtlingk (1887, 19), we could also read *ekavibhaktau* as a locative of condition conveying the meaning 'provided that one case ending with respect to (i.e. the same case ending as) other units is used': that is, 'provided that the same case ending attaches to the nominal inflected words which have the same form'. If this alternative reading of *ekavibhaktau* is adopted, A 1.2.64 translates as follows: 'In the place of nominal inflected words having the same form, only one remains, provided that the same case ending attaches to the nominal inflected words which have the same form' – to wit, *ekavibhaktau* would prevent us from deriving such forms as *vṛkṣau* 'two trees' from the coordination phrase in (16a), where the two tokens of *vṛkṣa-* have different case endings (nominative and accusative), and would instead force us to derive *vṛkṣau* from the coordination phrase in (16b), where the two tokens of *vṛkṣa-* have the same case ending (nominative). Thus, the occurrence of

ekavibhakti- in A 1.2.64 is perfectly compatible with a reading of *ekavibhakti-* in A 1.2.44 as 'having the same case ending'.[37]

(16a) (Invented example)

vṛkṣaś	*ca*	*vṛkṣaṃ*	*ca*
tree.NOM.SG.M	and	tree.ACC.SG.M	and

(16b) (Invented example, based on Cardona 1997, 260)

vṛkṣaś	*ca*	*vṛkṣaś*	*ca*
tree.NOM.SG.M	and	tree.NOM.SG.M	and

'The tree and the tree'.

Thus, I hypothesise that *nava-* is an *ekavibhakti* unit in *nava-jvāra-* in the sense that *nava-* 'has one case ending with respect to' (*ekavibhakti*), i.e. has the same case ending as, another nominal inflected word: in the example reported in (14), *nava-* has the same case ending as *jvāra-* = *jvāra-Ø*ACC. Note that, for this hypothesis to be tenable, the notion of *ekavibhakti* (in the sense of 'having the same case ending [as another nominal inflected word]') has to be relativised to (15), i.e. to a derivational stage at which *nava-* is non-case-marked whereas *jvāra-* is case-marked. Indeed, if the condition of being *ekavibhakti* in the sense of 'having the same case ending [as another nominal inflected word]' had to be satisfied at the derivational stage at which both *nava-* and *jvāra-* are case-marked (see (14a-b)), it would be impossible to determine which of the following two possibilities is correct: that *nava-* has the same case as *jvāra-*; or that *jvāra-* has the same case as *nava-*. – to wit, it would be impossible to understand which, between *nava-* and *jvāra-*, should be considered as *ekavibhakti*. Indeed, it is only when the condition of being *ekavibhakti* is relativised to (15) (i.e. is constrained to be satisfied at the derivational level where only *jvāra-* is case-marked) that it is possible to consider *nava-* as having the same case as *jvāra-*, and hence to consider *nava-* as an *ekavibhakti* unit: *jvāra-* could not be said to have the same case ending as *nava-* in (15), insofar as the case ending of *jvāra-* (= *jvāra-Ø*ACC) is already determined in (15) (by A 2.3.2), while the case

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37 For a detailed analysis of A 1.2.64 and discussion of its interpretation, see Borghero, Pontillo 2020 and the references cited therein. It may be worth noting that there are Vedic occurrences in which *eka-*, i.e. the left-hand member of *ekavibhakti-*, conveys the meaning 'the same (as another thing)' outside compounding. See for instance ṚV 9.21.3: *vṛthā krī́ḷanta índavaḥ/ sadhástham abhí ékam ít/ síndhor ūrmā́ ví akṣaran//* "Moving playfully at will toward one and the same seat, the drops have flowed in various ways into the swell of the river" (transl. Jamison, Brereton 2014). Here *sadhástham abhí ékam* conveys the meaning toward 'the same seat as the one toward which any drop moves'.

ending of *nava-* (= *nava-*?) is not.

The question now arises as to why Pāṇini should have taken S_1 (i.e. the derivational stage at which only one of the two units between which a *sāmānādhikaraṇya* relation holds is case-marked) to be (15), where *jvāra-* is assigned accusative case in accordance with A 2.3.2 and *nava-* lacks a case ending, rather than (17), where it is instead *nava-* that is assigned accusative case in accordance with A 2.3.2, *jvāra-* lacking instead a case ending.

(17) (Invented example)

*nava-Ø*ᴬᶜᶜ	*jvāra-?*	*paśyāmi*.
new.ACC.SG.M	suffering.?	see.IND.PRS.1SG

Intended meaning: 'I see new suffering'.

I reckon that there is no logical reason as to why (17) should be preferred over (15). I speculate that, for Pāṇini, the case-marking of *jvāra-* (and not of *nava-*) in accordance with A 2.3.2 was merely a grammatical fact, which cannot be traced back to any independent principle of grammar and therefore has merely to be recorded in the grammar.

Thus, *nava-* satisfies the condition of being *ekavibhakti* in *nava-jvāra-* under the hypothesis that *ekavibhakti* conveys the meaning 'having the same case ending as certain units Z' in A 1.2.44, where Z may refer to *jvāra-*, i.e. to a unit other than the one that is said to be *ekavibhakti* (i.e. *nava-*).

4.5   Summary

In this section I have advanced a fresh reading of the *ekavibhakti* segment featuring in A 1.2.44, whereby this segment is ambiguous, in the sense that it involves a variable ranging over different kinds of objects. Specifically, *ekavibhakti* conveys the meaning 'having one case ending with respect to, that is the same case ending as, certain units Z', where variable Z may stand for units that are said to be *ekavibhakti*, or for units other than those that are said to be *ekavibhakti*. In this way, what counts as *ekavibhakti* is not only the unit (say, *aśva-*) that has the same case ending as the other tokens of that unit (*aśva-*) across different sentences (see (6)), but also the unit (say, *nava-*) that has the same case ending as another unit (*jvāra-*) even in one single sentence (see (14b)). It is the latter possibility that is relevant in determining which compound-member satisfies the condition of being *ekavibhakti* in *karmadhāraya*s like *nava-jvāra-*. Moreover, I have argued that the condition of being *ekavibhakti* should be relativised to (i.e. should be satisfied at) derivational stage S_1, namely to

a derivational stage where only one of the two units between which a *sāmānādhikaraṇya* relation holds is case-marked. In the specific context of *nava-jvāra-*, S_1 corresponds to a sentence in which *nava-* lacks a case ending whereas *jvāra-* is assigned case in accordance with a rule of the A 2.3: for instance, in (15), *jvāra-* is assigned accusative case by A 2.3.2 (i.e. *jvāra-Ø*ᴬᶜᶜ) whereas *nava-* is non-case-marked.

I have shown that the rule governing present participles (i.e. A 3.2.124) justifies the existence of the case-copying operation – which applies at S_1 – in the *Aṣṭādhyāyī*. Exploiting this operation, I have then suggested that *nava-* (= *nava-*?) copies the case attached to *jvāra-* (= *jvāra-Ø*ᴬᶜᶜ) in (15). In this way, there is a very precise sense in which *nava-* satisfies the condition of being *ekavibhakti* in (15): *nava-* has the same case as *jvāra-* (i.e. is *ekavibhakti* with respect to *jvāra-*) insofar as *nava-* (= *nava-*?) copies the case attached to *jvāra-* (= *jvāra-Ø*ᴬᶜᶜ) in (15), thereby showing up as *nava-Ø*ᴬᶜᶜ.

Since the *upasarjana* is defined as the *ekavibhakti* unit in A 1.2.44, *nava-* can now be considered as the *upasarjana* of *nava-jvāra-* in accordance with A 1.2.44. Thus, the ambiguity of *ekavibhakti* makes it possible to reconcile A 2.1.49 (considered in conjunction with A 1.2.43), which singles out *nava-* as the *upasarjana* of *nava-jvāra-*, with A 1.2.44, thereby resolving the apparent contradiction between these rules. The definition of *upasarjana* as the *ekavibhakti* unit (A 1.2.44) can now be seen to hold in both *tatpuruṣa*s like *aśva-śapha-* and *karmadhāraya*s like *nava-jvāra-*, and possibly in any other compound type: the *upasarjana* is the *ekavibhakti* unit, i.e. the unit that has the same case ending as other tokens of that unit across different sentences (as in *tatpuruṣa*s), or the unit that has the same case ending as another unit even in one single sentence (as in *karmadhāraya*s).

From a contemporary perspective, one way of seeing the *upasarjana* is as the unit U such that the case ending of U is determined not by the grammatical function that the NP to which U belongs fulfils within the sentence, but by the grammatical function that U fulfils within that NP: e.g. the case ending of *aśva-* (= *aśva-Ø*ᴳᴱᴺ) in *aśva-śapha-* is determined by the grammatical function of possessor fulfilled by *aśva-* within the NP *aśva-Ø*ᴳᴱᴺ *śapha-Ø*ˣ; the case ending of *nava-* (= *nava-Ø*ˣ) in *nava-jvāra-* is determined – via the operation of case-copying – by the *sāmānādhikaraṇya* relation that *nava-* bears to *jvāra-* within the NP *nava-Ø*ˣ *jvāra-Ø*ˣ (see Pontillo 2003b, 27).

5   Conclusion

In this study, I have addressed a puzzle posed by Pāṇini's analysis of *karmadhāraya* compounds like *nava-jvāra-*: while A 2.1.49 – considered in conjunction with A 1.2.43 – provides for *nava-* to be designated as *upasarjana* in *nava-jvāra-*, A 1.2.44 seems to suggest that neither *nava-* nor *jvāra-* gets the designation *upasarjana* in *nava-jvāra-*. Specifically, A 1.2.44 defines the *upasarjana* as the *ekavibhakti* unit, i.e. in the light of work by Candotti and Pontillo (see, among others, Pontillo 2003b; Candotti, Pontillo 2019), as the unit U such that the case ending of U does not change when the grammatical function of the NP which U belongs to changes. And yet, both the case ending of *nava-* (e.g. *nava-Ø*ᴀᴄᴄ) and the case ending of *jvāra-* (e.g. *jvāra-Ø*ᴀᴄᴄ) change when the grammatical function of the NP which these units belong to (i.e. *nava-Ø*ˣ *jvāra-Ø*ˣ) changes. Therefore, *nava-* cannot qualify as *ekavibhakti* in *nava-jvāra-*, and hence cannot qualify as *upasarjana* either, in apparent contradiction with 2.1.49.

I have argued that *ekavibhakti* is ambiguous, in the sense that it conveys the meaning 'having one (*eka-*) case ending (*vibhakti-*) with respect to – i.e. the same case ending as – another unit Z', where Z is a variable ranging over different kinds of objects. This makes it possible to consider *nava-* as *ekavibhakti* in *nava-jvāra-*, in that *nava-* has the same case as – i.e. copies the case ending of – *jvāra-* in the derivation of this compound; I have provided evidence from A 3.2.124 (i.e. the rule governing present participles) in favour of the existence of the operation of case-copying in Pāṇini's grammar. Insofar as the *upasarjana* is defined as the *ekavibhakti* unit by A 1.2.44, *nava-* gets the designation *upasarjana* in *nava-jvāra-* in accordance with A 1.2.44. In this way, the contradiction between A 1.2.44 and 2.1.49 (considered in conjunction with A 1.2.43) dissolves: A 2.1.49 and 1.2.44 can now be seen to converge in designating *nava-* as the *upasarjana* of *nava-jvāra-*.

The sketch of Pāṇini's classification of compounds presented here is short, partial, and incomplete, focusing in fact on subordinate endocentric compounds (*tatpuruṣa*s proper) and attributive endocentric compounds (*karmadhāraya*s) only. Nonetheless, I hope that this sketch suffices to show that Pāṇini's classification of compounds cannot be considered as a purely semantic classification, as has instead been claimed by contemporary scholars of compounding (see, e.g., Tribulato 2015, 53 and Bauer 2017, 107-12): one of the defining features of *tatpuruṣa*s and *karmadhāraya*s is the fact that they contain exactly one *upasarjana*; since the *upasarjana* is defined on purely syntactic (or morpho-syntactic) grounds, along the lines suggested in § 4, the classification of a compound as *tatpuruṣa* or *karmadhāraya* must be considered, at least in part, as syntactic. This is not to deny the role of semantics in Pāṇini's classification of compounds: the fundamental

difference between *tatpuruṣa*s (proper) and *karmadhāraya*s is the fact that the *sāmānādhikaraṇya* relation – i.e. a semantic relation – holds between the members of a *karmadhāraya*, but not between the members of a *tatpuruṣa*.

Thus, Pāṇini's model of compounding appears to be more complicated than has been thought before, involving both syntactic (= *upasarjana*-based) and semantic criteria of classification, as well as powerful grammatical tools such as silent case endings, abstract derivational levels, and the case-copying operation.

Abbreviations

1   first person
2   second person
3   third person
AP   adjectival phrase
ACC   accusative
ABL   ablative
CAUS causative
DAT   dative
DU   dual
F   feminine
GEN   genitive
IMPF   imperfect
IND   indicative
LOC   locative
M   masculine
N   neuter
NOM   nominative
NP   noun phrase
PL   plural
PRS   present
PTCP participle
SG   singular

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