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Pāṇini's Semantic Hierarchy, or How to Remove the Commentarial Dust from A 2.3.15¹

ABSTRACT: In the Indian grammatical tradition, the semantic values ascribed by Pāṇini to the infinitival suffix *-tum* (notably, ‘agent’, ‘purpose’, ‘future’) were disputed by his commentators. In particular, Patañjali argued that *-tum* denotes ‘action’ (*bhāva-*) instead of ‘agent’. In the present contribution I provide fresh evidence in favor of Pāṇini’s original account of the semantic values of *-tum*. I also show how the issue of determining the denotation

¹ This contribution is funded by a Japan Society for the Promotion of Science post-doctoral fellowship (short term (PE)) at Kyoto University (“Formal syntax meets quantitative techniques in reconstructing the Indo-Aryan cultural archetype”). Part of the research underlying this contribution was carried out within the framework of the Research Project of National Interest (PRIN PNRR 2022) “Entangled chronotopes: language, power, bodyscapes and religion in the first ten books of the *Śaunaka Atharvaveda-Saṃhitā* [SS]” (Principal Investigator: Tiziana Pontillo), funded by the European Union (Next Generation EU, Mission 4, Component 1, CUP F53D23008030006). I am deeply grateful to the anonymous Reviewers for the Journal for their insights, suggestions, and corrections: I learned a lot from them. Finally, a huge thanks to Tiziana Pontillo: the main idea of this study was conceived in the context of a joint work on Vedic dative-marked infinitives (Mocci and Pontillo 2026); if it weren’t for Tiziana’s passion and encouragement, that idea could hardly have seen the light of day. All translations are by the Author, unless explicitly stated otherwise.

of *-tum*, far from being the purview of a handful of erudite historians of linguistics, reveals a fine-grained theory of argument structure—with several hierarchically organized meaning components—that can fruitfully interact with, even inform, the modern language sciences.

KEYWORDS: argument structure, *kāraṅgas*, Indian grammatical tradition, infinitives, Old Indo-Aryan

1. Introduction: The bigger picture

This study deals with a debate that developed within the Indian grammatical tradition regarding the denotation of the Old Indo-Aryan infinitival suffix *-tum*. Due to the specificity of this topic, a general introduction is called for that reveals the bigger picture lying behind the present study. Thus, in this section I shall briefly address the question as to why one should study Pāṇini's *Aṣṭādhyāyī* (i.e., the foundational work of the Indian grammatical tradition) nowadays: outside the framework of this question, the present work risks appearing as a collection of erudite and abstruse historical observations of very limited interest for Indological and linguistic studies alike, let alone for the modern scientific community more broadly.

While several different answers may be conceived, two rise prominently above the others to my mind.

1.1. The place of Pāṇini's grammar in Old Indo-Aryan studies

For one thing, the *Aṣṭādhyāyī*—a grammar of Old Indo-Aryan that dates back to ca. the 4th century BCE—is an extraordinary documentary work, bearing witness to the existence not only of diachronic varieties of Old Indo-Aryan, but also of diatopic and diastratic ones (Houben 2018; Deshpande 2019). Furthermore, in accordance with the groundbreaking work of Kiparsky (1979), Pāṇini provides subtle judgments that rank a series of linguistic options (i.e., forms that are in complementary distribution with one another) against a three-value

scale, i.e., as ‘preferred’ (vā), ‘neutral’ (*anyatarasyām*), or ‘marginal’ (*vibhāṣā*). Indeed, Pāṇini’s judgments may also rule some linguistic data out, in a way that is reminiscent of modern linguistic acceptability judgments (i.e., judgments that linguists elicit from native speakers in linguistic experiments to determine whether a given utterance belongs to the set of well-formed sentences of a given language). As an example of the latter kind of judgment, one may consider the following *Aṣṭādhyāyī* rule (‘A’ for short):²

A 2.2.10: *na nirdhāraṇe* [*samāsaḥ* 2.1.3] [*saha supā* 2.1.4] [*tatpuruṣaḥ* 2.1.22] [*śaṣṭhī* 2.2.8]

When a setting apart (*nirdhāraṇa-*) is to be signified, no *tatpuruṣa* compound can be formed by combining a genitive-marked word with another case-marked word.

As discussed by Mocci and Pontillo (2019: 7 n. 16), this rule prevents the combination of case-marked words in (1b) from being the input that yields the compound (1a). This is because (1b) involves an adnominal partitive genitive (*puruṣānām*), which brings it about that a tiger is set apart (*nirdhāraṇa-*) from the set of men:

- (1) a. *puruṣa-vyāghra-ḥ*
 man-tiger-NOM.SG.M
 b. *puruṣānām* *vyāghraḥ*
 man.GEN.PL.M tiger.NOM.SG.M
 A tiger among men.

As a result, the compound *puruṣa-vyāghra-* cannot be read as ‘a tiger among men’ in Old Indo-Aryan. It is crucial to emphasize that this reading cannot be excluded on any grounds (e.g., consistency

² My translation of *nirdhāraṇa-* as ‘a setting apart’ follows Cardona (1997: 216). I am thankful to an anonymous Reviewer for the Journal for refining my understanding of A 2.2.10.

with the textual passages in which the compound is attested) other than Pāṇini's own judgment, couched in the form a grammatical rule (i.e., A 2.2.10). Put another way, the reading in (1a) is simply not part of the repertoire of possible meanings conveyed by the Old Indo-Aryan compounds, just as (2a) can be read along the lines of (2b) (i.e., as a question about a mode or way of wondering), but not along the lines of (2c) (i.e., as a question about a mode or way of solving problems), as signaled by the asterisk prefixed to it: there is nothing inherently or logically wrong in these excluded readings; however, they are just perceived as unavailable by the relative native speakers of Old Indo-Aryan (including Pāṇini) and English.³

- (2) a. How do you wonder which problem to solve?
- b. Which way is such that you wonder in that way [which problem to solve].
- c. *Which way is such that you wonder [which problem to solve in that way].

Thus, as pointed out by Kielhorn (1969: 235) and more recently by Penn and Kiparsky (2012: §7), Pāṇini's rules teach not only how to output correct linguistic forms, but also how to avoid incorrect ones: that is, they are 'explicit' rules, in the technical sense of formal linguistics (Mocci 2025).⁴

³ See Rizzi (1990: 8–9) for the discovery of a seminal principle of grammar that accounts for the English native speakers' judgments reproduced in (2). See instead Ogawa (2005: 270–271) and Ozono (2021: 483–484) for an overview of the class of Old Indo-Aryan native speakers who served as model speakers (*śiṣṭa-*) for the *Aṣṭādhyāyī*.

⁴ This is indeed an oversimplification. As a matter of fact, the degree of explicitness of the *Aṣṭādhyāyī* rules is limited by the so-called *anabhidhāna* principle, whereby the forms output by the rules may not match the forms actually used by the model speakers of the *Aṣṭādhyāyī* (Ogawa 2005: 271). The validity of the *anabhidhāna* principle in the *Aṣṭādhyāyī* was questioned by Kielhorn (1969: 234–235) but has been recently reinstated by Ozono (2021: 484). I am grateful to an anonymous Reviewer for drawing my attention to the *anabhidhāna* principle.

Therefore, the first answer to the question as to why one should study the *Aṣṭādhyāyī* nowadays is that the *Aṣṭādhyāyī* places modern scholarship in a unique position: not only by granting access to the varieties of Old Indo-Aryan that would otherwise remain unknown to us, but also by providing an inner perspective into the Old Indo-Aryan language more broadly. This position is in fact unparalleled in the studies of any other ancient language.

The second motivation for studying the *Aṣṭādhyāyī* today rests on the fact that Pāṇini's grammar represents the most advanced syntactic model worldwide until at least the twentieth century, when generative models were developed directly by Chomsky (e.g., Chomsky 1956; 1975; 2002 [1957]) or in response to Chomsky's work (e.g., Bresnan and Kaplan 1982).⁵ As a consequence, studying the *Aṣṭādhyāyī* implies learning a highly sophisticated procedure to analyze the syntax of Old Indo-Aryan and possibly of other natural languages.

1.2. The place of the indigenous Indian commentaries on Pāṇini's grammar in Old Indo-Aryan studies

The honorable place occupied by Pāṇini's grammar in modern scholarship provides an immediate rationale for the study of the indigenous Indian commentarial tradition on Pāṇini's grammar: it is worth studying and researching on this tradition nowadays insofar as it clarifies the content and purpose of Pāṇini's encrypted rules, for example by providing linguistic examples that illustrate the application of the rules.

However, there is an additional motivation for the study of the Indian grammatical tradition that goes beyond a better understanding of Pāṇini's single rules. Thus, the commentaries often dwell on alleged shortcomings inherent in Pāṇini's rules and discuss possible solutions for these shortcomings, including the alteration of the wording of the rules. Such discussions crucially reveal sensitive points of

⁵ For some concrete examples of the sophistication and granularity achieved by the *Aṣṭādhyāyī*, see the case studies offered by Kiparsky and Staal (1969), Kiparsky (2009), and Lowe (2024).

Pāṇini's grammatical model that require careful consideration. These are often points of the model that connect with other points of the model, thereby creating a complex—albeit hidden—system of interconnections between the *Aṣṭādhyāyī* rules: within this system, the alleged shortcomings of Pāṇini's rules can be eliminated, thereby returning a more consistent and often deeper picture of the whole grammatical system of the *Aṣṭādhyāyī*.

Thus, for example, Scharfe (1965) and Pontillo (2010) illuminated the system of the semantic conditions on rule outputs by calling into question the commentarial interpretation of *vacana*- (with special reference to A 1.2.51). Kiparsky (1979) illuminated the system of rule optionality by challenging the commentators' interpretation of *vā* and *vibhāṣā*, understood by Kiparsky as respectively enjoining a preferred and a marginal option.⁶ Pontillo (2018) shed new light on the system of complex word forms (e.g., nominal derivatives and compounds) by calling into question the commentarial interpretation of A 2.1.1, now re-interpreted as governing the relationship between complex word forms and the matching combination of inflected words.⁷ Likewise, Mocci and Pontillo (2020) cast new light on the system of *kāraḥ* by dissociating themselves from the commentators' reading of A 2.3.46, a rule that provides for the assignment of nominative case to nominal stems.⁸ Finally, by going beyond the commentarial reading of

⁶ As pointed out by an anonymous Reviewer for the Journal, Kiparsky's system of rule optionality has met with mixed reactions in modern scholarship. Thus, for example, Radicchi (1988: 56–58) and Candotti and Pontillo (2022: 10 n. 26) make crucial use of this system in their interpretation of compounding, whereas Cardona (1997)—a reference work for the study of the *Aṣṭādhyāyī*—draws no distinction between *vā* and *vibhāṣā*, thereby sticking to the traditional understanding of these terms (see especially Cardona 1997: 219).

⁷ The re-interpretation of A 2.1.1 presupposes a crucial connection—also gone unnoticed in the Indian commentaries on the *Aṣṭādhyāyī*—between this rule and the pair of rules that define the *upasarjana*, i.e., A 1.2.43–44. See Pontillo (2003), Candotti and Pontillo (2019), and Mocci and Pontillo (2019) for a detailed discussion.

⁸ Simplifying somewhat, *kāraḥ* (e.g., *karṭṛ*- 'agent' and *karman*- 'patient') are syntactic-semantic notions that codify the relationship between the eventuality

the most important metarule on substitution (i.e., A 1.1.56), Candotti and Pontillo (2021) unveiled a scalar morphological system where the class of Pāṇini's linguistic segments is partitioned into morphemes (i.e., meaningful units), phonemes (i.e., meaningless units), and units that are halfway between morphemes and phonemes. All these studies—the list is by no means exhaustive—exemplify the approach to the commentaries on Pāṇini's grammar whereby the alleged aporias discussed in the commentaries indeed conceal unnoticed or misunderstood systems of interconnections between the *Aṣṭādhyāyī* rules.

In the present work I contribute to this approach by means of a case study on A 2.3.15. All in all, the main motivation for studying Pāṇini's commentators nowadays lies in their being powerful research tools for uncovering crucial points of a grammatical model—i.e., the *Aṣṭādhyāyī*—that is of enormous importance for Old Indo-Aryan studies.

1.3. The goal of this study

The main goal of this study is to show that Patañjali's modifications of Pāṇini's denotation of *-tum* infinitives in fact conceal a serious misunderstanding of the fine-grained theory of argument structure (i.e., the theory of verb-argument relations) of the *Aṣṭādhyāyī*.⁹ My core argument to achieve this goal is based on A 2.3.15 and on the notion of 'semantic hierarchy'.

The present contribution is organized as follows. First, I outline Pāṇini's model of the infinitive (section 2). Next, in section 3, I discuss the commentarial modifications of this model, by focusing on Patañjali's *Mahābhāṣya*. Last, in section 4, I show that Pāṇini's syntax makes crucial use of the notion of semantic hierarchy, which makes the commentarial modifications unnecessary and in fact unwarranted.

denoted by the verbal stem and the participants of this eventuality. See Lowe (2024: 108–117) for an updated discussion.

⁹ See Hale and Keyser (1993); (2002) for an insightful theory of argument structure.

2. Pāṇini's model of the infinitive

What is an infinitive for Pāṇini? The present section is given over to answering this question.

2.1. The unmarked infinitival type: *-tum*

The most general rule given over to the infinitive in Pāṇini's grammar is A 3.3.10:

A 3.3.10: *tumunṇvulau kriyāyām kriyārthāyām* [*pratyayaḥ* 3.1.1] [*paraś ca* 3.1.2] [*bhaviṣyati* 3.1.3] [*dhātoḥ* 3.1.91] [*kṛt* 3.1.93]

The *kṛt* affixes *tumUN* and *ṆvuL* are introduced after a verbal base X when an action Y taking place in the future (*bhaviṣyati*) is to be signified such that:

Y co-occurs with the action denoted by X;

Y has the action denoted by X as Y's purpose (*kriyāyām kriyārthāyām*).

This rule establishes *-tum* as the unmarked suffix for the formation of Old Indo-Aryan infinitives,¹⁰ and provides for a series of constraints on the use of this infinitival suffix. These constraints have been recently discussed in Mocci and Pontillo (2026: 200–204). The following subsections summarize the main results of their discussion.

¹⁰ The other infinitival suffixes, such as the Vedic dative suffixes *-se*, *-tave*, and *-tavai*, are taught as replacements of *-tum* in compliance with A 3.4.9: *tumarthe sese-naseasenkṣekasenadhyaiadhyainkadhyaiśadhyaiśadhyaintavaitaveṇtavenaḥ* [*pratyayaḥ* 3.1.1] [*paraś ca* 3.1.2] [*dhātoḥ* 3.1.91] [*kṛt* 3.1.93] [*chandasi* 3.4.6] 'In the Vedic *saṃhitās* (*chandasi*), the *kṛt* affixes *-se*, *-seN*, *-ase*, *-aseN*, *-Kse*, *-KaseN*, *-adhyai*, *-adhyaiN*, *-Kadhyai*, *-KadhyaiN*, *-Śadhyai*, *-ŚadhyaiN*, *-tavai*, *-taveN*, *-taveN* occur after a verbal base in the sense of *-tum*.' See Mocci and Pontillo (2026) for an updated discussion of this rule and its interaction with Pāṇini's system of *kārakas*.

2.2. First constraint: the infinitive as an agent-denoting unit

The first constraint imposed by A 3.3.10 on *-tum* is that the latter denotes an agent. This is because: i) *kṛt*, which is part of the wording of A 3.1.91, continues in A 3.3.10 by the mechanism of *anuvṛtti*, thereby labelling *-tum* as a *kṛt* (i.e., as a deverbal nominal); ii) linguistic units labelled as *kṛts* denote an agent by A 3.4.67.¹¹ I illustrate this point by means of a constructed example:¹²

(3) *paktum vrajati*

He goes to cook.

In accordance with Pāṇini's interpretation, the suffix *-tum*, which attaches to the verbal base *pac-* 'to cook' to form the infinitive *paktum*, denotes not the action of cooking, but rather the agent of this action (i.e., a cook).

¹¹ A 3.4.67: *kartari kṛt* [*pratyayaḥ* 3.1.1] [*paraś ca* 3.1.2] [*dhātoḥ* 3.1.91] 'any affix labelled as *kṛt* is introduced after a verbal base in the sense of agent'.

¹² Cf. the following textual example from early Vedic, which contains the *-tum* infinitive *prāṣṭum* (from *prach-* 'to ask'): RV 1.164.4cd: *bhūmyā āsur āsrg ātmā kūva svit/ kó vidvāmsam ūpa gāt prāṣṭum etāt//* 'Where is the life, blood, and breath of the earth? Who will approach the knowing one to ask this?' (tr. Jamison and Brereton 2014). In this connection it may be worth pondering on the legitimacy of the operation of testing Pāṇini's rules (which date back to the 4th century BCE) against early Vedic material (RV and the two recensions—*Paippalāda* and *Śaunakīya*—of the *Atharvaveda*, spanning ca. 1200-1000 BCE). I limit myself to referring the reader to the studies on early Vedic bahuvrīhi compounds and dative-marked infinitives by Candotti and Pontillo (2022) and Mocchi and Pontillo (2026), where it is argued that this operation is not only philologically sound, but may also advance our detailed understanding of the textual material under examination. Cf. Deshpande (1985) and Ozono (2010) for an updated overview of the complex relationship between Pāṇini and the Vedas. I am thankful to an anonymous Reviewer for the Journal for the stimulating discussion on this point.

2.3. Second constraint: the infinitive as a co-occurring unit

The second constraint provides for the verbal base to which *-tum* is affixed to co-occur with another verbal base. This ultimately results from A 3.3.10 being a rule of the section headed by A 3.1.91. Let us consider how. By A 3.1.92, the locative-marked words contained in any rule of the section headed by A 3.1.91 denote a co-occurring word, technically dubbed as *upapada*.¹³ A 3.3.10, which belongs to this section, contains the locative-marked words *kriyāyām kriyārthāyām*. Accordingly, these locative-marked words denote an action that co-occurs with another action; in plain words, they qualify the verbal base to which *-tum* is affixed as co-occurring with another verbal base, which can conveniently be referred to as the ‘governing verb’ (i.e., the verb that governs the infinitival clause).

For example, the governing verb of (3) is the verbal base *vraj-* ‘to move’ (*vrajati*), which co-occurs with the verbal base *pac-* of the infinitive *paktum*.

2.4. Third constraint: the infinitival clause as a purpose clause

In keeping with the third constraint imposed on *-tum* by A 3.3.10, the action denoted by the *-tum* infinitive must be the purpose for which the action denoted by the governing verb is fulfilled. This is also expressed by Pāṇini by means of the locative-marked words *kriyāyām kriyārthāyām*. Specifically, *kriyāyām* refers to the action Y denoted by the governing verb, and *kriyārthāyām*—a bahuvrīhi compound—qualifies Y as having the action denoted by X as Y’s own purpose, where X is the verbal base to which *-tum* is affixed. Put another way, the infinitival clause headed by the *-tum* infinitive is a purpose clause.

Thus, for example, the infinitival clause *paktum* ‘in order to cook’ is a purpose clause in (3): the action of cooking denoted by *pac-* is

¹³ A 3.1.92: *tatropapadaṃ saptaṃsthāṃ* ‘What is marked with the locative here (i.e., in a rule of the section headed by A 3.1.91: *dhātoḥ*) goes under the rubric of *upapada* (i.e., co-occurring unit).’

the purpose of the action of going or moving denoted by the governing verb *vraj-*.

2.5. Fourth constraint: the infinitive as a future-denoting unit

The fourth constraint to be discussed here is that the action denoted by the verbal base to which *-tum* is affixed must take place in the future relative to the action denoted by the governing verb. In other words, the action denoted by the verbal base to which *-tum* is affixed takes place after the action denoted by the governing verb. This, Pāṇini provides for by means of the locative-marked segment *bhaviṣyati* 'when an action in the future is to be signified'. The reader can easily verify that this constraint is also complied with in (3).

In this section I have sketched out Pāṇini's model of the infinitive. In the following section I provide an outline of Patañjali's deviations from this model.

3. Patañjali's break from Pāṇini's model of the infinitive

Patañjali takes it that the infinitival suffixes (e.g., *-tum*, *-tave*, *-tavai*, *-se*) convey the sense of *bhāva-* by virtue of *tumarthe* continuing in A 3.4.26 from A 3.4.9 via the mechanism of *anuvṛtti* (Deshpande 1980: 49–50).¹⁴ This is shown in the following excerpt from his *Mahābhāṣya* (ca. 2nd century BCE):

M 2.175 ll. 20–22 *ad* A 3.4.26

*tat tarhi vaktavyam ā ca tumunaḥ samānādhikaraṇe iti. na vaktavyam.
avyayakṛtaḥ bhāve bhavanti iti bhāve bhaviṣyanti. kim vaktavyam etat.*

¹⁴ For completeness's sake, I reproduce here the wording of A 3.4.26: *svādumi ṇamul [pratayayaḥ 3.1.1] [paraś ca 3.1.2] [dhātoḥ 3.1.91] [samānakartrkayoḥ pūrvakāle 3.4.21] [kṛṇāḥ 3.4.25]* 'Affix *ṇamUL* occurs after the verbal base *kṛṇ* that co-occurs with *svādu-m* (lit. pleasant-ACC.SG.M), when [*ṇamUL*] signifies: (i) a point in time that is prior (to the point in time signified by another verb form B); and (ii) the same agent (as B).' See above, §2.1, for the wording of A 3.4.9.

na hi. katham anucyamānam gaṃsyate. tumarthe iti vartate. tumarthaḥ ca kaḥ. bhāvaḥ.

Then, should one make the statement: “Affixes up to *-tumUN* should be co-referential (with the inflection of the main verb)”? Such a statement should not be made. On the basis of the statement, i.e. “indeclinable *kṛt* formations denote the action,” (affixes such as *-ṆamUL*, *-Ktvā*, and *-tumUN*) will denote the action. Should this (second) statement be made? No. How can something which has not been stated be understood? The word *tum-arthe* continues (from P.3.4.9¹⁵ into the following rules). What is the meaning of *-tum*? Action. (transl. Deshpande 1980: 51)

Note that Deshpande is translating *bhāva-* as ‘action’, which calls for some elaboration. To start with, in Pāṇini’s grammar this term does not refer to the antonym of ‘state’ (e.g., ‘to smash’ as opposed to ‘to be happy’). Indeed, following Wezler (1975: 104), *bhāva-* ‘action’ designates an eventuality considered in and of itself, i.e., in opposition to the agent and the patient of that eventuality:¹⁶ e.g., both the eventuality of smashing and the eventuality of being happy satisfy this definition of *bhāva-*, but the smasher (agent), the smashee (patient), or the person who is happy, do not.

The assignment of the meaning of *bhāva-* to the infinitival suffix *-tum* represents a substantial break from Pāṇini’s own model of the infinitives.¹⁷ This is because the infinitives are classified as *kṛts* by Pāṇini, which implies that they all convey the sense of agent (as opposed to *bhāva-*) in accordance with A 3.4.67, as discussed above (see §2.2). Patañjali motivates his shifting the denotation of the Old Indo-Aryan infinitives from ‘agent’ to *bhāva-* along the following lines:

¹⁵ In Deshpande’s translations, ‘P’ stands for ‘Pāṇini’s *Aṣṭādhyāyī*’.

¹⁶ In modern linguistics, ‘eventuality’ is a technical term that refers to anything that can be predicated, including states and actions (Bach 1981: 67–69; Lowe 2015: 95 n. 1).

¹⁷ As Deshpande (1980: 51) and Mocci and Pontillo (2026: 214–215) point out, Patañjali’s view also differs substantially from Kātyāyana’s.

M 2.171 ll. 9–17 *ad* A 3.4.9

*tumarthe iti ucyate. kaḥ tumarthaḥ. kartā. yadi evam na arthaḥ tumar-
thagrahaṇena. yena eva khalu api hetunā kartari tumun bhavati tena
eva hetunā sayādayaḥ api bhaviṣyanti. evam tarhi siddhe sati yat tumar-
thagrahaṇam karoti tat jñāpayati ācāryaḥ asti anyāḥ kartuḥ tumunaḥ
arthaḥ iti. kaḥ punaḥ asau. bhāvaḥ. kutaḥ nu khalu etat bhāve tumun
bhaviṣyati. na punaḥ karmādiṣu kārakeṣu iti. jñāpakāt ayam kartuḥ apa-
krṣyate. na ca anyasmin arthe ādiṣyate. anirdiṣṭārthāḥ pratyayāḥ svārthe
bhavanti iti svārthe bhaviṣyati tat yathā guptijikidbhyaḥ san yāvādibhyaḥ
kan iti. saḥ asau svārthe bhavan bhāve bhaviṣyati. kim etasya jñāpane
prayojanam. avyayakṛtaḥ bhāve bhavanti iti etat na vaktavyam bhavati.*

The rule says: “in the meaning of *-tum*”. What is indeed the meaning of *-tum*? (*Prima facie argument*): The meaning of *-tum* is the agent. (*Objection*): If this is so, there is no purpose in saying “in the meaning of *-tum*” (in P.3.4.9). The reason because of which *-tum* is said to denote the agent (i.e. P.3.4.67 [...]) will also be the reason by which affixes such as *-se* would have to denote the agent. [...] (*Final view*): Therefore, since Pāṇini explicitly says “in the meaning of *-tum*” (in P.3.4.9) even though the desired result may be (apparently) accomplished (without doing so), the teacher implies that the meaning of *-tum* is other than the agent. What is it? It is *bhāva* ‘action’. Why is it this way? Why would *-tum* occur in the meaning of action and not in other syntactic meanings such as the object? (*The answer is as follows*): On the basis of (above- given) implication, the affix *-tum* is dissociated from the meaning ‘agent’. It has not been prescribed in any other meaning. Since affixes with no explicit meaning ascribed to them occur in the meaning of the stem, the affix *-tum* would denote the meaning of the stem. Thus, denoting the meaning of the stem (i.e. the verb root), it would denote the action. What is the purpose of this indication? (With this indication accepted) we do not have to make an explicit statement that indeclinable *kṛt* formations denote the action. (transl. Deshpande 1980: 50–51)

The main claim made by Patañjali in this long excerpt is that, if one applies A 3.4.67 to let the Vedic infinitival affixes taught in A 3.4.9,

including *-se*, *-tave*, and *-tavai*, convey the sense of agent like any other *kṛt* affixes, Pāṇini's teaching 'in the meaning of *-tum*' (*tumarthe*) would fulfill no function in A 3.4.9.¹⁸ Therefore, Patañjali concludes that Pāṇini included the segment *tumarthe* 'in the meaning of *-tum*' in A 3.4.9 only in order to make it clear that the Old Indo-Aryan infinitival suffixes (i.e., the Vedic infinitival suffixes taught by A 3.4.9, as well as the unmarked infinitival suffix *-tum* taught by A 3.3.10) carry the meaning component *bhāva*- 'action'.

Indeed, several arguments can be deployed to show that Patañjali's conclusion is unwarranted. Some of these arguments were originally presented by Deshpande (1980) and were recently confirmed by Mocci and Pontillo (2026: 216). Thus, for one thing, the segment *tumarthe* of A 3.4.9 fulfills multiple functions in the *Aṣṭādhyāyī*: not only the signification of the meaning of 'agent' (*kartṛ*-), but also the signification of the meaning of 'purpose' (*artha*-) and 'future' (*bhav-iṣyat*-). Therefore, contrary to Patañjali's contention, *tumarthe* 'in the meaning of *-tum*' still fulfills some function in the *Aṣṭādhyāyī* (i.e., that of endowing the Old Indo-Aryan infinitival suffixes with the meaning components 'purpose' and 'future'), even when one lets the Vedic infinitival suffixes carry the meaning component 'agent' (Deshpande 1980: 53).

Furthermore, Pāṇini explicitly ascribes the meaning component *bhāva*- to the Vedic infinitival suffix *-tavai* (i.e., to one of the suffixes that serves as a *de facto* substitute of *-tum* in compliance with A 3.4.9) in A 3.4.14, by teaching that this suffix is used *kṛtyārthe* 'in the sense of the *kṛtya* affixes', where the sense of the *kṛtya* affixes is *bhāva*- and 'patient'.¹⁹

A 3.4.14: *kṛtyārthe tavaikenkenyatvanah* [pratyayaḥ 3.1.1] [paraś ca 3.1.2] [dhātoḥ 3.1.91] [kṛt 3.1.93] [chandasi 3.4.6]

¹⁸ See above, §2.1, for the wording of A 3.4.9.

¹⁹ See A 3.4.70: *tayor eva kṛtyaktakhalarthāḥ* [pratyayaḥ 3.1.1] [*karmanī bhāve akarmakebhyah* 3.4.69] '*kṛtya* affixes, as well as affixes used in the sense of *Kta* and *KHaL*, occur to denote only these, i.e., only patient (*karman*-) and action (*bhāva*-)'.

In the Vedic *saṃhitās*, affixes *-tavai*, *-KeN*, *-Kenya* and *-tvaN* occur after a verbal base in the sense of the *kṛtya* affixes.

Since Pāṇini resorts to a specific rule (i.e., A 3.4.14) to let *-tavai* carry the meaning component *bhāva-*, the segment *tumarthe* of A 3.4.9 must in itself be unable to ascribe this selfsame semantic component to any Old Indo-Aryan infinitival suffix in the system of the *Aṣṭādhyāyī* (Deshpande 1980: 55).

In the next section, I provide a fresh argument against Patañjali's contention that *-tum* (and, for that matter, the Vedic infinitival suffixes such as *-te*, *-tave*, and *-tavai*) denotes *bhāva-*. I argue that Patañjali's contention reveals a serious misunderstanding of Pāṇini's syntactic model, but at the same time helps us to identify a core point of Pāṇini's syntax that has so far gone unnoticed, which I will refer to as 'semantic hierarchy'.

4. The notion of semantic hierarchy in Pāṇini's grammar

Patañjali's claim that the infinitival suffix *-tum* denotes *bhāva-* 'action' clashes with the way Pāṇini models verb-argument relations (argument structure). I prove this by making crucial use of A 2.3.15.

4.1. On the difference between 'agent' (*kartṛ-*) and 'action' (*bhāva-*) in A 2.3.15

The wording of A 2.3.15 reads as follows:

A 2.3.15: *tumarthāc ca bhāvavacanāt* [*caturthī* 2.3.13] [*anabhihite* 2.3.1]

Provided that an action is not otherwise signified, the fourth *vibhakti* (dative ending) also occurs after a linguistic item (that ends in a suffix X) such that: X expresses an action; and X is used in the meaning of *-tum*.

This rule provides for the formation of sentences like (4), where a dative ending applies to a deverbal derivative nominal (*kṛt*), i.e., *pāka-* (from the verbal base *pac-* ‘to cook’), thereby yielding *pākāya*.

(4) *pākāya vrajati*

He goes to cook.

Qua *kṛt*, *pāka-* should convey the meaning ‘agent’ in compliance with A 3.4.67 (*kartari kṛt*), but A 2.3.15 blocks this meaning by teaching that the nominal base to which the dative ending applies signifies an action (*bhāvavacanāt*). In this way, *pāka-* denotes not the agent of the action of cooking, but rather the very action of cooking. At this point, Pāṇini specifies that the *bhāva*-signifying *pāka-* to which a dative ending is to be applied (thereby giving *pākāya*) is used in the meaning of the infinitival suffix *-tum* (*tumarthāt*). This is tantamount to saying that (4) is meaning-equivalent to (5):

(5) *paktum vrajati*

He goes to cook.

If taken seriously, this meaning equivalence implies that, in (4), *pākāya* is assigned the three semantic values assigned to *-tum* in accordance with A 3.3.10: i.e., ‘agent’, ‘purpose’, and ‘future’ (see above, §§2.2–2.4). Let us consider these assignments in turn.

The assignment of the values ‘purpose’ and ‘future’ to *pāka-* is straightforward: the action of cooking denoted by *pac-* (i.e., by the verbal base to which both *pāka-* and *paktum* are formed) is envisioned: (i) as the purpose of the action of going/moving denoted by *vraj-* (i.e., by the verbal base to which *vrajati* is formed); (ii) as taking place at a point in time that follows the point in time when the action of going/moving takes place. However, the assignment of the value ‘agent’ to *pāka-* may strike us as an absurdity: as a result of this assignment, Pāṇini switches the denotation of *pāka-* from ‘agent of the action of

cooking' (in compliance with A 3.4.67) to 'action of cooking' (in compliance with the segment *bhāvavacanāt* of A 2.3.15), only to return to the denotation 'agent of the action of cooking' (in compliance with the segment *tumarthāt* of A 2.3.15).

Indeed, I believe that the assignment of the value 'agent' to *pāka-*, far from being an absurd complication of Pāṇini's model, is perfectly consistent with his treatment of finite active sentences. Let us consider how in the following subsections.

4.2. On the sentences that denote an 'agent' (*karṭṛ-*) and an 'action' (*bhāva-*)

The affixation of the second person active verbal ending *-si* to *pac-* in this sentence ensures that 'you' (i.e., the denotatum of *tvad-*) is co-referential with the 'agent of the action of cooking' (i.e., the denotatum of the verbal ending *-si*):

(6) *tvam pacasi*

You are cooking.

This co-referentiality is enjoined by A 1.4.105, here interpreted along the lines of Mocci and Pontillo (2023):

A 1.4.105: *yuṣmady upapade samānādhikaraṇe sthāniny api madhyamaḥ*

When the second-person pronoun *yuṣmad-* co-occurs and is co-referential with LA, even if *yuṣmad-* is a substituendum, then LA is instantiated by a second-person verbal triplet.²⁰

²⁰ 'LA' is a fictitious term used by Pāṇini to collectively refer to the entire set of Old Indo-Aryan verbal endings. See Mocci and Pontillo (2023) for a detailed discussion of this and other aspects of the interpretation of A 1.4.105.

As a consequence, the meaning of (6) is properly ‘you are the agent of the action of cooking’. Crucially, this means that the meaning of *pac-a-si* is to be computed cyclically, from right to left (i.e., from the outside in), as indicated in (7):²¹

(7) [[pac-a]^{ACTION}-si]^{AGENT}

Here the meaning of the outer, or less embedded, morphological exponent (i.e., *-si*, which denotes an agent) supersedes the meaning of the inner, or more embedded, morphological exponent (i.e., *pac-a-*, denoting the action of cooking).²² Put another way, (7) does not convey the meaning ‘there is an action of cooking that involves you as an agent’

²¹ The occurrence of the thematic vowel in between the verbal base *pac-* and *-si* is governed by A 3.1.68: *kartari śap [pratyaṣaḥ 3.1.1] [paraś ca 3.1.2] [dhātoḥ 3.1.22] [sārvadhātuke 3.1.67]* ‘The affix *ŚaP* occurs after a verbal base but before a *sārvadhātuka* affix that conveys the sense of agent.’ The technical term *sārvadhātuka* primarily refers to the verbal triplets according to A 3.4.113: *tiñśit sārvadhātukam [pratyaṣaḥ 3.1.1] [paraś ca 3.1.2] [dhātoḥ 3.1.91]* ‘Verbal triplets (*tiñ*), as well as affixes that have *Ś* as their marker, occur after a verbal base and are designated as *sārvadhātuka*.’ The thematic vowel conveys no meaning in (7), so it can be disregarded for the purposes of computing the meaning of *pac-a-si*.

²² Specifically, *pac-a-* denotes a *kriyā-* which, just like *bhāva-*, is also ordinarily translated as ‘action’. This raises the issue of the relationship between *bhāva-* and *kriyā-* in Pāṇini’s grammar. Following Wezler, *kriyā-* is superordinate to *bhāva-* in the *Aṣṭādhyāyī*, in the sense that *kriyā-* includes *bhāva-*: ‘Es besteht folglich ein deutlicher und genau bestimmbarer Unterschied zwischen *bhāva* und *kriyā*, da der Terminus *kriyā* [...] die „Handlung“ als die allen Verbalwurzeln gemeinsame abstrakte Bedeutung bezeichnet, ohne [...] zugleich auch ihren Vollzug durch einen Agens oder ihr Sich-realisieren mitzunehmen. Eine *kriyā-* ist etwas, das entweder von einem Agens angeführt werden oder sich ohne einen Agens realisieren kann. Dementsprechend bezeichnen die Suffixe, die an die Würzel angefügt werden, um nomina agentis und bestimmte finite und infinite Verbalformen, bzw. nomina actionis und bestimmte andere Verbalformen zu bilden entweder den Agens (*kartr*) oder das bloße Sein, d. h. Sich-ereignen (*bhāva*)’ (Wezler 1975: 104). Cf. Cardona (1970: 216–217), (1976: 197), and Ogawa (2005: 157–200) for a detailed discussion of the relationship between *bhāva-* and *kriyā-* in the Indian grammatical tradition. I am indebted to an anonymous Reviewer for the Journal for helping me to correct and refine my understanding of this relationship.

(where the meaning component 'action' supersedes the meaning component 'agent'), but rather 'you are an agent of the action of cooking'.²³

By contrast, in a sentence like (8), where the third person passive verbal ending *-te* denotes *bhāva*- 'action', the meaning of the inner morphological exponent (i.e., *supya*-) is passed on, as it were, to the outer morphological exponent of the verb (i.e., *-te*),²⁴ as indicated in (9):²⁵

(8) *mayā supyate*

'I sleep'

(9) [[sup-ya]^{ACTION}-te]^{ACTION}.

All in all, Pāṇini's treatment of infinitival sentences parallels that of finite active sentences in that the outermost morphological exponent of both the infinitival and the finite active verb (e.g., *-tum* and *-si*, respectively) can, and in fact must, denote an agent.

²³ By capitalizing on the logical representations of formal semantics (see May 1985 for a classic example), one may perhaps expose the meaning carried by (7) in Pāṇini's system as follows: 'there is an agent of the action of cooking and the identity of this agent is you'.

²⁴ More precisely, *sup-ya*- denotes *kriyā*- 'action' and *-te* denotes *bhāva*- (also 'action'), *bhāva*-being the name given to a *kriyā*- when it is passed on to an outer morphological exponent (in this case, *-te*).

²⁵ *-ya*- immediately precedes the medio-passive verbal endings, which denote either a patient or an action, in compliance with A 3.1.67: *sārvadhātuke yak [pratyayah 3.1.1] [paraś ca 3.1.2] [dhātoḥ 3.1.22] [bhāvakarmaṇoḥ 3.1.66]* 'Affix *-ya*- occurs after a verbal base but before a *sārvadhātuka* affix when an action (*bhāva*-) or a patient is to be signified (by this very *sārvadhātuka* affix).' Accordingly, the passive-forming suffix *-ya*- in itself conveys no meaning and can be disregarded for the purposes of computing the meaning of (8). The Pāṇinian analysis of this sentence is also discussed in Kiparsky (2009: 54–56).

4.3. The ultimate purpose of *bhāvavacanāt* in A 2.3.15

The approach to the argument structure of (6) and (8) that was illustrated above (§4.2) has a corollary: an outer meaning component ‘agent’ must be computed before an inner meaning component ‘action’. For example, the constructed representation (10) is ill-formed, inasmuch as the outermost meaning component ‘agent’ is computed before the meaning component ‘agent’ of the *kṛt* affix *-a*:²⁶

$$(10) * [[[pāk-]^{ACTION} -a-]^{AGENT}]^{AGENT}$$

In plain words, one cannot have an agent of an agent of cooking; an agent can only be the agent of an action. This corollary, I refer to as ‘semantic hierarchy’. We now have all the ingredients to understand the seemingly absurd shift imposed by A 2.3.15 on the meaning of *pāka-* (i.e., ‘agent’ > ‘action’ > ‘agent’).

Thus, the segment *bhāvavacanāt* of A 2.3.15 (in combination with A 3.3.11, as discussed by Deshpande 1980: 53–54) rewrites the denotation of the *kṛt pāka-*, i.e., (11a), where the intermediate meaning component is ‘agent’, as (11b), where the intermediate meaning component is instead ‘action’.

$$(11) \text{ a. } [[[pāk-]^{ACTION} -a-]^{AGENT}]^X \\ \text{ b. } [[[pāk-]^{ACTION} -a-]^{ACTION}]^X$$

Next, the segment *tumarthāt* of A 2.3.15 specifies that the value of the outermost meaning component of (11b), here labelled as X for convenience, is ‘agent’. This denotation is now well-formed because a meaning component ‘agent’ is computed before a meaning component ‘action’ (*bhāva-*):²⁷

²⁶ The ill-formedness of (10) is indicated by the asterisk.

²⁷ At a finer level of analysis, (12) should also include the meaning components (or semantic values) ‘future’ and ‘purpose’, which are provided to *pāka-* along with ‘agent’ by the segment *tumarthe* of A 2.3.15 (cf. above, §2, for a discussion of the semantic values enjoined by *tumarthe* in the *Aṣṭādhyāyī*). A distinction should

(12) [[[pāk-]^{ACTION}-a-]^{ACTION}]^{AGENT}

Crucially, however, if Pāṇini had not specified *bhāvavacanāt* in A 2.3.15, the derivation of (4) (*pākāya vrajati*) would have necessarily proceeded with the assignment of the value ‘agent’ to the X-labelled bracket of (11a), thereby resulting in the ill-formed representation (10). Therefore, in this perspective, the ultimate purpose of *bhāvavacanāt* (i.e., of the re-writing of (11a) as (11b)) is to suspend the assignment of the value ‘agent’ to the X-labelled bracket of (11a), and to license the assignment of the value ‘agent’ to the X-labelled bracket of (11b) in its stead.

In this way, the re-writing of (11a) as (11b) is far from being an absurd complication; instead, it is needed to avoid the illegal representational scheme (13a) (instantiated in (10)) in favor of the well-formed representational scheme (13b) (instantiated in (12)):²⁸

- (13) a. *[[X]^{AGENT} Y]^{AGENT}
 b. [[X]^{ACTION} Y]^{AGENT}

4.4. The ultimate purpose of *tumarthāt* in A 2.3.15

The main takeaway from the previous subsection is that the rule segment *tumarthāt* in A 2.3.15 assigns *pāka-*, i.e., the stem of the dative-marked nominal *pākāya* occurring in (4) (*pākāya vrajati*), the meaning component ‘agent’, alongside ‘purpose’ and ‘future’. A crucial question now arises. Since (4), repeated below as (14), denotes an agent in the system of the *Aṣṭādhyāyī*, shall we conclude from this that Pāṇini interpreted (14) as in (15)?

also be made between the token of ‘action’ denoted by *-a-*, which corresponds to Pāṇinian *bhāva-*, and the token of ‘action’ denoted by the vṛddhied verbal base *pāk-*, which corresponds to Pāṇinian *kriyā-* instead.

²⁸ In fact, one can go as far as to claim that *bhāvavacanāt* feeds *tumarthāt*, in the sense that *tumarthāt* can only apply to the output of *bhāvavacanāt* (i.e., to a representation like (13b)).

(14) *pākāya vrajati*

(15) *He moves towards the agent of the action of cooking.

This would of course be an unwelcome result, inasmuch as (15) clashes with the message conveyed by (14) in Old Indo-Aryan, namely that the agent of the action of cooking and the agent of the action of going/moving are one and the same entity. Indeed, I submit that the ultimate purpose of the rule segment *tumarthāt* in A 2.3.15 is to block the interpretation in (15).²⁹ Let us consider how by contrasting (15) with (16), also an interpretation of (14).³⁰

(16) He goes in order to be the agent of the action of cooking.

The fundamental difference between (15) and (16) is that only in (16) is the action of cooking (i.e., the denotatum of the verbal base *pac-*) envisioned as the purpose of the action of going/moving (i.e., the denotatum of the verbal base *vraj-*).³¹ In point of fact, the segment *tumarthāt* of A 2.3.15 ensures that, in (14), *pākāya* carries the meaning components ‘agent’, ‘purpose’, and ‘future’, as discussed above (§4.1). Accordingly, (15) is to be considered as an illegitimate interpretation of (14) inasmuch as, under this interpretation, (14) violates

²⁹ It may be worth recalling that the previous discussion (§4.3) provides a rationale for Pāṇini’s inclusion of the rule segment *bhāvavacanāt* in A 2.3.15 but says nothing as to the rationale for *tumarthāt* in this selfsame rule.

³⁰ Indeed, (16) should be refined as ‘There is an agent who performs the action of going in order to be an agent of the action of cooking’, if one is to account for the fact that finite verbs like *vrajati* of (14) also denote an agent. We shall disregard this refinement here for convenience, but cf. above, §4.2, for relevant discussion.

³¹ Note that the agent of the governing verb (e.g., *vrajati*) systematically has control over the action denoted by the verbal base of a purpose clause (e.g., *paktum*). However, the agent of the action of going/moving lacks any control whatsoever over the action of cooking in (15). Therefore, the absence of this control in (15) is further confirmation that the action of cooking fails to qualify as a purpose in (15). Cf. Mocchi and Pontillo (2026: 202–203) for evidence that some notion of an agent’s control over an action is involved in Pāṇini’s account of infinitives.

the purpose constraint enjoined by the segment *tumarthāt* of A 2.3.15. By contrast, when it is interpreted as in (16), (14) does comply with the three meaning constraints enjoined by *tumarthāt* of A 2.3.15.

All in all, (14) is to be assigned an interpretation very much like (16) in compliance with A 2.3.15. This implies that (5), repeated below as (17), should also be assigned the interpretation in (16), given the meaning equivalence between (14) and (17), which was established above (§4.1).

(17) *paktum vrajati*

A side advantage of this account is that it makes it possible to express the difference between *-tum* infinitives and *-syant-* (future) participles in fully explicit terms.³² Thus, in *pakṣyan vrajati* ‘he who intends to cook moves’, the future participle *pakṣyan* conveys the meaning components ‘agent’ and ‘future’ (in keeping with A 3.3.14, combined with A 3.2.127 and 3.3.13)³³ but crucially does not convey the meaning component ‘purpose’: the action of cooking denoted by the verbal base *pac-* is not envisaged as the purpose of the action of going/moving denoted by the verbal base *vraj-*. Accordingly, *pakṣyan vrajati* differs from *paktum vrajati* only in the meaning component ‘purpose’, which is signified by *paktum* but not by *pakṣyan*.

4.5. Back to Patañjali

We saw above (§3) that, according to Patañjali, the infinitival suffix *-tum* does not carry the meaning ‘agent’, but rather ‘action’ (*bhāva-*) in (17). This of course implies that *pāka-* also conveys the meaning ‘action’ in (14) (*pākāya vrajati*) according to Patañjali, for *pāka-* is constrained by the rule segment *tumarthāt* of A 2.3.15, i.e., *pāka-* must

³² I am thankful to an anonymous Reviewer for the Journal for drawing my attention to this point.

³³ See Cardona (1997: 172) for a lucid discussion of these rules.

be used in the meaning of *-tum*. With reference to (14), this yields the semantic representation in (18):³⁴

(18) [[[pāk-]^{ACTION} -a-]^{ACTION}]^{ACTION}

While (18) is not in itself a deviant semantic representation – at least insofar as it does not violate the semantic hierarchy – it is nonetheless problematic: it is hard to see why the intermediate meaning component ‘action’ (enjoined by *bhāvavacanāt*) should be embedded within the outermost meaning component ‘action’ (enjoined by *tumarthe* according to Patañjali) in (18). Put another way, by letting ‘action’ (*bhāva-*) be signified by both rule segments *tumarthe* and *bhāvavacanāt* in A 2.3.15, Patañjali causes the wording of this rule to be blatantly redundant.

Indeed, in the reconstruction of Pāṇini’s model of the infinitive adumbrated above, the infinitival suffix *-tum* signifies ‘agent’ (as opposed to ‘action’) in accordance with A 3.4.67, while the rule segment *bhāvavacanāt* of A 2.3.15 ensures that the meaning component ‘action’ is embedded within the meaning component ‘agent’ signified by *-tum*, in compliance with the principle referred to as ‘semantic hierarchy’ (see above, §4.2). This was depicted in (12), repeated below as (19):

(19) [[[pāk-]^{ACTION} -a-]^{ACTION}]^{AGENT}

In this way, no redundancy is detected in the wording of A 2.3.15: the wording of this rule is in fact crafted in a way that aims at avoiding the violation of the semantic hierarchy. I take this as fresh evidence against Patañjali’s model of the infinitive and conclude that *-tum* invariably denotes an agent in the *Aṣṭādhyāyī*.

³⁴ To be specific, the outermost and intermediate (*-a-*) tokens of ‘action’ translate *bhāva-*, while the innermost token of ‘action’ (*pāk-*) translates *kriyā-*. See above, §4.2, on the distinction between *kriyā-* and *bhāva-*.

5. Conclusion: The art of embedding meanings within other meanings

In the present contribution I have provided a fresh argument against Patañjali's assumption that *-tum* signifies *bhāva-* 'action'. The gist of this argument consists in showing that Patañjali's assumption not only makes the wording of A 2.3.15 redundant, but also—more importantly—obliterates Pāṇini's fine-grained theory of the argument structure of Old Indo-Aryan verbs: this theory makes crucial use of the principle referred to here as 'semantic hierarchy', which bans semantic representations where a meaning component 'agent' is computed immediately after (i.e., is embedded within) another meaning component 'agent': formally, *[[X]^{AGENT} Y]^{AGENT}.

However, Patañjali's reflections on the meaning of *-tum* have the merit of drawing attention to the complex interactions between the meaning components of Old Indo-Aryan verbs in the *Aṣṭādhyāyī*, in fact pointing out that there is more to Pāṇini's theory of argument structure than meets the eye. Accordingly, primary importance must be attached to Pāṇini's *usus scribendi* when we interpret the *Aṣṭādhyāyī* rules (as forcefully argued for by Candotti and Pontillo 2021), but Pāṇini's commentators still qualify as a fundamental heuristic to study the *Aṣṭādhyāyī*.

While in this study I have offered a solution to an issue internal to the Indian grammatical tradition, I hope I have managed to demonstrate that there are many good reasons for linguists to study the syntactic system of the *Aṣṭādhyāyī* that go well beyond the specific issue dealt with here.

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