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Reparsing Pāṇini

ABSTRACT: The order in which rules are applied in Pāṇinian derivations was traditionally explained by four main principles: (a) the order of enumeration in the grammar *para* ‘later’ > *pūrva* ‘earlier’, (b) constituent structure: *antaraṅga* ‘internal’ > *bahiraṅga* ‘external’, (c) the interaction of operations: *nitya* ‘persistent’ > *anitya* ‘non-persistent’, (d) generality: *apavāda* ‘exception’ > *utsarga* ‘general case’. Modern Pāṇini interpretation has much reduced the role of (a) and (b). The theory developed by S. D. Joshi and his collaborators relies on generalized versions of (c) and (d), respectively called the *siddha*-principle and generalized blocking. Rajpopat (2025) proposes a different version of generalized blocking, and replaces (c) by a completely new principle. I argue that (1) Rajpopat’s version of generalized blocking is ill-defined, (2) his new principle yields the wrong results in a large class of cases, (3) his criticism of the Joshi approach is misguided, and (4) a Joshi-type approach accounts both for the cases that Rajpopat’s theory gets right and for the cases that it does not get right. I conclude with an argument that the Aṣṭādhyāyī and the Prātiśākhya follow exactly the same basic approach, and that the vast differences between their analyses are the result of their different scope.

KEYWORDS: Pāṇini, Aṣṭādhyāyī, paribhāṣās, rule ordering, *siddha*-principle, *para*-principle, Joshi, Rajpopat.

1 The revisionist turn

The Mahābhāṣya was long valued mainly as the indispensable authority on the structure and interpretation of the Aṣṭādhyāyī. Thieme called Patañjali “the great guide”, without whose help “even indigenous interpretation may fall short of a real comprehension of Pāṇini’s phrases” (1935: 60). But Kielhorn (1887) had already shown conclusively that Patañjali had no direct *paramparā* line of connection to Pāṇini, and the Aṣṭādhyāyī was beginning to be studied as a distinct stage of an evolving science of language. That meant delving more deeply into its principles, into its connections to ritual, philosophy, Vedic exegesis and orthoepic diaskeuasis (Bronkhorst 1981), and into the discontinuities and innovations of the tradition.¹ It also resulted in a renewed interest in Patañjali as not simply a commentator and interpreter of Pāṇini but a remarkable figure with a distinctive philosophical agenda of his own (Bronkhorst 2004).

Thanks to the practice of verbatim oral transmission, the text of the Aṣṭādhyāyī has been transmitted rather accurately. The biggest overt change was the loss of the *svarita* accent that originally marked headings, which could not survive because it disappeared from the language itself. Other audible modifications of the actual recited text since Kātyāyana appear to consist only of additions and changes in single words and some added rules, mostly imported vārttikas and gaṇas. Inaudible changes in the text involved dividing original single rules into two (*yogavibhāga*), misdividing rules (e.g. Kiparsky 1979: 66), and discreetly inserting covert *anubandhas* in places where they are unpronounceable and always deleted (such as *G*, *Y*, *Ḍ* in *gkñiti*, *gkṣṇu*, *ycuñcup*, *atḍ*, Kiparsky 2007). Systematic study of the syntax of the rules, in particular of the use and placement of the particle *ca* (Joshi and Bhate 1983) and of the principles of *anuvṛtti* (Kiparsky

¹ Houben (2012) cites Nārāyaṇa Bhaṭṭa, a heterodox grammarian contemporary with Bhaṭṭojī Dikṣita, who denied the divinity of Pāṇini and insisted that non-Pāṇinian grammarians such as Candra are also authoritative.

1979: 45–47, 154–5, Joshi and Bhate 1984), has revealed other likely textual changes of the inaudible type.

The most consequential changes were not textual but interpretive. The scope of *anuvṛtti* was often enlarged (*maṇḍūkapluti*), and some rules were completely repurposed without any change in wording whatsoever.² New *paribhāṣās* were formulated, and the *gaṇapāṭha* and *dhātupāṭha* were augmented with later vocabulary. The stylistic information about usage preferences that is conveyed by *vā* ‘preferably’ versus *vibhāṣā* ‘preferably not’ (= *na vā*) was lost, and remained completely unknown until it was rediscovered by collating the optional rules with the actual usage of Pāṇini himself, of his contemporaries, and — for the specifically Vedic rules — of the Vedic texts (Kiparsky 1979).

Most of the innovations were attempts to reconcile perceived mismatches between the grammar and the evolving language. As the vocabulary and even the syntax changed, the grammar continued to be held responsible for the new usage. The desire to derive post-Pāṇinian forms from Pāṇini’s grammar drove Patañjali and his successors to stretch the rules beyond what they had originally been intended to account for. They did it with astonishing ingenuity, though with some cost to the integrity of the system. Fortunately, the changes in the *Aṣṭādhyāyī*, as far as we can tell, did not involve drastic reorganization of its rules, such as moving them from one part of the grammar to another. Moreover, the changes were well-intentioned and intelligent: none were entirely unmotivated, none created more problems than they were intended to solve. This point will become important in section 3.

Given the discontinuities in the transmission of the grammar and its commentatorial apparatus, and the fixes intended to fill gaps in

² For example, 3.4.1 *dhātusaṃbandhe pratyayāḥ* is traditionally understood as a *vidhi* rule concerning relative tense, such as the past-in-the-future in *agniṣṭomayājy asya putro bhavitā* ‘his son will have performed the *agniṣṭoma*’. Joshi (1971) made a persuasive case that it is actually intended to be an *adhikāra* over the following block of rules, which introduce dependencies between verbs in infinitive and absolutive constructions.

coverage, it is worth re-examining the grammar from the ground up to seek a simpler and more elegant set of principles as its basis than the traditionally received one. From that perspective, the interpretation of the *Aṣṭādhyāyī* has become a project of elucidating Pāṇini's original intentions, the principles behind it, its strengths and weaknesses, and (for linguists at least) learning from its achievements and insights. The re-examination of the *Aṣṭādhyāyī*'s structure and the principles behind it in terms of its own internal logic, and in the context of the philosophical ideas in its background, is still ongoing, and yielding increasingly radical reinterpretations. Although Patañjali is no longer seen as a first-hand source of information about Pāṇini's intentions, he is so to speak the founder of the field of Pāṇini studies, whose subtlety and extraordinary command of the material few if any modern scholars can hope to match.

The pivotal figure in this turn was in my opinion S.D. Joshi. After investing decades on a *Mahābhāṣya* translation and commentary, he abandoned it and embarked at the age of 65 on a second lifetime project, prefaced by this heartbreaking but courageous announcement: "When we started the *Mahābhāṣya* project, our idea was that it could be only through Patañjali that we would be able to understand Pāṇini better. However, we have now come to the conclusion that, apart from introducing a great deal of extraneous material in the interpretation of the *Pāṇinisūtras*, Patañjali is often at a loss to construe Pāṇini's intention. . . . These and similar considerations have led us to terminate our *Mahābhāṣya* project, and to start a new project, namely, the translation and critical explanation of the *Aṣṭādhyāyī*." (Joshi and Roodbergen 1991–2013, Vol. I, Preface, referred to as AP below). Fourteen volumes of this work appeared.

2 The principles underlying the *Aṣṭādhyāyī*

The traditional understanding of Pāṇini's grammar posited four main principles for prioritizing rule applications in derivations:

- (1) a. Order of enumeration in the grammar: *para* (later) > *pūrva* (earlier)
- b. Constituent structure: *antaraṅga* (internal) > *bahiraṅga* (external)
- c. Interaction of operations: *nitya* (persistent) > *anitya* (non-persistent)
- d. Generality: *apavāda* (exception) > *utsarga* (general case)

Modern Pāṇini scholarship has modified this picture substantially. The first two conditions have become much diminished in function and scope, while the other two have been generalized, and taken on a more important role in the system. There has been a surprising amount of convergence in this direction among researchers working independently, with vigorous debate continuing on the particulars.

The first break with the traditional doctrine was the demotion of rule 1.4.2 *vipratīṣedhe paraṃ kāryam*. It was traditionally thought to resolve conflicts between rules throughout the grammar in favor of the rule that is listed later in the grammar. Faddegon (1936: 36) was the first to challenge this view, remarking that rule 1.4.2 is not a system-wide *paribhāṣā* but restricted to the specific section 1.4–2.2 that it heads. His student Buiskool concurred.³ The limitation on the scope of *paratva* was endorsed by Scharfe (1961: 50), Shefts (1961: 28), Subrahmanyam 1999, among others, and confirmed by Cardona (1970: 41, 1976: 190, 1997: 405, 407), as well as by Joshi and Roodbergen throughout their edition and commentary of Pāṇini (1991–2013), which I will refer to as AP from here on. In Rajpopat (2025) not even this much of its meaning is retained, and the rule receives an altogether different function, to which I return below.

³ “The view that e.g. in **vr̥kabhyas e* is substituted for *a* by VII.3.103 in supersession of 102 (lengthening of *a*) because the former rule is *para* in regard to the latter, cannot be admitted since with reference to the position before *bh* 103 (plural!) is evidently a *restriction* on 102.” (1939: 40)

Next on the chopping block was the *antaraṅga*-paribhāṣā. It was argued that the *antaraṅga-bahiraṅga* relation does not hold word-internally. It is replaced by a much weaker principle that just prioritizes word-internal rule application over application across word boundaries (Joshi and Kiparsky 1979: 23–40, Kiparsky 1982: 77–120, Joshi and Roodbergen 1993, AP IV: 32–3, Roodbergen 2008: 32–2, Kiparsky 2009: 235–40, Kiparsky 2022, and independently Rajpopat 2025, 5.6.⁴). In other words, the *antaraṅga*-paribhāṣā is replaced by (2):

- (2) WORD-INTEGRITY PRINCIPLE: Rules apply first within words and then to combinations of words.

This revision also eliminates the various minor paribhāṣās devised to curb the unwanted effects of the *antaraṅga*-paribhāṣā (Pbh. 51–55, among others). As Joshi and Roodbergen put it, “the assumption that *antaraṅgatva* holds internally is the root cause of confusion in Sanskrit grammar.” (AP II: xiii).

Once it became clear that most rule conflicts are not resolved throughout the grammar by these two principles, neither in favor of later rules over earlier rules nor in favor of *antaraṅga* rules over *bahiraṅga* rules, the hunt was on for more valid alternative principles to establish priority between conflicting rules. Two comprehensive proposals to this effect were put forward. The first was worked out by Joshi and his collaborators, the second by Rajpopat (2025).

Of the two revisionist projects, the former is based on the other great pair of asymmetries recognized in the traditional interpretive doctrine, namely (1) the distinction between regular cases and exceptions, or more broadly between general and special rules, (*utsarga*

⁴ Rejection of *antaraṅga*-principle on pp. 14, 129, the Word-integrity principle on p. 142: “. . . according to me, in the Pāṇinian system all possible rules that can be applied while constructing a word ought to be applied before the word is considered within the context of the sentence. In other words, these rules, which contribute towards the construction of a word, cannot be applied to the word after it enters the sentence.”

and *apavāda*), including the related concepts of *sāmarthya* and *niravakāśatva*, and (2) the distinction between *nitya* and *anitya* rules. Unlike the *para* and *antaraṅga* principles, which were downgraded or abolished, these concepts were systematically extended. Generalized versions of both of them became the main regulators of rule interaction in the entire grammar. I'll call the first *generalized blocking*; the second is the *siddha*-principle.

Generalized blocking is already invoked in the work of Buiskool, as in his remark quoted in fn. 3, though he did not call it that, nor did he formulate it explicitly. But it seems that he meant it in the modern sense as holding between rules which share elements, one of which has additional conditions that apply specifically in relation to a particular case, even when there is not a strict subset relation between their respective domains. The classic presentation of it is Cardona (1970), who called it limited blocking (not the most felicitous term in my view, since it is a generalization of blocking (the *utsarga-apavāda* principle). It was taken a step further by Pataskar 1985, and systematically applied by Joshi and Roodbergen in a series of monographs and throughout their 14-volume *Aṣṭādhyāyī of Pāṇini* (AP, 1991–2007). They demonstrated its effectiveness to resolve most of the residual rule conflicts that were left unexplained when the *para* and *antaraṅga* principles were liquidated (see e.g. AP VI: 96). Their generalized blocking principle says that rules that apply to specific items have priority over rules that apply to a general class of items that subsumes them. The rules do not have to be adjacent or under the same heading, and their application need not even be mutually incompatible.⁵ For example, 6.4.111 is an *apavāda* of 6.4.119 because it mentions the verbal base *as-* (AP IX.67). 6.4.47 is an *apavāda* to 7.2.3, because it applies specifically to *bhrasj*, whereas 7.2.3 (*vrddhi*) is generally applicable (AP IV: 145), e.g. *a-bhrj-s-ī-t* → *abhārjsūt* → *abhārksīt*. In *akṣi-au* the special rule 7.1.77 *ī ca dvivacane*, which

⁵ The two rules can even make the same change. For example, *i* → *y* by 6.1.81 *ino yaṇ* (*aci*) is an “exception” to *i* → *y* by 6.1.77 *iko yaṇ aci* (IX: 238).

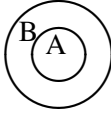
replaces the final *-i* of Vedic *asthi*, *dadhi*, *sakthi*, *akṣi* by $\acute{i}$ (*akṣi*-au $\xrightarrow{7.1.77}$ *akṣī*-au $\xrightarrow{6.1.102\dots}$ *akṣī*) has priority over the general rule 7.1.73 *iko'ci vibhaktau*, which would add the augment *nUM* to the stem.⁶

Another generalization of the *utsarga/apavāda* principle, related to *anavakāśatva*, is *collective blocking* (Kiparsky 1982: 115, 1991: 358), traditionally called *bādhyasāmānyacintā*, also used in *nyāya*. The idea is that blocking is induced by a domain inclusion relationship between a rule and a *set* of rules:

- (3) *Collective blocking*: If the domain of rule A is properly included in the domains of a set of rules $\mathcal{R} = \{R_1, R_2, \dots R_n\}$, A blocks (has priority over) each of the rules in $\mathcal{R}$.

So rule A blocks B in (4a), and it blocks both B and C in (4b):

(4) Blocking



a. Regular blocking



b. Collective blocking

For example, 6.1.77 *iko yaṇ aci* and 6.1.101 *akaḥ savarṇe dīrghaḥ* can be taken together with a third rule, 6.1.87 *guṇa* contraction:

- (5) a. 6.1.77 *iko yaṇ aci* ‘*i*, *u*, *r*, *l* (*iK*) $\rightarrow$ *y*, *v*, *r*, *l* (*yaN*) before a vowel (*aC*)’

⁶ Further examples: 6.1.58 *tṛjdiṣor jhali* > 7.3.85 *pugantalaghūpadhasya ca* (*draṣṭum*); 7.2.1 *sici vṛddhiḥ parasmaipadeṣu* > 7.3.84 *sārva-dhātukārdhahātukayoḥ* (*acaiṣīr*); 6.1.87 *ato guṇe* > 6.1.101 *akaḥ savarṇe dīrghaḥ* (*pacanti*).

- b. 6.1.101 *akāḥ savarṇe dīrghaḥ* (84 *ekāḥ pūrvaparayoḥ*) 77 *aci* ‘*aK* (*a, i, u, ṛ, l*) and a following homogeneous vowel are (both) replaced by a long vowel’
- c. 6.1.87 *ād guṇaḥ* (77 *aci*) ‘*a* + a vowel is replaced by *guṇa*’

Together, the three form a blocking set, with *savarṇadīrgha* as blocker (note that they all fall under *aci* from 6.1.77). Collective blocking applies because the domain of *savarṇadīrgha* is wholly included in the domain of *guṇa* and glide-formation taken together, for of the possible like-vowel sequences, *a + a* also falls under *guṇa*, and all others (*i + i*, *u + u*, *ṛ + ṛ* . . .) also fall under glide-formation.

Similarly, wherever rule 6.1.51 *ner aniṭi* is applicable, another *aṅga* rule is also applicable, and 6.4.51 blocks all the rules in that set. It includes *guṇa*, *vṛddhi*, glide formation, and other rules. Likewise, wherever rule 6.4.48 *ato lopāḥ* is applicable, some other rule is also applicable, and 6.4.48 blocks all the rules in that set.

Conceptually akin to generalized blocking is the idea that word-building rules such as reduplication and augmentation have priority over substitution rules (allomorphy or phonology). For example, in noun inflection the augment *nUM* is always inserted prior to application of any general *guṇa*, *vṛddhi*, or other stem-changing rule, and so is the augment *āT* in verb inflection. JR have applied this principle systematically with success (AP IX: 15, 35, 193, 234, 254, X: 24, 215–217, XIII: 52). It is crucially subordinated to the *siddha*-principle, in that reduplication and augmentation “wait” for the phonology to produce the actual environment (AP IX: 84, XII: 138, 141).

JR go further in AP IV: 34, where they suggest an order of application based on a three-way rule classification: (a) word-building rules, (b) morphological rules (rules whose application is determined by a stem-suffix context), (c) phonological rules. A similar rule hierarchy has been independently suggested by Scharf (2009, 2011), with semantics added as a fourth layer at the top.

For example, in *vāri-Ñi* two mutually exclusive rules become applicable simultaneously:

- (6) a. 7.1.73 *iko'ci vibhaktau* ‘the augment *nUM* is inserted after the final vowel of a neuter stem ending in an *-iK* vowel (*-i*, *-u*, *-ṛ* . . .) before a vocalic case ending’.
- b. 7.3.111 *gher ñiti* ‘final *-i*, *-u* are replaced by *guṇa* (*-e*, *-o*) in a neuter stem before case endings marked with *Ñ*’.

In JR’s typology 7.1.73 is a word-building rule, 7.3.111 is a substitution rule, and the former prevails over the latter. So *vāri-Ñi* → *vārin-Ñi* (→ *vāriṇi*), not **vāre-Ñi* (→ **vārayi*). Cf. Pbh. 55 *vārṇād āṅgaṃ balīyaḥ*.

The generalization of the *nitya*-principle as the *siddha*-principle (Joshi and Kiparsky 1979, Kiparsky 1982) has been more controversial, although in my opinion it is empirically at least as well supported and formally better defined than generalized blocking.

(7) The *siddha*-principle

If rule A affects the operation of rule B, but not conversely, rule A has priority.

J&R applied and refined it in a series of monographs (Joshi 1981; Joshi and Roodbergen 1987, 1990) and throughout their AP (e.g. IV: 17–20, IX: 87, XII: 227). They distinguish between two types of rule conflict: *one-way* conflict (resolved by the *siddha*-principle) and *two-way* conflict (mutual blocking). A one-way conflict obtains if the application of rule A would affect the way rule B applies (or would make it entirely inapplicable), while the application of rule B would have no effect on how rule A applies. A two-way conflict obtains when each rule would affect the way the other applies (*tulyabalatva*). Their core idea is that one-way conflicts in the Aṣṭādhyāyī are resolved by the *siddha*-principle, and two-way conflicts are resolved by generalized blocking (AP IV: 35, VIII: 65, IX: 87). Unlike the *nitya*-principle, the *siddha*-principle works also to prioritize environment-*changing* rules — not just environment-*destroying* ones. In other words, a rule may affect the operation of another rule either by removing its environment

or by modifying the environment. Intuitively, the *siddha*-principle says that rules should interact as much as possible.

There are several ways in which one could implement the *siddha*-principle, all of which maximize *siddha* relations in derivations, but to different extents. We could assume that the *siddha*-principle applies at each point in a derivation to determine which of the rules that is applicable at that point should take effect. Or we could assume that it scans entire candidate derivations and chooses the one in which *siddha*-relations are maximized. There is some evidence that the *siddha*-principle has the latter, crucially global “lookahead” character. It comes from the close examination of Pāṇinian derivations and from the tell-tale wording of some of the rules. An example is the different treatment of *agāt* ‘went’ (3.Sg. Aorist) and *āyan* ‘went’ (3.Pl. Imperfect). The underlying vocalic root *i* is replaced by *y* in *ā-y-an*, and by suppletive *gā* in *a-gā-t*, thereby coming to begin with a consonant in both forms. By 6.4.71–2 *luṇlaṇlṛṇkṣv aḍ udāttaḥ*, *āḍ ajādīnām*, the past tense augment is *a-* before a consonant and *ā-* before a vowel. The global *siddha*-principle dictates that this distribution should be checked *after* *i* is replaced by *gā* and *y*, predicting a short augment *a-* in both forms. This is correct for *agāt*:

$$(8) i \xrightarrow{3.2.115} i-luṇ \xrightarrow{3.4.78} i-ti \xrightarrow{3.4.100} i-t \xrightarrow{2.4.45} gā-t \xrightarrow{6.4.71} a-gā-t$$

The point is that the context of augment insertion is there already at the stages *i-luṇ* → *i-tiP* → *i-t*, but the *siddha*-principle correctly tells the augment rule to hold off inserting the augment until its final context *gā* is in place, thereby maximizing *siddha* relations over the derivation. By the same token, however, the extended *siddha*-principle gives the wrong result for *āyan*, which has to get *ā-*, as if the root was still vocalic. With this in mind, Pāṇini has put both relevant rules, 6.4.72 *āḍ ajādīnām* and 6.4.81 *īṇo yaṇ* (but *not* 2.4.45 *īṇo gā luṇi*!) into the special section headed by 6.4.22 *asiddhavad atrā bhāt*, which states that all rules in this section are as if *asiddha* with respect to each other. This heading sets aside the *siddha*-principle and tells us to “pretend” that the root still begins with a vowel, ensuring that the augment *ā-* is

selected *as if* the root vowel had not been replaced by y. (The derivation in (9) again skips a few steps for the sake of perspicuity.)

- (9) $i \xrightarrow{3.2.115} i-la\bar{n} \xrightarrow{3.4.78} i-an$ (up to this point, the desired augment $\bar{a}$ could be derived by 6.4.72 $\bar{a}\dot{d} aj\bar{a}d\bar{i}n\bar{a}m$) $\xrightarrow{6.4.81} y-an \xrightarrow{6.4.72} \bar{a}-y-an$ (in virtue of 6.4.22)

Here we see Pāṇini using the extended *siddha*-principle in constructing his grammar. The argument rests not just on this or any particular example, but on a general observation: rules have been put under the scope of 6.4.22 and 8.2.1 *only* in order to defeat the *siddha*-principle. Moreover, since the inclusion of some rules in those sections is justified *only* by the global *siddha*-principle, that is the version that Pāṇini must have worked with.

In practice, the *asiddha* relation on operations is a way to restrict the relative order in which the rules that enjoin those operations take effect. The restriction “A is *asiddha* with respect to B” has the same import as the restriction “B and A are applied in that order” would have.

3 Rajpopat 2025

3.1 A new theory

Much of Rajpopat’s framework is familiar and widely accepted. He builds on the modern near-consensus that the *antaraṅga-bahiraṅga* relation does not apply within words, whereas word-internal operations do precede operations across word boundaries. He rejects the idea that rule 1.4.2 *vipratishedhe paraṁ kāryam* prioritizes later (*para*) operations over earlier ones. He adopts a generalized blocking principle along the lines of Pataskar 1985 and Joshi and Roodbergen, as well as the distinction between one-way and two-way rule conflict.⁷

⁷ The publisher deserves thanks for putting out this volume and giving it plenty of media coverage. Unfortunately the production is reader-unfriendly: no index

But Rajpopat’s main thesis is completely new and even shocking. It gives an entirely new function for 1.4.2 (the “perfect rule” of the book’s title), with new meanings for both *vipratishedha* and *para* in it, upending the accepted view of how rules are prioritized. These are remarkable claims, and they require commensurate evidence. Although a version of this work has been publicized since 2022, it has for some reason not received much attention yet from specialists. I am aware of only two serious reviews of it, or rather of the Ph.D. dissertation that the book is based on: Scharf (2022) and Bodas (2022), both of them unpublished. They are highly critical, but they are more concerned with flaws in Rajpopat’s analyses of specific examples than with the larger issues raised by the book, or with comparing it to other approaches.

Rajpopat introduces a distinction between two types of rule interaction: Same Operand Interaction (SOI), where two rules are applicable to the same operand at the same point in the derivation, and Different Operand Interaction (DOI), where two rules are applicable to different operands at the same point in the derivation. He claims that Pāṇini’s term *vipratishedha* refers to DOI (not to incompatibility in general), and that his rule 1.4.2 *vipratishedhe paraṃ kāryam* resolves cases of DOI by giving priority to the right-hand side (*para*) operation. Moreover, he claims that Pāṇini deploys a generalized blocking principle, not stated in his grammar but part of the *sūtra* tradition, which resolves SOI in favor of the more specific rule.

To show how this works, let’s look at the simple derivation *deva-bhis* → *devaiḥ* ‘god’ (instr.pl.). Pāṇini’s rule 7.1.9 *ato bhis aḥ* replaces *bhis* by *aḥ* after a stem ending in *a*, superseding 7.3.103 *bahuvacane jhaly et*, which is also applicable here and would replace final *a* by *e* before a plural case ending beginning with a *jhal* consonant (an obstruent), to yield the wrong form **devebhis*. The modern consensus

of rules, no index of technical terms, no index of examples, endnotes instead of footnotes. I found myself constantly flipping around in the text in search of particular parts of the tightly framed argument. In the age of computer typography footnotes are so easy to typeset that there is simply no excuse for using endnotes in a work where they convey crucial content.

is that *ais* $\rightarrow$ *bhis* supersedes *a* $\rightarrow$ *e* because it is an exception to it (Cardona 1997:405, AP X:30). But this analysis is unavailable in Rajpopat's theory. The two rules operate on different elements, so this is a case of DOI, and hence of *vipratīṣedha* (in his special sense). Therefore the competition between the rules must be resolved by 1.4.2 in favor of the *para* operation 7.1.9. It is actually the earlier rule in the order of the Aṣṭādhyāyī, but that is irrelevant because by Rajpopat's new interpretation *para* in 1.4.2 does not mean 'the later rule', but 'the rightmost operand', which in the case at hand is *bhis* rather than *a*.

Your head may be spinning by now, but I hope you appreciate how novel and intriguing these ideas are. In what follows I will examine Rajpopat's theory of SOI and DOI rule interactions. My conclusion, sadly, is (1) that Rajpopat's theory of SOI interactions is ill-defined, and (2) that his theory of DOI interaction is wrong, and that the *siddha*-principle and generalized blocking together account for both for the cases that Rajpopat's theory gets right and for the cases that it does not get right.

3.2 SOI cases

A generalized blocking relation does a lot of work in Rajpopat's theory, and he takes some pains to illustrate how it works. The idea is to break down rules into elementary subrules, and then to compare the matching pairs of subrules that are relevant in the derivation at hand in order to determine which of them is more specific. Unfortunately we are not given rules or instructions for establishing a generalized blocking relation, but asked by the author to intuit the procedure from examples.

I illustrate Rajpopat's method with the derivation $\bar{r} + \acute{S}aP + tiP \rightarrow tarati$ 'crosses' (3.Sg.). Two rules compete here. The first is 7.3.84 *sārvadhātukārdhahātukayoḥ* (82 *guṇaḥ*), which is applicable to the class of short or long simple vowels *i*, *u*, *r*, *l* before a *sārvadhātuka* or *ārdhahātuka* suffix not marked with *K* or *Ṇ*. The second is 7.1.100 *ṛta iddhātoḥ*, which turns root-final $\bar{r}$ to *ir* (before any affix). This is not a case of *vipratīṣedha* (in Rajpopat's terminology), because both rules

apply to the same operand (SOI). Therefore the new *para*-principle does not apply here, and blocking should cause the more specific of the two rules to take effect. What we want is $t\bar{r} + \acute{S}aP + tiP \rightarrow t\acute{a}rati$ (contrast $t\bar{r} + \acute{S}a + tiP \rightarrow t\acute{ir}\acute{a}ti$ with $\acute{S}a$, which is $\acute{N}it$ by 1.2.4; both forms are frequent in usage). We break down the rules into subrules as in (10), pick out the relevant subrules (boldfaced), establish on that basis that 7.3.84 is the special rule, which therefore has preference over 7.1.100.

- (10) a. 7.3.84
 $\bar{r}$ + non-*Kit*, non- $\acute{N}it$ *sārvadhātuka* or *ārdhadhātuka* affix
 other vowels + non-*Kit*, non- $\acute{N}it$ *sārvadhātuka*
 or *ārdhadhātuka* affix
- b. 7.1.100
 $\bar{r}$ + *sārvadhātuka* or *ārdhadhātuka* affix

But it looks like we have stacked the deck here. Rule (10a) 7.3.84 has been made a special rule by singling out the relevant operand $\bar{r}$ as a special case (boldfaced) and setting aside the other operands to which 7.3.84 is applicable as being irrelevant. But by parity that procedure should also be applied to the other rule 7.1.100, by singling out its relevant context “non-*Kit*, non- $\acute{N}it$ ” as a special case, while the other suffixes before which 7.1.100 is applicable are set aside as being irrelevant. I have done that in (11), again with the relevant subrules boldfaced.

- (11) a. 7.3.84
 $\bar{r}$ + non-*Kit*, non- $\acute{N}it$ *sārvadhātuka* or *ārdhadhātuka* affix
 other vowel + non-*Kit*, non- $\acute{N}it$ *sārvadhātuka* or
ārdhadhātuka affix
- b. 7.1.100
 $\bar{r}$ + non-*Kit*, non- $\acute{N}it$ *sārvadhātuka* or *ārdhadhātuka* affix
 $\bar{r}$ + other affix

It seems that neither rule is more special than the other, and we are left with no explanation for why 7.3.84 blocks 7.1.100 in the domain

where they intersect. The vowels to which 7.1.100 applies are a proper subset of the set of vowels to which 7.3.84 applies, while the suffixes before which 7.3.84 applies are a proper subset of the ones before which 7.1.100 applies. The fact that we get *táрати* and not **tíрати* in (10) does not emerge from the subset relations, but from the decision to privilege one subset relation while suppressing the other. In other words, it construes the competition as being between two rules about the treatment of $\bar{r}$ before suffixes, and not as being between two rules about the treatment of vowels before non-*Kit*/*Ñit* suffixes. If the facts were the other way round, the procedure could “explain” that outcome too, by writing the subrules like this:

- (12) a. 7.3.84
i, u, r, l + non-Kit, non-Ñit sārvaḥātuka or ārdhaḥātuka affix
 b. 7.1.100
 $\bar{r}$ + non-Kit, non-Ñit sārvaḥātuka or ārdhaḥātuka affix
 $\bar{r}$ + other affix

From this perspective it is 7.1.100 that is the special rule, because it only applies to long $\bar{r}$, whereas 7.3.84 applies to short or long *i, u, r, l, ī, ū, ṛ, ḷ*.

Surprisingly, this exposition is directly followed by a summary of Cardona’s (1970) account of the same two rules, and of my refutation of it (Kiparsky 1991), with the comment:

I think that Cardona’s limited blocking principle is similar to my method of dealing with SOI. However, Kiparsky correctly points out that the explanation offered by Cardona is ambiguous. On the other hand, my solution overcomes such ambiguity by following the clearly defined procedure which I have developed and used to tackle all examples of SOI in this book. (p. 104)

As best as I can make out, Rajpopat’s method, and his analysis of this example, is not just “similar” to Cardona’s — it is a notational variant of it, and it suffers from exactly the same problem. This has been

also pointed out by Scharf (2022). The indeterminacy of Cardona’s version, which both Rajpopat and Scharf acknowledge, also vitiates Rajpopat’s version. Rajpopat claims to have presented a “clearly defined procedure” which overcomes this problem, but I have been unable to find it in his book.

But before we give up, let’s explore a possible way to save the idea. In (10) the winning rule applies to a more special class of operands, while the losing rule applies in a more special set of contexts. Could having a special operand be more important than having a special context? Unfortunately that is a dead end, for two reasons. First, there are cases of the reverse kind, where the rule that applies to a more special class of contexts wins and the rule that applies in a more special set of operands loses. Secondly, Rajpopat’s account explicitly equates context specificity and operand specificity for purposes of establishing blocking. Here are the details.

In the derivation of feminine *tri-ām* → *tiṣṛñām* ‘three’ (gen.pl.), the two relevant rules are:

- (13) a. 7.2.99
tricaturōḥ striyām tiṣṛcatasṛ ‘feminine *tri* and *catur* are replaced by *tiṣṛ* and *catasṛ* before a case suffix’
 b. 7.1.53
tres trayah (52 *āmi*) ‘*tri* is replaced by *traya* before (the case suffix) *ām*’

Because the rules apply to the same operand *tri*, this is not a case of *vipratishedha* in Rajpopat’s terminology. It is an SOI case, so the more specific of the two rules should take effect. To determine which of the rules is more specific, we break them down into subrules, discard the ones that are not applicable to both inputs, and select the more specific remaining subrule.⁸ If we do it in both rules, we get:

⁸ We could add “feminine *catur* + *ām*” and “feminine *catur* + any case suffix” to (14a), but these subrules would not enter into the evaluation (they would not get boldfaced) because 7.1.53 cannot not apply to *catur*.

- (14) a. 7.2.99
 feminine *tri* + *ām*
 feminine *tri* + any case suffix
- b. 7.1.53
 feminine *tri* + *ām*
 any gender of *tri* + *ām*

For *tri*, 7.2.99 selects the operand more specifically than 7.1.53 does (feminine *tri* rather than any *tri*), whereas 7.1.53 selects the context more specifically than 7.2.99 does (*ām* rather than any case suffix).⁹ In this example, the operation conditioned by the more specified context (*ām*) wins, so the subrule applying in that context should have come out more specific, whereas in the previous example (10) the rule applying to the more specified operand (*ṛ*) wins, so the subrule applying to that operand should have come out more specific. We could make the display in (14) asymmetric by suppressing one of the subset relations, but if we can have it both ways, we have no theory. We seem to have made no progress over Patañjali’s wry proposal that *vipratīṣedha* is resolved in favor of the *para* rule in the sense of the *iṣṭa* ‘desired’ rule.

Moreover, prioritizing operand over context or vice versa would lead nowhere anyway, because Rajpopat’s formal implementation is set up in such a way that context and operand are on a par. In Ch.2, Ex. 5 (p. 63) he explains that his procedure for prioritizing rules by specificity treats context and operand together. He illustrates this by rule 6.1.77 *iko yaṇ aci*. The operation enjoined by this rule is not to be considered as a replacement of *iK* with *yaN* before *aC*, but as a replacement of *iK-aC* with *yaN-aC*. The formal motivation for this is that it allows the procedure to compare rules of the form “*A + B → C*” to context-sensitive rules of the form “*A → B* before *C*”, in particular to compare *ekādeśa* rules such as 6.1.101 *akaḥ savarṇe dīrghaḥ* (77

⁹ Rajpopat 2025: 62 says that 7.2.99 wins because it has a “specific restriction or marker”, meaning that it is specifically restricted to feminine stems. But it seems to me that it could equally well be 7.1.53, because it is specifically restricted to *ām*.

aci) to replacement rules like 6.1.77 *iko yaṇ aci*. The consequence is that the distinction between context and operand plays no role in determining which rule is *apavāda* and which rule is *utsarga*. The derivation is given in (15).

- (15) a. 6.1.87 *ād guṇaḥ* (77 *aci*): *guṇa* (*a, e, o*) replaces both *a* and the vowel immediately after it.
 b. 6.1.101 *akaḥ savarṇe dīrghaḥ* (77 *aci*): a long vowel replaces both *aK* (*a, i, u, ṛ, ṝ*) and the immediately following *savarṇa* (homorganic) vowel.

Rajpopat says that 6.1.101 wins because it is more specific, in that it is applicable only when the following vowel is homorganic. He shows this graphically by bolding the subrule that is relevant to the conflict.

- (16) a. 6.1.101
 a + vowel (savarṇa)
 i, u, ṛ, ṝ + vowel (savarṇa)
 b. 6.1.87
 a-vowel

Here we may again object that 6.1.87 is also more specific, in that it is applicable only to *a*. So to be consistent we should write:

- (17) a. 6.1.101
 a + vowel (savarṇa)
 i, u, ṛ, ṝ + vowel (savarṇa)
 b. 6.1.87
 a + vowel (savarṇa)
 a + vowel (any)

Neither rule is more special than the other. By the method of judicious expansion into subrules used in (16) we could equally well have “explained” the contrary case where 6.1.87 is the winning rule.

Recall from (3) in section 2 that collective blocking works perfectly in this case, see (5). Once the rules that operate are grouped together

into a threesome with (5), it is obvious that *savarṇadīrgha* is a special case relative to the other two, and sets them aside in the overlapping domains. The problem of prioritizing them disappears.

Here is another pair of rules with intersecting conditions.

(18) a. 7.1.58

idito num dhātoḥ ‘*nUM* is added (1.1.47 to the last vowel of) a root (6.4.1 that is an *aṅga*) and is marked with *I*’

b. 6.1.75

dīrghāt (73 *che*, 71 *tuk*, 72 *saṃhitāyām*) ‘*tUK* is added (1.1.46 after) a long vowel before *ch* (in connected speech).’

7.1.58 is more special in that it singles out the class of roots marked with *I* and requires it to be (part of) an *aṅga* ‘stem’. 6.1.75 is more general in that it has no morphological restrictions and is applicable anywhere in connected speech (close phonetic contact), even across word boundaries. On the other hand, 6.1.75 is more special in that it is restricted to the phonological context between a long vowel and *ch*. Both rules are applicable in a case such as *vāchI* + *ŚaP* + *tiP* ‘wants’. This is an SOI conflict. It is not clear how to apply Rajpopat’s procedure here, or any version of generalized blocking for that matter. The *siddha*-principle, however, gives an immediate answer. If nasal insertion by 7.1.58 takes effect first, it eliminates the context $\bar{V}___\text{ch}$ in which 6.1.75 wants to add *tUK*, and we derive the correct form *vānchati*. If *tUK* is added first by 6.1.75, 6.1.75 can then still add *nUM*, and we get **vāntchati* → **vāncchati*. The *siddha*-principle predicts the correct outcome.

A more difficult case is the relationship between 7.1.73 and 7.3.111, also proposed as a case of limited blocking by Cardona (1970, 60).

(19) a. 7.3.111

gher niti (108 *guṇaḥ*) (6.4.1 *aṅgasya*)

‘before endings with the marker - $\dot{N}$ (Dative - $\dot{N}e$, Ablative - $\dot{N}asi$, Genitive - $\dot{N}as$, and Locative - $\dot{N}i$), (the final segment of) *ghi* stems (a class of stems in -*i*, *u*) is replaced by *guṇa*’

- b. 7.1.73
 (58 num) *iko'ci vibhaktau* (72 *napuṃsakasya*) (6.4.1 *aṅasya*)
 ‘the augment *nUM* is inserted after the final vowel of a neuter
aṅa ending in an *-iK* vowel (*-i*, *-u*, *-r*, *-l*) before a vocalic case
 ending’

In the shared operand domain, comprising neuter *ghi* bases, 7.3.111 is more specific than 7.1.73 in that it applies only before *Ñit* endings (all of which are vocalic), whereas 7.1.73 applies before any vocalic ending. In the shared context domain, namely before *Ñit* endings, 7.1.73 applies only to neuter stems, 7.3.111 to stems of any gender, but in another respect, 7.3.111 is more specific than 7.1.73 in that it applies only to *-i*, *-u* stems, whereas 7.1.73 applies also to *-r*, *-l* stems. So 7.3.111 has two proprietary contexts as against 7.1.73’s one proprietary context. Still, 7.1.73 takes precedence, as in Dat.Sg. *jatu-e* → *jatun-e* (not **jatave*). This case falls under J&R’s generalization that augment rules are word-building rules, and as such dominate phonological and morphological rules (see AP IV: 26).

3.3 DOI cases

All 40 unidirectional DOI cases cited by Rajpopat work by the *siddha*-principle. They are the following:

- Section 2.7, Exx. 6–8: *kroṣṭūṇām*, *karṭṛṣu*, *tad*
- Section 3.2, Exx. 1–7: *praṭīcaḥ*, *seduṣaḥ*, *gargāḥ*, *pañcālāḥ*, *gārgīyāḥ*, *puṣyaḥ*, *pañcamāḥ*
- Section 4.3, Exx. 1–9: *śvayitvā*, *hata*, *ghnanti*, *kramitvā* ~ *krantvā* ~ *krāntvā*, *atikramya*, *prasthāya*, *āgatya* ~ *āgamya*, *śiṣṭāt*, *hatāt*
- Appendix C, Exx. 1–21: *glāyati*, *abhūt*, *agrahūt*, *agopūt*, *abhitta*, *ūrnaviṣyati*, *bhūyāt*, *naśitavya*, *devitvā*, *khanitvā*, *kuru*, *stāt*, *bhāvi*, *krīṇanti*, *udvijisya*, *bibhyati*, *anijāt*, *asicat*, *vatvā*, *āghnīya*, *viddhvā*

In each instance, the winning rule is the right-hand operation *and* it is the rule that removes or modifies the context of the other.

Rajpopat's theory also makes the right-hand rule responsible for the small group of DOI cases that involve mutual (bidirectional) blocking. Some of these are instances of special rules superseding general rules, others follow from the *siddha*-principle.

- (20) *hari-āN harinā* 'green' (Instr. Sg), application of 6.1.77 *iko yaṇ aci*, which replaces *iK* (*i, u, ṛ, ḷ*) by *yaN* (*y, v, r, ḷ*) before *aC* (any vowel) would derive the wrong form **haryā*. It is superseded by 7.3.120 *āno nāstriyām*, which replaces *-āN* (= *Ṭā*) by *-nā* after a non-feminine *ghi* base (a base ending in *i* or *u*, except *sakhi*). The morpheme-specific rule 7.3.120 is the special case, for all instances of it are included in the remit of 6.1.77, and as such it supersedes 6.1.77. Rajpopat's theory derives the same outcome in a different way: since the operands are different (DOI), the case falls under 1.4.2 *vipratishedhe paraṃ kāryam*, and it is resolved in favor of the *para* 'right-hand' operation 7.3.120.

- (21) In *strī-ām* 'woman' (feminine, genitive plural) the conflict is between 6.4.79 *striyāḥ* (6.4.1 *aṅgasya*, 6.4.77 *aci yvoḥ iyaṇ*), which replaces the final sound of the base *strī* by *iyāN* before a vowel-initial affix, and 7.1.54 *hrasvanadyāpo nuṭ* (52 *āmi*), which adds the augment *nUṬ* to *-ām* after a nominal base that ends in a short vowel or is termed *nadī* (feminine ending in *-ī* or *-ū*), or has the feminine affix *-ṬāP*. The derivation *strī* $\xrightarrow{6.4.79}$ *striy-ām* $\xrightarrow{7.1.54}$ *striyām* terminates in the wrong form. The correct derivation *strī* $\xrightarrow{7.1.54}$ *strī-nām* gives the correct form *strīṇām*. 7.1.54 wins because it is an augment rule, and augment rules prevail over substitution rules because they are word-building rules (AP IX.234).

- (22) In *vāri-ām* → *vārīṇām* 7.1.73 *iko'ci vibhaktau* (58 *num*, 72 *napuṃsakasya*) attaches the augment *nUM* to neuter bases end-

ing in *iK* (*i*, *u*, *r*, *l*) before a vowel-initial case ending. 7.1.54 *hrasvanadyāpo nuṭ* (*āmi*) (see previous example). Whichever rule takes effect destroys the context required by the other. 7.1.54 must win in order to feed lengthening by 6.4.3 *nāmi*: *vāri-ām* $\xrightarrow{7.1.54} \rightarrow \text{vāri-nām} (\rightarrow \text{vārīṇām})$. For Rajpopat this follows by the right-hand rule. For JR (AP X.156) the *nUṬ* rule 7.1.54 wins because it is the special rule, in that it applies specifically before the genitive plural case ending *-ām*, whereas the *nUM* rule applies before any case ending that begins with a vowel.

3.4 DOI cases that work only with the *siddha*-principle

In previous sections we saw that the *siddha*-principle and Rajpopat's *para*-principle make the same correct predictions in many cases. I now turn to some types of cases in which the outcomes diverge, where only the *siddha*-principle makes the correct predictions. I submit that whenever the *siddha*-principle would predict the *wrong* result, Pāṇini always adds a fix that requires an otherwise unmotivated complication. On the other hand, as far as I am aware there are no cases where Pāṇini has complicated his grammar in order to cope with the wrong consequences of Rajpopat's *para*-principle. This adds up to an argument that Pāṇini composed his grammar with the *siddha*-principle in mind. The examples that follow are drawn from a much longer list in Bodas' review (2022), but the use of the *siddha*-principle to explain them is mine.

Rule 7.2.101 *jarāyā jaras anyatarasyām* (100 *aci*) optionally replaces the feminine *ā*-stem *jarā* 'old age' by the consonantal stem *jaras* before a vocalic ending. The form of the inflectional endings is chosen accordingly, so we have *ā*-stem forms like Dat. *jarā-yai*, Acc. *jarā-m* alongside C-stem forms like Dat. *jaras-e*, Acc. *jaras-am*, Instr. *jaras-ā*, Gen. *jaras-aḥ*, (all these are cited from the Rīgveda, but the alternation is live throughout Sanskrit). The basic forms of the endings are like the C-stem forms, for example Dat.Sg. *jarā + Ne*, which yields both *jaras-e* and *jarā-yai* (via *jarā-yā-e* by 7.3.113 *yāḍ*

āpaḥ). This is a problem for Rajpopat's approach. His procedure for DOI conflict is to start the derivation with the rightmost operand (the "right-hand side" principle, RHS for short), in this case by adding *yā* to the case ending. This rule is obligatory. But after applying it we no longer have a vocalic ending, so we have no way to derive the other option *jaras-e*. The *siddha*-principle handles this alternation straightforwardly. Since the replacement of *jarā* with *jaras* by 7.2.101 bleeds (removes the *nimitta* of) the replacement of suffixes after vowel stems by 7.3.113, the *siddha*-principle tells us to apply 7.2.101 first. Since 7.2.101 is optional, we may either apply it to get *jarase*, after which 7.3.113 is no longer applicable (bleeding order), or we may not apply it, in which case affix replacement by 7.3.113 takes effect obligatorily, yielding *jarāyai*.

Next, take *dyauḥ* 'sky, god'. Two rules are applicable to Nom.Sg. *div-sU*:

- (23) a. 7.1.84 *diva auṭ* (*sau* 82) 'stem-final *-v* → *-au* before Nom.Sg. *-sU*'
- b. 6.1.68 *halṇiyābbhyo dīrghāt sutisy aprktam hal* (*lopaḥ* 66)
'a suffix consisting of a consonant is deleted after a stem-final consonant.'

The desired derivation is $div-sU \xrightarrow{7.1.84} diau-sU (\rightarrow dyauḥ)$. The *siddha*-principle correctly predicts it, for $v \rightarrow au$ replacement by 7.1.84 bleeds *s*-deletion by 6.1.68, whereas the converse is not the case, for after $-s \rightarrow \emptyset$ takes effect, $v \rightarrow au$ replacement remains applicable due to 1.1.62 *pratyayalope pratyayalakṣaṇam*, which maintains the triggering force of the deleted suffix. It follows that the *siddha*-principle prioritizes $v \rightarrow au$, which gives the correct result.

Rajpopat's *para*-principle, on the other hand, prioritizes $-s \rightarrow \emptyset$, because the operand *-sU* is to the right of the operand *-v*. This yields $div-sU \xrightarrow{6.1.68} div-\emptyset \xrightarrow{7.1.84} *diau$, which is incorrect. *dyauḥ* is a very frequent word, for which Pāṇini took care to formulate the special rule 7.1.84 *diva auṭ*. So he must have intended his grammar to cover it. Therefore, the fact that its derivation requires the *siddha*-principle

and is incompatible with Rajpopat's *para*-principle is a good piece of evidence for our position and against his.

A similar case involving a different pair of rules is *he gauḥ* 'hey bull!' (Voc.Sg.). In *go-sU*, rule 6.1.69 *eṇ hrasvād sambuddhau* (66 *lopaḥ*), (68 *sutisy apr̥ktam hal*) deletes final *-sU* in vocatives after certain vowels, including *o*, whereas 7.2.115 *aco ññiti* replaces stem-final *-e, -o* by *-ai, -au*. The *siddha*-principle gives precedence to the latter rule, for it bleeds 6.1.69 *-s* → ∅, whereas 6.1.69 does not bleed 7.2.115 because of 1.1.62 *pratyayalope pratyayalakṣaṇam*. So 7.2.115 takes effect first, yielding the correct form *he gauḥ*. Rajpopat's *para*-principle requires the opposite order of application, because the operand *-s* is to the right of the operand *-o*. That derivation produces the wrong output: *go-sU* $\xrightarrow{6.1.69}$ *go-∅* $\xrightarrow{7.1.115}$ **gau*.

Now look at the derivations of *adas-sU asau* and *tad-sU saḥ* 'he', 'that one' (Nom.Sg.). Two rules are applicable to *adas-sU*:

- (24) a. 7.2.107 *adasa au sulopaś ca* (106 *sau*)
 'the final segment of *adas* → *au* before Nom.Sg. *-sU*, and *-sU* is deleted'
 b. 6.1.68 *halñyābbhyo dīrghāt sutisy apr̥ktam hal* (66 *lopaḥ*):
 'a suffix consisting of a consonant is deleted after stem-final C-'

Why was 7.2.107 formulated as performing two distinct operations — replacing the stem-final *-s* by *-au*, and deleting the Nom.Sg. ending *-sU*? Couldn't the ending *-sU* just be deleted by (24b) 6.1.68, allowing (24a) 7.2.107 to be simplified by omitting *sulopaś ca*? The answer is no, and for an interesting reason (AP XI: 234).

Suppose 7.2.107 were formulated simply as **adasa au*. Then, if it applied first, it would destroy the environment of 6.1.68, whereas if 6.1.68 applied first, **adasa au* would still apply (by 1.1.62 *pratyayalope pratyayalakṣaṇam*, as before). That being the case, the *siddha*-principle would predict the wrong derivation in which **adasa au* would take effect first, viz. *adas+sU* → *adaau+sU* (→ *adauḥ*). But as a result the stem would no longer end in a consonant, and the *siddha*-principle

would predict the wrong outcome with **asauḥ*. And it is exactly *because* the grammar was constructed on the basis of the *siddha*-principle that **adasa au* had to be supplemented with *sulopas ca*. In other words, the *siddha*-principle *explains* the longer wording of 7.2.107 in the grammar.

Still continuing to assume the simpler version rule *7.2.107 *adasa au*, what would the *para*-theory predict? It would prioritize the *right-hand* operation, the deletion of *-sU* by 6.1.68, and after some further rules, the correct output would emerge: *adas-sU* $\xrightarrow{6.1.68}$ *adas* + $\emptyset$, and (by other rules) *asau*. There would have been no need for *sulopas ca*.

The conclusion is that only the *siddha*-principle made the complication of the additional clause *sulopas ca* in rule 7.2.107 necessary, and this reveals that Pāṇini was working with the *siddha*-principle in mind, and took care to forestall its negative consequences.

As a positive countercase, let's look at the derivation of *tad* 'that'. In *tad* + *sU* (neuter nom.sg.) the nominative case ending *sU* is deleted by 7.1.23 *svamor napuṃsakāt* (22 *luk*). The deletion of the case ending must take effect before rule 7.2.102 *tyadādīnām aḥ* (84 *vibhaktau*) has a chance to replace *-d* by *-a* before a case ending. Otherwise we would get the wrong derivation *tad-sU* $\xrightarrow{7.2.102}$ *taa-sU* $\xrightarrow{6.1.97}$ *ta-sU* $\xrightarrow{7.1.23}$ **ta*. In the right order of application, the case ending is deleted first, destroying the environment that triggers the unwanted stem change: *tad-sU* $\rightarrow \xrightarrow{7.1.23}$ *tad*. The *siddha*-principle predicts this order of application. Applying 7.1.23 first ensures that 7.2.102 takes account of its effects. If the rules were applied simultaneously, or if 7.2.102 were applied first, 7.1.23 would give the unwanted result **ta*. Thus the two rules interact transparently to produce *tad*, which is the correct form. The new *para*-principle, though, requires the suffix-triggered operation to apply first, leaving the suffix *-sU* in place to derive **ta*.

Each of these cases is an instance of a larger pattern that contradicts the new *para*-principle. Rajpopat is aware of them, and proposes to solve them by assuming that rules 6.1.68, 6.1.69 and 6.1.70

were originally in the Tripādī (right after 8.2.2, he suggests).¹⁰ and were moved from there to their present site, perhaps in order to allow *apṛktaṃ* to be omitted by *anuvṛtti* from 6.1.67 (except that they forgot to actually omit it). According to him, “clearly someone has fiddled with both the contents and the position” of these rules (2025: 116).

But whether or not 1.4.2 was interpreted in Rajpopat’s way, it is hard to see why rules 6.1.68, 6.1.69, and 6.1.70 would have been relocated from the Tripādī to their present location. The trivial purpose of getting *lopa* into it by *anuvṛtti* could have been achieved in any number of ways without messing up the derivations in the way that Rajpopat’s theory forces us to assume. Moreover, the relocation would have required two complications: the addition of *sulopas ca* to 7.2.107, and the addition of *apṛktaṃ hal* to 6.1.68. The latter’s purpose is to prevent deletion of *-NaL*, which is a replacement of *-tiP*, and therefore *sthānivat*. If 6.1.68 had been in the Tripādī, it would not have needed *apṛktaṃ hal*, because there is no *sthānivadbhāva* in that section (*pūrvatrāsiddhe na sthānivat*, Vt. 3 on 1.1.58, AP XII: 163).

3.5 Rajpopat’s objections to the *siddha*-principle

In section 5.7, Rajpopat criticizes Joshi and me for making a “logical error” in “inferring *siddha* principle from [Kātyāyana’s] vt. 1 on 6.1.86” (*asiddhavacanam ādeśalakṣaṇapratīṣedhārtham utsargalakṣaṇabhāvārtham*). We made no such inference. The vārttika formulates two functions of *asiddhatva*. While the distinction between them is useful, and they are indeed the functions of *asiddhatva*, one cannot infer a principle from a distinction. We simply cited Kātyāyana’s distinction and pointed out that *asiddhatva* in Pāṇini’s grammar has

¹⁰ But not for the sake of *anuvṛtti*, as he suggests. In 6.1.68–70 *lopa* is a *vidheya* ‘process item’, ‘predicate’ (what the rule enjoins) and in 8.2.2 it is an *uddeśya* ‘undergoer’, ‘subject’, which the rule declares to be *asiddha*, and *anuvṛtti* syntax does not mix them (Kiparsky 1979: 45–47, 154–5; Joshi and Bhate 1984). Moreover, in 8.2.2 *lopa* is part of the compound *nalopaḥ*, and *anuvṛtti* out of compounds is not common.

both functions that he identifies. To repeat, we have never claimed to “infer” the *siddha*-principle itself from anything but Pāṇini’s grammar itself.

To further refute our “inference” Rajpopat produces a misleading analogy in which *asiddhatva* is construed as prohibition and *siddhatva* as permission. This makes no sense. Pāṇinian rules are not permissions, they enjoin operations. And neither *siddhatva* nor *asiddhatva* are prohibitions, or permissions, or injunctions, or operations. They are *relations* between operations, and between the rules that enjoin operations. Rules apply obligatorily unless explicitly designated as optional, and operations not enjoined by a rule are prohibited. Operation A is *siddha* with respect to operation B if the result of A affects B. There is no question of “permission”.

For those who want a *laukika* analogy, here is my effort. Imagine a family where each member has a plate of their own. They are joined by two guests, Māṭhara, who brings a plate, and Kauṇḍinya, who brings a pot. Now picture three scenarios, where the host issues a different pair of instructions in each:

- (25) a. 1. Give plates to the guests.
 2. Give rice to everyone who has a plate.
 Outcome: Everyone, including Māṭhara and Kauṇḍinya, gets rice.
- b. 1. Take away the guests’ plates.
 2. Give rice to everyone who has a plate.
 Outcome: Everyone except Māṭhara and Kauṇḍinya gets rice.
- c. 1. Replace the guests’ pots by plates.
 2. Give rice to everyone who has a plate.
 Outcome: Everyone gets rice.

Coincidentally, in the jargon of generative grammar, (25a) and (25c) are feeding orders, while (25b) is bleeding order. Note also that the same two instructions carried out in the opposite order would leave

poor Kauṇḍinya hungry in scenario (25a) and (25c) (feeding order), but they would turn out better for Māṭhara in (25b) (counterbleeding order).

4 Systemic considerations

4.1 Grammar and naturalness

As far as I know, the new *para*-principle as reinterpreted by Rajpopat would be unique. I am not aware of anything like it in the grammar of any other language. All the other major devices and principles of Pāṇini's grammar have analogs in at least some other languages. In some cases they were independently found by modern linguists who had no concern or familiarity with Pāṇini.¹¹

Although the new *para*-principle often fails, it works most of the time, and that is remarkable. Clearly it reflects a real tendency of the language, which Rajpopat (mistakenly, as I am arguing) has construed as a structural principle of Pāṇini's grammar itself. Why this tendency holds is an interesting question, to which I have no answer.

4.2 The metalanguage

Because *siddhatva* is the default mode of rule interaction, it is systematically suspended where necessary by negating it by *asiddhatva* and *asiddhavattva*, in addition to *sthānivattva* and *pratyaalakṣaṇatva*. If the new *para*-principle reigned in the grammar instead, why is the term *asiddha* used so prominently for rule prioritization, and why is

¹¹ For example, the idea of applying rules cyclically from inner constituents outwards, a counterpart of the *antaraṅga*-principle, was invented by Chomsky, Halle, and Lukoff in 1955 and used to explain English sentence stress. The *siddha*-principle is equivalent to unmarked rule ordering (Kiparsky 1968), and it is the *only* kind of ordering that is available in classical Optimality Theory (Prince and Smolensky 2004). The *utsarga/apavāda* principle is equivalent to the Elsewhere Condition (Kiparsky 1973), also known as the Subset Principle.

the term *pūrva* (or *a-para*) never used to flag the exceptions? Shouldn't there be at least some rules that are specified to apply to the *leftmost* operand?

4.3 *jñāpakas*

In those cases where the effects of the *siddha*-principle yields the wrong result, Pāṇini complicates his rules to avoid the misapplication. Why does Pāṇini not do this where the new *para*-principle fails, for example in *dyauḥ*?

4.4 The placement of 1.4.2

If *vipratishedhe param kāryam* means “in case of conflict, apply the latter rule” and only has scope over 1.4–2.1, as traditionally thought, it is placed exactly where it should be. But if it means “in case of conflict, do the right-hand side operation”, why is it placed out of context in 1.4.2, at the head of sections that it has nothing to do with? Why isn't it located among the other *paribhāṣās*, or at the head of the *vidhi* rules that it supposedly regulates?

4.5 The *sūtra* context

In the *Prātiśākhya*s, all rules are *siddha*. When a rule fails to feed and bleed another, the grammar treats the case as an exception, and either lists the form or complicates the rule. So the *siddha*-principle is as much part of the *sūtra* context as blocking is. The discovery of *asiddhatva* was the major breakthrough that made the deep analysis of the *Aṣṭādhyāyī* possible.

5 *para* already has a different function

5.1 Agreement with conjuncts

In at least one compelling case *para* in the grammar means “later in the enumeration of rules”. Rules 1.4.105–8, well within the section that has always been considered in the scope of 1.4.2 *vipratīṣedhe paraṃ kāryam*, concern person agreement in finite verbs.

- (26) 1.4.105 *yuṣmady upapade samānādhikaraṇe sthāniny api madhyamaḥ*
 1.4.107 *asmady uttamaḥ*
 1.4.108 *śeṣe prathamaḥ*

These rules tell us that verbs have respectively second and first person agreement in the presence of a second person (*yuṣmad*) or first person (*asmad*) as an *upapada* (“coreferential” element, in effect as their subject), even if it has been replaced; otherwise (that is, if there is no such *upapada*), verbs have third person agreement. Coupled with 1.4.2 *vipratīṣedhe paraṃ kāryam*, (26) elegantly characterizes also the agreement pattern in compounds:

- | | | |
|------|------------|---------------------------------|
| (27) | conjunct | Agreement |
| | you and I | ‘we’ (first person agreement) |
| | he and I | ‘we’ (first person agreement) |
| | you and he | ‘you’ (second person agreement) |

The ordered agreement rules prioritize first person agreement over second person agreement, second person over third person. They make third person the ‘elsewhere’ (default) case. 1.4.108 is *not* a third person agreement rule, but applies (like Pāṇini’s other *śeṣa* rules) in a negatively defined “elsewhere” context, namely whenever there are neither *yuṣmad* nor *asmad* upapadas, or no upapadas at all: *devadattaḥ svapiti, mayā supyate, tvayā supyate*. Sanskrit conforms to these rules (as do most languages):

- (28) a. *nakulaḥ sahadēvaś ca bhīmasenaś ca pārthiva*
ahaṃ ca tvaṃ ca kaunteya draṅṣyāmahy śvetavāhanam (*Mbh.*
 3.141.23) ‘Nakula and Sahadeva and Bhīmasena, O Pārthiva,
 and you and I, O Kaunteya, will see Śvetavāhana’.
- b. *ahaṃ ca tvaṃ ca vṛtrahan saṃ yujyāva* (*RV.* 8.62.11) ‘may
 I and you, vṛtra-slayer, be united (1.Du.Aor.Opt.)’

There is no question of a right-hand side interpretation here: *para* isn’t even applicable here in that meaning. Neither is there an *ut-sarga/apavāda* relation between these groups of rules. But 1.4.2 accounts perfectly for the data if *para* means ‘the latter rule’. Since Pāṇini gave those agreement rules it is hard to believe that he overlooked agreement with conjoined subjects, and there is no other place in the grammar where that is addressed than 1.4.2, where *para* means ‘the latter rule’.

This has been the received view ever since Kātyāyana; see AP IV: 244 ff. for a full account of it. I am indebted to a reviewer of this MS for bringing to my attention Mocci and Pontillo’s (2023) ingenious new proposal to deal with conjoined subject agreement without requiring an appeal to rule 1.4.2 by exploiting the pattern of plural pronouns in (27). Building on Pāṇini’s derivation of pronominal plurals from conjoined phrases by *ekaśeṣa* reduction (rule 1.2.72 *tyadādīni sarvair nityam*), they argue for a different way to account for the agreement pattern of conjoined structures by *sthānivadbhāva*. Specifically, they assume that *tvaṃ ca devadattaś ca* ‘you (Sg.) and Devadatta’ is synonymous with *yuvām* ‘you two’, and in virtue of that synonymy it is an *ādeśa* ‘substitute’ of *yuvām*, its *sthānin*, which is subsumed under *yuṣmad* in 1.4.105 and hence falls under *sthāniny api* in that rule. Since its *sthānin* is *yuvām*, *tvaṃ ca devadattaś ca pacathaḥ* ‘you and Devadatta are cooking’ gets 2.Person (Dual) agreement by 1.4.105.

I submit that neither the conjoined phrase *ahaṃ ca devadattaś ca* nor the conjoined phrase *tvaṃ cāhaṃ ca* are actually “synonymous” with the bare pronoun *āvām*. They are not even synonymous with each other. The most we can say is that the two conjoined phrases are co-hyponyms of the pronoun. It is true that the bare pronouns may

get the same *interpretation* as the more explicit conjoined phrases in certain contexts where discourse or common ground provide the right clues, but that is not the same thing as synonymy. These *sthānin/ādeśa* relations would be the only instances in the grammar where *ādeśas* (in this case *aham ca devadattaś ca*) have much richer meanings than the corresponding *sthānins* (in this case *āvām*), and even mutually contradictory meanings. For example, *aham ca devadattaś ca* and *tvam cāham ca* would be *ādeśas* of the same *sthānin*, namely *asmad*, and therefore get 1.Person (Dual) agreement by rule 1.4.107 (where *sthāniny api* is continued from 106). Moreover, since any nominal whatever can stand in the place of *devadatta* in the second conjunct, the *sthānin* of a bare plural pronoun would correspond to an unbounded number of different phrasal *ādeśas*, quite alien to Pāṇini's usage.

Mocci and Pontillo say that “synonymy between X and Y [is] an implicit requirement for X to replace Y in Pāṇini's framework of substitution” (p. 484), and fallaciously conclude that “synonymy between *tvam ca devadattaś ca* and *yuṣmad-* then allows *yuṣmad-* to be replaced with *tvam ca devadattaś ca*, so long as *yuṣmad-* is a *sthānin*” (*ibid.*). That synonymy is a necessary condition for replacement does not mean that it is a sufficient condition for replacement. In fact, the relation between *sthānin* and *ādeśa* is not a symmetrical semantic equivalence relation. It is the asymmetrical relation between the input and the output of a replacement operation, governed either by a rule of the grammar, or by a discourse ellipsis process that is not stated in the grammar, but presupposed by it, and referred to by its rules.

A case in point is rule 2.3.14 *kriyārthopapadasya ca karmaṇi sthāninaḥ* (13 *caturthī*, 1 *anabhihite*) ‘(the fourth [dative] case endings are added to a nominal stem) in the sense of *karman* ‘direct object’ of a *sthānin* which is an *upapada* (of a form conveying the meaning of “action performed”) for the sake of (another) action’ (mentioned as an instance of *sthānin* by Mocci and Pontillo (2023: 478, fn. 30). This rule derives datives of purpose in sentences like *edebhyo gacchāmi* ‘I’m going for firewood’ from verb ellipsis (Kiparsky 1982: 38–39, AP VII: 28–33). Among a number of unremarkable elliptic versions

of *aham edhān āhartum gacchāmi* ‘I am going to fetch firewood’, each suited to a different discourse context as indicated in (29), one is conspicuously ungrammatical, namely (29f), just as its English counterpart is. Rule 2.3.14 replaces it by its grammatical counterpart (29g), elegantly explaining at one stroke both its ungrammaticality and the special use of the dative in an otherwise unaccounted for non-*saṃpradāya* (non-recipient) meaning.¹²

- (29) a. (Who is going to fetch firewood?) *aham* ‘me’
 b. (What are you going to fetch?) *edhān* ‘firewood’
 c. (What about fetching the firewood?) *gacchāmi* ‘I’m going’
 d. (Where are you going?) *edhān āhartum* ‘to fetch firewood’
 e. (What about the firewood?) *āhartum gacchāmi* ‘I’m going to fetch it’
 f. (How will you get fuel?) **edhān gacchāmi* *‘I’m going firewood’
 g. (How will you get fuel?) *edhebhya gacchāmi* ‘I’m going for firewood’

The rule defines the ellipted *sthānin* syntactically and semantically as *kriyārthopapada* ‘having as upapada a verb denoting an action performed for another action’, i.e. as a purpose complement in *-tum* or *-aka* as per 3.3.10 *tumunṇvulau kriyāyām kriyārthāyām*. The grammar has no rules for ellipsis, only for the cases where ellipsis is opaque and has consequences that must be taken care of (as here for the object of an ellipted verb), for agreement with null pronouns, and for verbs which are *karmavat* even though they have no overt object.

The most serious difficulty with the proposal is that the *ekaśeṣa* rule 1.2.72, which establishes the correspondence between bare pronouns and pronouns in conjoined phrases, actually operates in the opposite direction. It is phrased to apply to conjoined structures where

¹² See also my analysis of 1.4.51 as a treatment of object ellipsis (*ibid.*).

one conjunct is a bare pronoun, and suppresses all but the pronoun. I do not see how it can be read as enjoining the reverse operation where the bare pronoun is a *sthānin* that is replaced by an *ādeśa* consisting of a full conjoined structure.

If ellipsis is understood as the replacement of something by nothing, and 1.2.72 derives *āvām* from *aham ca devadattaś ca*), then if there is a *sthānin* it would have to be *devadatta*, and the corresponding *ādeśa*, deemed equivalent to the *sthānin* in virtue of *sthānivadbhāva* (1.1.56), would be the gap left by its deletion. But if *devadatta* were the *upapada sthānin* that the agreement rule 1.4.105 refers to, we would wrongly derive third person agreement for this use of *āvām*. Another version of this reversed construal of 1.4.105 would be to construe the entire unreduced conjoined structure as the *sthānin* and the output plural pronoun as the *ādeśa*, but that would just take us back full circle to the original agreement problem, which was *which* constituent of the conjoined structure triggers agreement. In sum, I cannot see how a overt pronoun such as *āvām* can be a *sthānin* in any sense that would be relevant to the agreement rules (26).

That leaves us with the straightforward traditional interpretation of *sthāniny api* in 1.4.105 as referring to the null replacement of a pronoun by the (unstated) ellipsis (*pro-drop*) process. The point of *sthāniny api* is then quite simply to get the agreement rule to apply to *pacāmi* and not only to *aham pacāmi*. This is in tune with the function that *sthānin* has elsewhere in Pāṇini's grammatical system. And this means that the agreement rules (26) need to be prioritized by 1.4.2 in sections 1.4–2.2.

5.2 The ordering of elements in *dvandva* compounds

Pāṇini gives three rules for ordering the elements of *dvandva* (copulative) compounds:

- (30) a. 2.2.32 *dvandve ghi* (30 *pūrvam*) ‘an *-il-u* stem precedes’ (e.g. *hariharau* ‘Hari and Hara’)

- b. 2.2.33 *ajādyadantam* ‘a stem that begins with a vowel and ends in *a* precedes’ (e.g. *uṣṭrakharam* ‘camels and donkeys’)
- c. 2.2.34 *alpāctaram* ‘a stem containing fewer vowels (i.e. syllables) precedes’ (e.g. *grīṣmahemantau* ‘summer and winter’).

Wackernagel (1957: 167) confirms that the three rules are on the whole correct, although often violated, and that they are listed in ascending strength. 2.2.34 *alpāctaram* is stronger than 2.2.33, and 2.2.33 is stronger than 2.2.32, just as the standard interpretation of *para* in 1.4.2 would have it. The rules tend to be respected in the grammar itself (1.1.8, 1.2.19, 1.1.26, 1.2.38, 1.2.57, 1.2.60).¹³ Rule 1.2.7 *mṛḍ-amṛda-gudha-kuṣa-kliṣa-vada-vasaḥ ktvā* shows the dominance of 2.2.34 and 2.2.33 in that order: the strongest rule *alpāctaram* places the monosyllable *mṛḍ* first in the compound, and the next strongest rule 2.2.33 *ajādyadantam* places *amṛda* next, and words that fall under neither of rules 2.2.32–34 follow.

It may be significant that these rules are placed right before 2.2.38 *kaḍārāḥ karmadhāraye*, which delimits the domain within which 1.4.2 is valid and terminates the initial portion of the grammar that is organized around defining the major grammatical categories. None of them are categorically obeyed, however, so they contribute less to the argument concerning the meaning of *para* in 1.4.2 than the agreement rules do.

Evidently some apparent violations of the three ordering rules are due to the interference of stronger regularities that are not encoded as part of the grammar. According to Wackernagel, the strongest generalization of all about the order of elements in *dvandva* compound is that the most “important” item typically comes first. This is something that Pāṇini missed, or perhaps was forced to omit because pragmatic categories like “importance” (in whatever sense it is relevant here)

¹³ Exceptions are 1.1.58 and 1.2.46. 1.1.33–35 also flout the rules, but that may be due to their complicated textual history, on which see Bloomfield 1927, section 5, and Kiparsky 1979: 84 ff.

have no place in his metalanguage, nor in the shared *sūtra* tradition that he was working in.

6 Brief and incomplete remarks on brevity and completeness

For a long time Western philologists did not appreciate the role of *lāghava* ‘economy’ in the design of the Aṣṭādhyāyī. They regarded the compression of rules as a source of obscurity, incoherence, and disorganization.¹⁴ More kindly, but still incorrectly, Faddegon and Buiskool explained it as an artifact of “mnemotechnical” practices and the associative linking of topics. This is a superficial view because it addresses only the rules. But of course not only the rules, but the entire system, including the conventions that govern the interaction of rules, as well as the organization of the dhātupāṭha and śivasūtras, work together to maximize simplicity. When applied on this global scale, simplicity has a deeper function: it is an engine of generalization and insight.

Pāṇini’s *lāghava* is conceptually related to Occam’s Razor and to the simplicity criterion of generative grammar, but these three things are different. For Chomsky (1965) simplicity was originally an empirical hypothesis internal to linguistic theory. It claims that, given a fixed format for grammars and equal descriptive coverage, the shortest grammar is the best, as judged by general scientific criteria such as predictive success and conceptual elegance. In later work (the Minimalist Program), he shifted to a different understanding of simplicity, still defined on grammars, according to which the complexity of operations is minimized. In either case, the complexity of the theory itself does not enter directly into the calculation. Occam’s Razor, on the other hand, is a general maxim for theory construction for any science. It says that a good theory should make the fewest assumptions and posit the fewest entities (*simplex sigillum veri*), but does not per se provide a measure of goodness or a way to relativize theoretical complexity to

¹⁴ “[Pāṇini] is so brief as to be often obscure and not seldom even illogical” (Thieme 1935), more such quotations in Buiskool 1939: 2.

the extent of empirical coverage. Pāṇini's *lāghava* requirement does that. It pits the cost of the analytical apparatus against the work it does. The complexity that must be minimized is in principle calculated globally on the entire grammar, including the *vidhi* rules and the conventions that govern their application and interpret their abbreviatory conventions, as well as the dhātupāṭha and śivasūtras. Taken literally it means weighing the complication of adding rules against the complication of *pratipadokta* listing of word forms. The idea has resurfaced in a mathematical and philosophical form as the theory of Minimum Description Length (Rissanen 1978), also known as Kolmogorov Complexity (Li and Vitányi 2008; Nannen 2010).

The dialectic of simplicity and completeness makes sense of a puzzling feature of the grammatical tradition: the contrast between Pāṇini's elegant account of Sanskrit phonology and the Prātiśākhya's treatment of the corresponding Vedic phenomena, which is as short on insight as it is long on lists. My first teacher of Pāṇini, Frits Staal, considered them a world apart, representing entirely different philosophical/scientific approaches (*voce*). The Prātiśākhya, he said, were compiled by empiricists, whom he compared to the descriptivist structuralist linguists (the *bêtes noires* at the time), while Pāṇini was a rationalist like Chomsky. This drastic dichotomy is hard to square with the fact that these supposed empiricists and rationalists overlapped in time, cited each other, used each other's results, and in some cases were the same people (see Thieme 1937–1936 on Kātyāyana, and Kiparsky 2012 on the relation between Vedic recensions and Pāṇini's preferences). I now think that there was no philosophical or ideological difference at all between them. They all subscribed to *lāghava*. The crucial difference between them is that the Prātiśākhya were strictly limited to describing a fixed corpus, whereas the Aṣṭādhyāyī tackles an entire language – a project that obviously required an entirely different approach, as Patañjali memorably explained in the Paspasā.

Here is an example to concretize the point. The Taittirīya-Prātiśākhya needs forty rules to account for the distribution of *anusvāra* (xv.1–9, xvi.31); (31) is a sample:

- (31) a. 16.14 *ākārekārōkārāḥ siṣiparāḥ padāntayoh*
 ‘The vowels *ā*, *ī*, *ū* have *anusvāra* before word-final *-si* or *ṣi*.’
 E.g.: *tamāṁsi*, *havīmṣi*, *yajūmṣi*
- b. 16.15 *vikṛte* ‘*pi*’ ‘Even when [the final *-i*] is altered.’
 E.g.: *chandāmsy upa dadhāti*
- c. 16.17 *na dvisvare nityam* ‘never in disyllables’
 E.g.: *yāsi*, *gāsi*, *pāsi*, *māsi*
- d. 16.18 *rjīṣi-jigāsi-jighāsy-ajāsi-yajāsi-dadāsi-dadhāsi-*
-vatayāsi
 ‘not in *rjīṣi* etc.’

The Prātiśākhya mostly lists words, and to the extent that it has rules, it deals with their interactions by cross-references (such as *vikṛte* ‘*pi*’ in (31a)). The Aṣṭādhyāyī, naturally, has a simpler and more insightful analysis of these data: the nasal is a morphological entity, the infixed augment (*nUM*), and its realization is handled by specifying the interactions between the relevant morphological and phonological processes. Importing the morphology of Sanskrit would have made possible a much more elegant account of the distribution of *anusvāra* in the Taittirīya-Saṃhitā, but the Prātiśākhya author could not provide it because his task was to formulate the simplest description of the corpus, nothing more. An insightful treatment would have made the Prātiśākhya longer, not shorter, and it would have had to include much morphological information of no relevance to the pronunciation of the text. *Both* analyses strive for simplicity but the result depends entirely on the richness of the domain.

If the role of simplicity is taken seriously, the *prātiśākhyas* can be seen as instantiating exactly the same scientific approach as the Aṣṭādhyāyī. The differences between these works are due to the fact that the *prātiśākhyas* cover only a specific corpus (the *Taittirīya Saṃhitā* in this case), whereas the Aṣṭādhyāyī covers the entire language. No elaborate calculations are needed to see that the cost of the grammatical apparatus required for a principled account of the distribution of *anusvāra*, measured in length, is greater than the net gain of simplifying

(31) to a few simple rules. In a complete grammar, of course, the opposite is the case. The grammatical apparatus with *nUM* infixation, affixation of inflectional morphemes, and so on, is needed anyway, and so the principle of *lāghava* works in the other direction to enforce the principled treatment of *anusvāra*. In a grammar that covers the whole language, the shallow rule 16.14 would have an intolerable number of “exceptions”, and additional rules for final -y (e.g. *dadhy atra*) would be needed as well. Adopting a *prātiśākhya*-style account of the nasal increment would have vastly complicated the *Aṣṭādhyāyī*, which deals the same data with a handful of general rules. In this way, depth of analysis increases with corpus size.

Remarkably, *lāghava* not only forces abstractions that bring out generalizations, it also sets limits on abstractness. Here is an example. Due to a sound change that merged two originally distinct consonants, Sanskrit has two kinds of /j/ – one which alternates with velars, and another which alternates with retroflex consonants, e.g. /bhiṣáj/ → *bhiṣák* versus /viráj/ → *virāt*. Should a phonological analysis set up two distinct phonemes that diverge in certain contexts but merge elsewhere (“absolute neutralization”)? Pāṇini’s grammar does not do that. It uses essentially the *Prātiśākhya* method of distinguishing the two kinds of /j/ by listing the latter (P 8.2.39). It requires no elaborate calculation to show that this is simpler than positing two distinct phonemes.

The upshot can be summarized in the formula: economy + completeness → insight. Abstraction is driven by *lāghava* ‘brevity’, ‘economy’. There is no a priori limit on it, but the economy principle that forces generalizations through abstraction also sets limits on abstraction.

It is also important that economy applies to the *whole system*: the rules of the *Aṣṭādhyāyī* and the structured lists for phonology and lexicon (*śivasūtras*, *gaṇapāṭha*, *dhātupāṭha*). The metalanguage is defined *within* the grammar itself. Technical terms and some conventions of rule application are introduced whenever they save more than their definition in the grammar costs. The smaller the corpus, the fewer

the theoretical devices that *lāghava* requires, and the less linguistic insight the grammar brings. Corpus grammars, such as grammars that omit accent or Vedic rules, are always going to be shallower than Pāṇini's formally rich system, which emerges from the twin goals of maximizing coverage and simplicity.

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