"Rule Selection in the Aṣṭādhyāyī,"
or
"Is Pāṇini's Grammar Mechanistic?"

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I   Total blocking

Cardona (1970; 1997: 401–427) discusses general principles that determine precedence in the application of rules in Pāṇini's grammar. Primary among these principles is that an exception (अपवाद) takes precedence over a general rule (उत्सर्ग) that operates in the same domain. An exception whose domain of application is wholly included within the domain of application of a general rule would have no scope at all if it did not take precedence; hence there would have been no reason to formulate it. The very fact that the wholly included exception has been stated (वचनसामर्थ्यात्) therefore demonstrates that Pāṇini operated with the principle that exceptions take precedence over their related general rules. The precedence of an exception wholly included within the domain of a rule with broader scope Cardona terms 'simple blocking'.

An example of simple blocking is afforded by *A.* 6.1.87 आद्गुणः and *A.* 6.1.88 वृद्धिरेचि. The first of these two rules provides that the sequence of a short or long अ and a following vowel is replaced by the closest guṇa vowel. The latter provides that the sequence of a short or long अ and a following ए, ओ, ऐ, or औ is replaced by the closest vṛddhi vowel. Since ए, ओ, ऐ, and औ constitute a subset of vowels, the domain of *A.* 6.1.88 is wholly included within the domain of *A.* 6.1.87 and is therefore an exception to it. (See Figure 1.)

II   Overlapping domains

The situation is more complicated, however, where the domains of operation of two rules overlap, yet neither is wholly included within the other so that each rule finds scope in the domain exclusive to it. The problem is in determining which rule takes precedence in the shared domain. The two
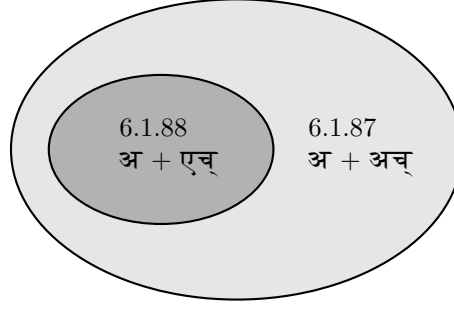
Figure 1: Simple blocking

Light gray: 6.1.87 **आद्गुणः** (**अचि** 77). The sequence of a vowel of the class अ
followed by a vowel (**अच्**, i.e. अ, इ, ..., औ) is replaced by the guṇa vowel
corresponding to the latter. Gray: 6.1.88 **वृद्धिरेचि**. The sequence of a vowel
of the class अ followed by a vowel in the pratyāhāra **एच्** (i.e. ए, ओ, ऐ,
औ) is replaced by the **वृद्धि** vowel corresponding to the latter. 6.1.88 blocks
6.1.87 because, due to the inclusion of its domain within the domain of
6.1.87, 6.1.88 would have no scope otherwise.

rules *A.* 6.1.77 **इको यणचि** and *A.* 6.1.101 **अकः सवर्णे दीर्घः** demonstrate
the situation of overlapping domains. *A.* 6.1.77 provides that a simple
vowel other than short or long अ, followed by a vowel, is replaced by its
corresponding semivowel. *A.* 6.1.101 provides that the sequence of two like
simple vowels (a simple vowel and a following simple vowel produced at
the same place of articulation as the preceding vowel) is replaced by their
corresponding long vowel. The domains of application of the two rules
overlap, but neither is wholly included within the domain of the other. The
domains overlap where a simple vowel other than short or long अ is followed
by its like simple vowel. Yet each rule has its exclusive domain. *A.* 6.1.77
alone applies to simple vowels other than short or long अ followed by unlike
vowels, and *A.* 6.1.101 alone applies to short or long अ followed by अ. (See
Figure 2.) Since the domain of neither rule is wholly included within the
domain of the other, simple blocking does not apply; neither is an exception
to the other. Considering the initial context in each rule, since the domain
of any simple vowel other than short or long अ is included within the domain
of any simple vowel, *A.* 6.1.77 would have the narrower domain and would
block *A.* 6.1.101, but considering the subsequent context, since the domain
of the like simple vowel is included within the domain of vowels, *A.* 6.1.101
would have the narrower domain and would block *A.* 6.1.77. There does not
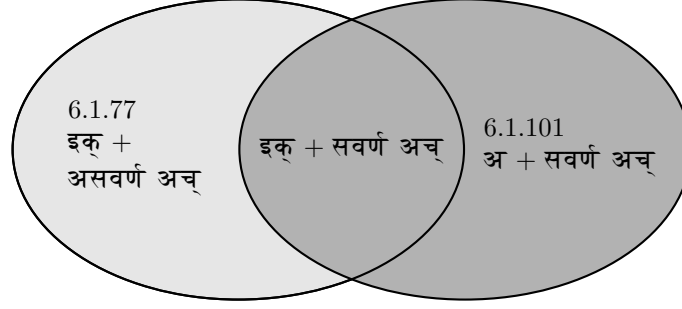appear to be any factor with respect to the domains of the two rules that

Figure 2: Overlapping domains. Example 1

6.1.77 इको यणचि. Followed by a vowel (अच्), a simple vowel other than अ (इक्) is replaced by its corresponding semivowel (यण्). 6.1.101 अकः सवर्णे दीर्घः. A sequence of a simple vowel (अक्) followed by a homorganic simple vowel is replaced by their corresponding long simple vowel. 6.1.77 domain: इ, उ, ऋ, or लृ + any vowel (अच्). 6.1.101 domain: अ, इ, उ, ऋ, or लृ + a homorganic (सवर्ण) vowel. 6.1.77 exclusive domain: इक् + असवर्ण अच्, i.e.: इ + अ, इ + उ, इ + ऋ, इ + लृ; उ + अ, उ + इ, उ + ऋ, उ + लृ; etc. 6.1.101 exclusive domain: अ + सवर्ण अच्, i.e.: अ + अ. Shared domain: इक् + सवर्ण अच्, i.e.: इ + इ, उ + उ, ऋ + ऋ, लृ + लृ. Problem: Neither domain is wholly included within the other. 1. The scope of इक् is included within the scope of अक्, i.e. इ, उ, ऋ, लृ is included within अ, इ, उ, ऋ, लृ implying that 6.1.77 has the narrower domain and that by simple blocking it would take precedence over 6.1.101. 2. The scope of the terms सवर्ण अच् is included within the scope of अच् implying that 6.1.101 has the narrower domain and that by simple blocking it would take precedence over 6.1.77. The two implications are contradictory.

determines the precedence of application. Each rule has its own exclusive scope. Neither is left without scope if the other takes precedence. Hence one cannot resort to the principle that one or the other takes precedence by virtue of the fact that it has been stated (वचनसामर्थ्यात्). There is a conflict regarding which of the rules applies.

III   Vipratiṣedha

Patañjali refers to the conflict of rules with overlapping domains as विप्रतिषेध. In such cases, he appeals to *A.* 1.4.2 विप्रतिषेधे परं कार्यम् as the grounds for resolving conflict. *A.* 1.4.2 states that when two rules are in conflict, the latter rule applies. Commenting on Kātyāyana's first vārttika on *A.* 1.4.2 (द्वौ प्रसङ्गावन्यार्थावेकस्मिन्, स विप्रतिषेधः । MBh. 1.304.13), Patañjali explains

that conflict occurs where two rules that have independent domains have the opportunity to apply simultaneously to the same domain (द्वौ प्रसङ्गौ यदान्यार्थौ भवत एकस्मिंश्च युगपत्प्राप्नुतः, स विप्रतिषेधः। MBh. 1.304.14). Patañjali applies the principle that the rule which is stated later (परत्व 'being later') prevails in cases of conflict (विप्रतिषेधे) throughout the grammar where other principles of rule precedence, such as being more internally conditioned (अन्तरङ्गत्व), precedence in condition elimination (नित्यत्व), and rule suspension (असिद्धत्व), are inapplicable. In the above example, applying the principle that the later rule takes precedence produces the correct result. As shown by the same shade of gray in the intersection of ellipses in Figure 2, A. 6.1.101 takes precedence over A. 6.1.77 in the domain common to the two rules where a simple vowel other than short or long अ is followed by a like vowel. For example, in दधि इन्द्रः, the sequence of the final इ of दधि and the initial इ of इन्द्रः is replaced by their single corresponding long vowel ई yielding दधीन्द्रः.

Patañjali's solution would settle some other cases of विप्रतिषेध besides that in Example 1 as well. As shown in Figure 3, A. 7.3.102 सुपि च and A. 7.3.103 बहुवचने झल्येत् apply in overlapping domains. The former provides that the final sound of a stem ending in short अ is replaced by its corresponding long vowel when followed by a nominal termination beginning with य्, न्, or भ्. The latter provides that the final sound of a stem ending in short अ is replaced by ए when followed by a plural nominal termination beginning with भ्, or स्. Neither domain is wholly included within the other; each rule has its exclusive domain. The former alone applies when the nominal termination begins with य्, or न्, or with भ् in the dual, that is, when the nominal terminations य, नाम्, or भ्याम् follow the stem. The latter alone applies when the nominal termination begins with स्, that is, when the nominal termination सु follows. Yet the domains overlap. Both have scope when the nominal termination begins with भ् in the plural, that is, when the nominal termination भ्यस् follows the stem. भ्यस् is equally as well included within the referents of यञ् सुप् as within the referents of झल् बहुवचन सुप्.

As Patañjali writes under A. 1.4.2, the two rules apply to independent domains, A. 7.3.102 to वृक्ष + भ्याम्, and A. 7.3.103 to वृक्ष + सु; they both apply simultaneously to वृक्ष + भ्यस्. (वृक्षाभ्यां वृक्षेष्वित्यन्यार्थौ वृक्षेभ्य इत्यत्र युगपत्प्राप्नुतः। MBh. 1.304.15–16.) Patañjali determines which of the two rules applies by virtue of the principle stated in A. 1.4.2 विप्रतिषेधे परं कार्यम्; the latter rule takes precedence. Thereby, he argues, the correct form वृक्षेभ्यः is obtained. The solution is stated by Kātyāyana as well under A. 7.3.103. He writes in vārttika 1, in place of short अ before a plural nominal termination, replacement by ए occurs in precedence to replacement by a long vowel by the principle that the latter rule applies in cases of conflict (अतो दीर्घाद्बहुवचन एत्वं विप्रतिषेधेन MBh. 3.340.2). In that context Patañjali reit-
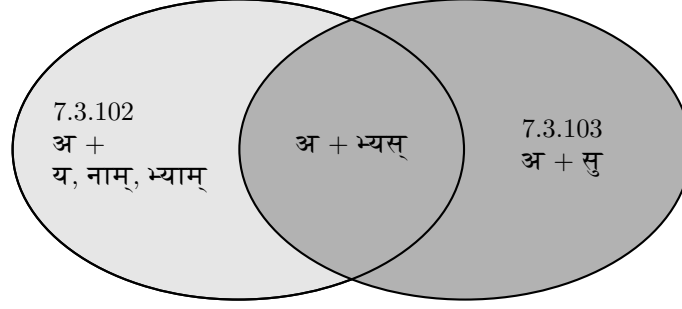
Figure 3: Overlapping domains. Example 2

7.3.102 सुपि च (अतो दीर्घो यञि 101). Followed by a nominal termination (सुप्) beginning with a sound in the pratyāhāra यञ्, the final sound of a stem ending in अ is replaced by its corresponding long vowel. 7.3.103 बहुवचने झल्येत्. Followed by a plural nominal termination beginning with the pratyāhāra झल्, the final sound of a stem ending in अ is replaced by ए. 7.3.102 domain: अ + य, नाम्, भ्याम्, भ्यस्, defined by the terms यञ् सुप्. 7.3.103 domain: अ + भ्यस्, सु defined by the terms झल् बहुवचन सुप्. 7.3.102 exclusive domain: अ + य, नाम्, भ्याम्. 7.3.103 exclusive domain: अ + सु. Shared domain: अ + भ्यस्.

erates Kātyāyana's comment (अतो दीर्घाद्बहुवचन एत्त्वं भवति विप्रतिषेधेन) and then explains as follows: The scope of *A.* 7.3.102 is वृक्षाभ्याम् प्लक्षाभ्याम्. The scope of *A.* 7.3.103 is वृक्षेषु प्लक्षेषु. Both have scope here: वृक्षेभ्यः, प्लक्षेभ्यः. Replacement by ए occurs by the principle that the latter applies in cases of conflict. (अतो दीर्घो यञि सुपि च [7.3.101–102] इत्यस्यावकाशः — वृक्षाभ्याम् प्लक्षाभ्याम्। बहुवचने झल्येदित्यस्यावकाशः — वृक्षेषु प्लक्षेषु। इहोभयं प्राप्नोति — वृक्षेभ्यः प्लक्षेभ्यः। एत्त्वं भवति विप्रतिषेधेन॥ MBh. 3.340.3–5.)

A third example of the resolution of conflicting rule application in overlapping domains by the principle that the latter rule takes precedence appears in the application of *A.* 7.3.113 याडापः and *A.* 7.3.116 ङेराम्नद्याम्नीभ्यः (see Figure 4). *A.* 7.3.113 provides that a nominal termination marked with ङ that occurs after a stem ending in a feminine affix आ receives the initial augment या. *A.* 7.3.116 provides that the singular seventh triplet nominal termination ङि, when it occurs after a stem termed नदी, a stem ending in a feminine affix आ, or a nominal that ends in the root नी, is replaced by आम्. (Feminine stems ending in short and long इ and उ are termed नदी under certain conditions by *A.* 1.4.3–6.) The former rule applies to a stem ending in the feminine affix आ followed by any of the singular nominal terminations of the 4th–7th triplets, i.e. ङे, ङसि, ङस्, or ङि. The latter applies to

the singular seventh triplet nominal termination ङि preceded by a feminine
stem termed नदी, a nominal stem ending in a feminine affix आ, or a nomi-
nal stem ending in the root नी. As shown in Figure 4, the domains overlap
but neither is wholly included within the other. *A.* 7.3.113 alone applies
to the dative, ablative, and genitive singular terminations ङे, ङसि, and ङस्
following a stem ending in the feminine affix आ, producing forms such as
the feminine dative singular कट्वायै and the feminine ablative and genitive
singular कट्वायाः, both from the stem कट्वा 'cot'. *A.* 7.3.116 alone applies
to the locative singular termination ङि following feminine stems in short
or long इ and उ termed नदी, and stems ending in the root नी, producing
locative singular forms such as कुमार्याम् (< कुमारी 'girl'), and सेनान्याम् (<
सेना-नी 'army-leader'). Both rules have scope where the locative singular
termination ङि follows a stem ending in the feminine affix आ. The fact that
ङि is included within the domain of nominal terminations marked with ङ्
would imply that *A.* 7.3.116 takes precedence over *A.* 7.3.113 by simple
blocking. However, the fact that आप् is included within the domain of नदी,
आप्, नी, would imply that *A.* 7.3.113 takes precedence over *A.* 7.3.116 by
simple blocking. The two implications are contradictory. Patañjali deter-
mines that the latter of the two rules takes precedence by virtue of the
principle stated in *A.* 1.4.2 that the latter of two rules takes precedence in
cases of conflict. *A.* 7.3.113 then applies after the application of *A.* 7.3.116.
Thereby the correct forms, such as the feminine locative singular खट्वायाम्
are obtained (< कट्वा-या-आम् (*A.* 7.3.113) < कट्वा-आम् (*A.* 7.3.116) <
कट्वा-ङि).

IV   Pūrvavipratiṣedha

The preceding sections have shown that the principle that the latter rule
takes precedence in cases of conflict provides a solution to a number of cases
of conflict. There is a problem, however, in determining the precedence of
conflicting rules by the principle of later occurrence stated in *A.* 1.4.2. There
are cases of conflict where the earlier rule must take precedence in order to
account for the proper forms. Consider the two rules *A.* 7.3.111 घेर्ङिति and
A. 7.1.73 इको ऽचि विभक्तौ (see Figure 5). *A.* 7.3.111 provides that the final
vowel of a stem termed घि is replaced by its corresponding गुण vowel before a
nominal termination marked with ङ्. *A.* 7.1.73 provides that the last vowel
of a neuter stem that ends in a simple vowel other than अ and is followed by
a vowel-initial nominal termination receives the augment न्. *A.* 7.3.111 has
as its exclusive domain masculine stems (except सखि, and uncompounded
पति under certain circumstances; see *A.* 1.4.7–9), and feminine stems not
termed नदी, ending in इ, or उ followed by any of the singular nominal
terminations of the 4th–7th triplets, that is, ङे, ङसि, ङस्, or ङि. *A.* 7.1.73
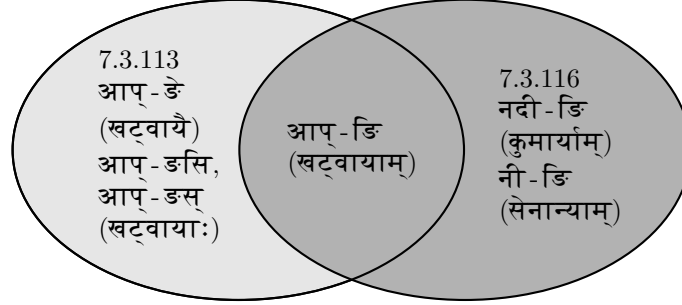
Figure 4: Overlapping domains. Example 3

7.3.113 याडापः (ङिति 111). After a stem ending in the feminine affixes आप् (i.e. टाप् 4.1.4, डाप् 4.1.13, चाप् 4.1.74), a nominal termination marked with ङ् receives the initial augment याट्. 7.3.116 डेराम्नद्याम्नीभ्यः. After a stem termed नदी (1.4.3–6), the feminine affixes आप् (i.e. टाप् 4.1.4, डाप् 4.1.13, चाप् 4.1.74), or a nominal stem ending in the root नी, the singular seventh triplet nominal termination ङि is replaced by आम्. 7.3.113 domain: आप्-ङे, आप्-ङसि, आप्-ङस्, आप्-ङि. 7.3.116 domain: नदी-ङि, आप्-ङि, नी-ङि. 7.3.113 exclusive domain: आप्-ङे, आप्-ङसि, आप्-ङस् (खट्वायै f4s, खट्वायाः f5/6s). 7.3.116 exclusive domain: नदी-ङि, नी-ङि (कुमार्याम्, सेनान्याम् f7s). Shared domain: आप्-ङि (खट्वायाम् f7s).

has as its exclusive domain neuter stems ending in ऋ followed by the vowel-initial nominal terminations of the nominative and accusative dual ई, and genitive and ablative dual ओस्.[1] The overlapping domain of the two rules is neuter stems ending in इ or उ termed घि, followed by any of the singular nominal terminations of the 4th–7th triplets, i.e. ङे, ङसि, ङस्, or ङि. As shown in Figure 5, neither domain is wholly included within the other. The fact that nominal terminations marked with ङ् (ङित्) are included among the referents of the term विभक्ति and the fact that the referents of the term घि are included among stems ending in इ and उ both imply that *A. 7.3.111* has the narrower domain and blocks *A. 7.1.73*. Conversely, neuter stems are included among stems of any gender, implying that *A. 7.1.73* has the narrower domain and blocks *A. 7.3.111*. There is no criterion to determine which of the two rules takes precedence by simple blocking. To account for the desired forms, for example the neuter dative singulars त्रपुणे (< त्रपु 'tin' + ङे) and जतुने (< जतु 'lac' + ङे), the rule providing the augment न् (*A. 7.1.73*) must apply, not the rule providing guṇa (*A. 7.3.111*). The earlier rule must take precedence, not the later rule. Therefore one cannot invoke the principle stated in *A. 1.4.2* that the later rule takes precedence over the former to resolve the conflict.

V   The desired operation takes precedence

In such cases, where the earlier of two conflicting rules must apply, the initial solution proposed in the *Mahābhāṣya* is to state that the opposite principle to *A. 1.4.2* applies in those cases. Kātyāyana states that the augment नुम् occurs in precedence over guṇa in cases such as Example 4 [Figure 5] by virtue of the principle that the prior rule applies in cases of conflict. (गुणवृद्ध्यौत्त्वतृज्वद्भावेभ्यो नुम्पूर्वविप्रतिषिद्धम् *A. 7.1.96 vt. 10*, MBh. 3.275.23.)

Patañjali specifically adduces examples illustrating Example 4. First he describes the exclusive domain of *A. 7.3.111* and *A. 7.1.73*, and their overlapping domain. In that case, he states, the exclusive domain of guṇa (*A. 7.3.111*) is the dative through locative singular of इ-final and उ-final stems termed घि such as the masculine dative singulars अग्नये (< अग्नि 'fire' + ङे) and वायवे (< वायु 'wind' + ङे). The exclusive domain of the augment नुम् is the nominative/accusative duals of neuter stems such as त्रपुणी (< त्रपु 'tin' + ई) and जतुनी (< जतु 'lac' + ई). Both rules obtain in the dative through

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[1]The singular third-triplet termination आ is replaced by the न्-initial ना by *A. 7.3.120*; the plural sixth-triplet termination gets an initial augment न् (नुट्) by *A. 7.1.54–57*; the neuter nominative, vocative, and accusative plural stem (preceding the सर्वनामस्थान termination शि) gets the augment नुम् already by *A. 7.1.72*.
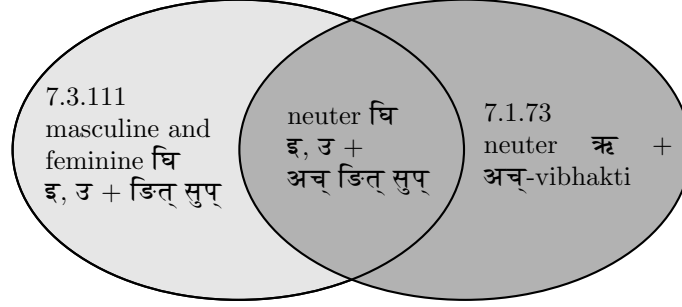
Figure 5: Overlapping domains.
Example 4: Earlier rule takes precedence over later rule.

7.3.111 घेर्ङिति (गुणः 108). Followed by a nominal termination marked with ङ्, the final vowel of a stem termed घि is replaced by its corresponding गुण vowel. 7.1.73 इको ऽचि विभक्तौ (नपुँसकस्य 72, नुम् 58). Followed by a vowel-initial nominal termination, the last vowel of a neuter stem ending in a vowel in the pratyāhāra इक् receives the augment न् (नुम्). 7.3.111 domain: masculine, feminine, and neuter stems ending in इ or उ that are termed घि + ङित् (4–7s) सुप्. 7.1.73 domain: neuter stems in इ, उ, ऋ + अच् vibhakti. 7.3.111 exclusive domain: masculine and feminine इ and उ stems termed घि + ङित् (4–7s) सुप्. 7.1.73 exclusive domain: neuter ऋ + अच्-initial vibhakti. Shared domain: neuter stems ending in इ, उ termed घि + अच्-initial ङित् (4–7s) सुप्.

locative singular of neuter stems such as त्रपुणे (< त्रपु + ङे) and जतुने (< जतु + ङे). (गुणवृद्ध्यौत्त्वतृज्वद्भावेभ्यो नुम्भवति पूर्वविप्रतिषेधेन॥ तत्र गुणस्यावकाशः — अग्नये वायवे। नुमो ऽवकाशः — त्रपुणी जतुनी। इहोभयं प्राप्नोति — त्रपुणे जतुने॥ MBh. 3.275.24–25.) As shown in the examples of the overlapping domain त्रपुणे and जतुने, the augment नुम् provided by the earlier of the two rules, namely *A.* 7.1.73, takes precedence.

To justify the prior rule taking precedence, Patañjali states that in the section of rules governed by the heading *A.* 6.4.1 अङ्गस्य, that is, the fourth pāda of adhyāya six through the end of the seventh adhyāya, the prior of two conflicting rules takes precedence. It is objected that there are conflicting rules in that section, where the latter rule must apply to account for proper forms. Witness examples 2–3 (figures 3–4). In addition, to state such a principle would require emending *A.* 1.4.2. (विप्रतिषेधे परमित्युक्ताङ्गाधिकारे पूर्वमिति वक्तव्यम्। किं कृतं भवति। पूर्वविप्रतिषेधा न पठितव्या भवन्ति। गुणवृद्ध्यौत्त्वतृज्वद्भावेभ्यो नुम्पूर्वविप्रतिषिद्धम्। नुमचिरतृज्वद्भावेभ्यो नुडिति। कथं ये परविप्रतिषेधाः। इत्वोत्वाभ्यां गुणवृद्धी भवतो विप्रतिषेधेनेति। सूत्रं च भिद्यते॥ MBh. 1.306.1–4.)

Patañjali concludes that everything is in order even with the sūtra left as it is. Among the many meanings of the term पर is the meaning *desired* (इष्टवाची परशब्दः) such as in the phrase, "Gone to the supreme abode" (परं धाम गतः), and it is the term पर having that meaning that is used in *A.* 1.4.2 (तस्येदं ग्रहणम्). The meaning of *A.* 1.4.2 is therefore that the rule which is supreme, that is, which is desired, takes precedence where there is conflict between rules with overlapping domains (विप्रतिषेधे परं यदिष्टं तद्भवति). (यथान्यासमेवास्तु। कथं ये पूर्वविप्रतिषेधाः। विप्रतिषेधे परमित्येव सिद्धम्। कथम्। परशब्दो ऽयं बह्वर्थः। ... अस्तीष्टवाची परशब्दः। तद्यथा। परं धाम गत इति। इष्टं धामेति गम्यते। तद्य इष्टवाची परशब्दस्तस्येदं ग्रहणम्। विप्रतिषेधे परं यदिष्टं तद्भवति॥ MBh. 1.306.4–10.) That Patañjali's final conclusion is that the desired rule applies in cases of conflict is shown by its frequent invocation. Patañjali repeats his interpretation that the term पर in *A.* 1.4.2 विप्रतिषेधे परं कार्यम् means *desired* (इष्ट) rather than *subsequent* (MBh. 1.46.14, etc.) and his assertion that in cases of conflict the desired rule applies (MBh. 1.46.15, etc.) in numerous discussions in the *Mahābhāṣya*.

Cardona (1976: 189–191) and other scholars do not accept Patañjali's interpretation of the term पर, nor do they accept his extension of the scope of *A.* 1.4.2 to the whole grammar. They consider that the scope of *A.* 1.4.2 is limited to the section of rules headed by *A.* 1.4.1 आ कडारादेका संज्ञा and ending with *A.* 2.2.38 कडाराः कर्मधारये. *A.* 1.4.2 determines that only the latter of two conflicting technical terms (संज्ञा) applies in the fourth pāda of the first adhyāya and the first two पादs of the second अध्याय. *A.* 1.4.2 does not apply as a decision-making device concerning the precedence of

rules throughout the grammar. Nor is it desirable that there be a decision-making device that selects the preferred rule. Such a principle departs from a mechanistic procedure for determining the application of rules and relies rather on knowledge of the desired outcome of the generative grammar to determine rule ordering. Such a departure would be a shortcoming in the grammar. Cardona (1976: 191) states, "I think that such a procedure would weaken the grammar. .... I think this can and should be avoided. Cardona (1970a) has discussed how this can be done in the context of principles seen to operate in the *Aṣṭādhyāyī*." Indeed, if the grammar were meant to validate correct speech forms, it would be circular for knowledge of correct speech forms to be required in order to comprehend what the grammar provided.

VI Topicality

Cardona has sought other principles that might determine the ordering of rules in cases of conflict. He asserts (1997: 406) that "the rule concerning the narrower part of the overlapping domain blocks the other by what I call partial limited blocking." Kiparsky (1991) rejects limited blocking and denies that it is a principle accepted by Patañjali. In each of the four examples Cardona (1997: 406–409) provided — the same four examples discussed above and shown in figures 2–5 — a cursory distribution of rule conditions into domains appears to justify the application of the undesired rule equally as much as the desired one, just as Kiparsky objected. However, careful attention to the statement of the rules in question, the terms used, and their contexts does reveal means to determine the blocking relationship of overlapping domains without invoking the principle stated in *A.* 1.4.2 outside its proper scope. In particular, the terms used in the formulation of certain rules justifies domain inclusion within an overlapping domain and bears out the concept of limited blocking.

In the case of Example 1 (Figure 2), Kiparsky himself (1991: 358–359) proposes a solution that he calls 'collective blocking' rather than invoking the principal that the later rule takes precedence. Kiparsky's solution requires recognizing that *A.* 6.1.101 is wholly included within the combined domains of two rules, *A.* 6.1.77–78. Because of this total inclusion, in order to have scope, *A.* 6.1.101 must take precedence over both. It therefore takes precedence over each. As shown in Figure 1, *A.* 6.1.87 states that the sequence of a short or long अ and a following vowel is replaced by the single closest गुण vowel. *A.* 6.1.88 states an exception to *A.* 6.1.87. It states that the sequence of a short or long अ and a following ए, ओ, ऐ, or औ is replaced by the single closest वृद्धि vowel. By simple blocking, *A.* 6.1.87 has its scope limited to the sequence of a short or long अ and a following simple
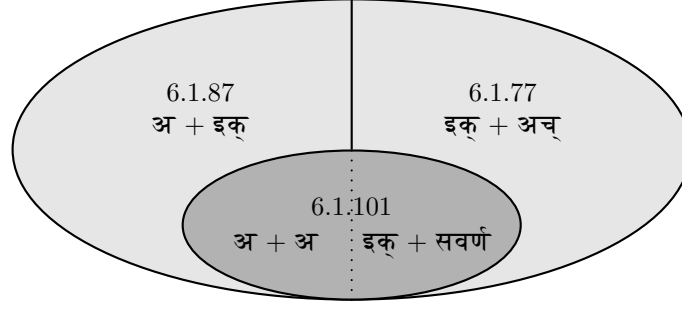
Figure 6: Solution to Example 1

(cf. Figure 2. See Cardona 1997: 406; Kiparsky 1991: 358–359.) 6.1.77
इको यणचि has domain: इक् + अच्. 6.1.87 आद्गुणः has domain: अ + अक्.
6.1.78 एचो ऽयवायावः has domain: एच् + अच्. 6.1.88 वृद्धिरेचि has domain:
अ + एच्. The domains of the four rules constitute the combined domain
अच् + अच्. Considering rules in pairs, अ + अ in 6.1.101 is an exception
to 6.1.87 leaving it with the scope अ + इक्. इक् + सवर्ण इक् in 6.1.101 is
an exception to 6.1.77. Alternatively, 6.1.101 has domain अक् + सवर्ण अक्,
which is an exception to the combined domains of the two rules 6.1.77 and
6.1.87.

vowel. The combined domains of application of the four rules *A.* 6.1.77–78,
87–88 constitute the conjunction of two vowels. The combined domains of
the two rules *A.* 6.1.77, 87 constitute the domain of a simple vowel fol-
lowed by a vowel. *A.* 6.1.101 is an exception to this combined domain. The
conjunction of short or long अ with short or long अ is a subset of the con-
junction of short or long अ with any vowel so that part of the domain of
A. 6.1.101 is wholly included within the domain of *A.* 6.1.87. Similarly, the
conjunction of a simple vowel other than short or long अ with a following
like simple vowel is a subset of the domain of the conjunction of a simple
vowel other than short or long अ with any vowel, so the other part of the
domain of *A.* 6.1.101 is wholly included within the domain of *A.* 6.1.77. *A.*
6.1.101 is therefore an exception to the combined domains of *A.* 6.1.77, 87.
(See Figure 6.) Patañjali states under *A.* 6.1.102 vt. 3 that *A.* 6.1.77 and
A. 6.1.87 (आद्गुणयणादेशौ) are general rules (उत्सर्गौ) and that, among oth-
ers, *A.* 6.1.101 providing सवर्णदीर्घ is an exception to them. (*A.* 6.1.102 vt.
3 आद्गुणयणादेशयोरपवादा वृद्धिसवर्णदीर्घपूर्वसवर्णादेशास्तेषां पररूपं स्वरसन्धिषु
MBh. 3.79.1–2. आद्गुणयणादेशावुत्सर्गौ । तयोरपवदा वृद्धिसवर्णदीर्घपूर्वसवर्णादेशाः ।
MBh. 3.79.3.)

Kiparsky's solution requires examining the domain structure of all rules pertaining to a domain together in order to determine blocking relationships. He does not propose solutions to the other cases considered in this paper. Cardona prefers to consider the blocking relation between two rules at a time. He treats *A.* 6.1.101 as an exception to *A.* 6.1.77 and to *A.* 6.1.87 individually.[2] Rather than simply examining the ultimate referents of terms stated in सूत्रs in a set-theoretic framework to determine what constitutes the domain of each rule, a more nuanced approach is required.

First, let us consider the terms used to describe elements within the conflicting domain in their contexts and make a judgement concerning the topic of Pāṇini's description. Terms in earlier sūtras in a single context determine the topic. Terms introduced in later sūtras in the same context specify additional restrictions. The order is therefore significant, in spite of the fact that rule *A.* 1.4.2 is not allowed to apply outside its proper scope. Although later rules may include some terms that have broader reference than some others, if they are still governed by the same topic of other terms, the new broader terms do not change the topic. With respect to the shared domain, the earlier terms with narrower reference do not serve to limit the scope of the terms introduced later. The later rules therefore constitute exceptions to the earlier rules in the shared domain, but not vice versa. In the case of *A.* 6.1.77 and *A.* 6.1.101, the term अचि in the former rule opens the topic by stating the broader domain. The term सवर्णे in the latter rule qualifies the term अचि and therefore states an additional restriction. Although the term अक् refers to a broader context than the term इक् does, it does not change the topic. The fact that the term सवर्ण restricts अच् therefore determines that *A.* 6.1.101 is an exception to *A.* 6.1.77. The case of conflict of the two rules *A.* 6.1.87 and *A.* 6.1.101 is similar.

The topical approach to determining the precedence of rule application just sketched in regard to *A.* 6.1.77 or *A.* 6.1.87 and *A.* 6.1.101 works where the two conflicting rules occur in close contiguity in the same section, where a term at the beginning of that section determines the topic common to the two conflicting rules, and where it is the latter rule that is desired to take precedence. Such is the case for Example 2 (Figure 3) and for Example 3 (Figure 4). In Example 2, *A.* 7.3.101 अतो दीर्घो यञि determines the topic of the section with the terms अतः 'in place of the final sound of a stem ending in short अ', and यञि 'before a sound in the pratyāhāra यञ्'. The term सुपि in *A.* 7.3.102 सुपि च limits this context to nominal terminations that begin

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with यञ्. The terms झलि and बहुवचने in *A.* 7.3.103 बहुवचने झल्येत् further limit this context to a nominal termination beginning with झ् or भ् in the plural, namely to the termination भ्यस्. Although the scope of the terms झल् and बहुवचन include the termination सु not included within the scope of the term यञ्, the terms do not change the topic; the fact that the scope of its reference includes sounds within the domain of the term यञ् makes *A.* 7.3.103 an exception to *A.* 7.3.102 within the domain common to the two rules.

In Example 3, The term ङित् 'an affix marked with ङ्' in *A.* 7.3.111 घेर्ङिति determines that the topic of the section is the singular dative through locative terminations. The term recurs in *A.* 7.3.113 याडापः (ङिति 111). The term ङि in *A.* 7.3.116 डेराम्नद्याम्नीभ्यः refers to just one of these affixes, the locative. The fact that ङि in *A.* 7.3.116 is an added term that narrows the domain dictates that the later rule constitutes an exception to the earlier one. The fact that the term नद्याम्नी in *A.* 7.3.116 is broader than the term आप् in *A.* 7.3.113 does not reverse rule precedence because it is not the topic.

The topical solution works for other cases in which two rules have overlapping domains as well. These include *A.* 3.1.97 अचो यत् and *A.* 3.1.124 ऋहलोर्ण्यत् where the term अच् in the former determines the topic, *A.* 6.1.97 अतो गुणे and *A.* 6.1.102 प्रथमयोः पूर्वसवर्णः where the term अच् in *A.* 6.1.77 determines the topic, *A.* 6.4.144 नस्तद्धिते and *A.* 6.4.155 टेः where the term तद्धिते in *A.* 6.4.144 determines the topic, etc.

The topical solution has some complications, however. The criteria for determining the topic are not clear. What makes the subsequent context a more suitable topic than the preceding context in Example 1 (figures 2 and 6)? How can the term यञ् in *A.* 7.3.102 determine the topic of *A.* 7.3.103 when the term झल् in the latter is not included within its scope? The determination of inclusion is likewise not clear where several limiting terms occur together in a sūtra, often in compounds. Is there significance to considering the scope of terms individually? The scope of ऋहल् in *A.* 3.1.124, for example, is not wholly included within the scope of the term अच् in *A.* 3.1.97; the scope of ऋ is. What justifies selecting अच् as the topic when हल् is not included within that topic but the sūtra in which it occurs is yet included within the section? Furthermore, if topic were determined by terms in preceding sūtras, topicality would be able to determine rule precedence only in cases where later rules take precedence over earlier rules; not in cases such as Example 4 (Figure 5) where an earlier rule takes precedence over a later rule. The principle would achieve no more than the extension of the विप्रतिषेध principle stated in *A.* 1.4.2 to the whole grammar.

Instead of determining domain inclusion on the basis of a topic stated at the beginning of a section of rules, selection of the domains to compare may
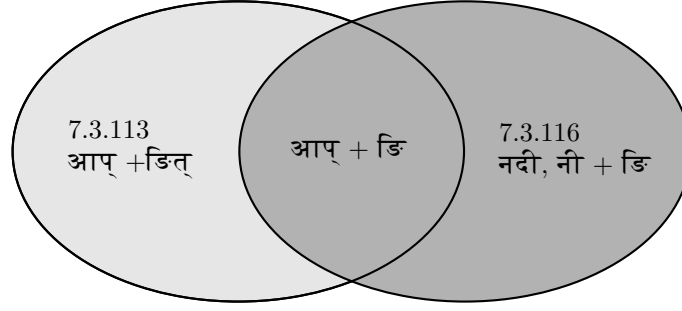
Figure 7: Solution to Example 3

(Cf. Figure 4. See Cardona 1997: 409 "limited blocking".) 7.3.116 डेराम्नद्याम्नीभ्यः takes precedence over 7.3.113 याडापः (ङिति 111) because the scope of 7.3.116, defined by the term ङि, is a limitation of the domain of 7.3.113 (ङे, ङसि, ङस्, ङि) defined by the term ङित्.

be determined by the terms used to describe the overlapping domains. It appears to be necessary to determine the overlapping domain and then to examine just the terms used to describe that domain. Considering compound elements as separate terms, the broader term is then selected as designating the more general scope; the narrower term then states the exception, and the rule that includes the term with the narrower scope takes precedence in the shared domain. This procedure justifies setting the compound element हल् aside in *A.* 3.1.124, comparing the scope of the two terms ऋ and अच्, and selecting the latter as the topic without reference to the order of the rules. Similarly, regarding the solution to Example 3 (see Figure 7; cf. Figure 4) this procedure justifies breaking up the compound नदी-आप्-नी in *A.* 7.3.116, considering just the term आप् in the rule since it alone describes the domain that overlaps with that of *A.* 7.3.113, selecting the term ङि in *A.* 7.3.116 for comparison with the term ङित् in *A.* 7.3.113, and determining general scope and domain inclusion on the basis of that comparison. Since the terms नदी and नी are irrelevant to the shared domain and the term आप् is common to both rules, these terms are not pertinent to determining precedence of rule application on the basis of domain inclusion. *A.* 7.3.116 takes precedence because the term ङि has narrower scope wholly included within the scope of the term ङित् in *A.* 7.3.113.

VII   Specificity hierarchy

As was stated above, the approach of determining the precedence in rule application by examining the topic of a section leads to proper results where the two conflicting rules occur in close contiguity in the same section, where a term at the beginning of that section determines the topic common to the two conflicting rules, and where it is the latter rule that is desired to take precedence. However, this solution does not work where the former rule is desired to apply. There are likewise difficulties with the approach of determining precedence in rule application just by considering the scope of terms that describe the overlapping domain of two conflicting rules. These difficulties arise where the relation of inclusion does not hold between the scope of terms in the conflicting rules, regardless of whether the two conflicting rules are in completely different sections or occur in close contiguity.

As an example of the circumstance in which consideration of the scope of terms alone will not succeed in determining a solution for rules in completely different sections, take Example 4 (Figure 5). The overlapping domain is neuter stems ending in इ or उ termed घि before vowel-initial nominal terminations marked with ङ्. The scopes of the terms घि and ङित् in *A.* 7.3.111 घेर् ङिति are wholly included within the scopes of the terms इक् and अच् विभक्ति respectively in *A.* 7.1.73 इको ऽचि विभक्तौ. The scope of the term नपुँसक, which recurs in *A.* 7.1.73 from *A.* 7.1.72 नपुँसकस्य झलचः, is neither wholly included within (see the discussion of the compound अतिसखि in the neuter below) nor wholly includes the scope of the term घि in *A.* 7.3.111. The scope of terms in one of the two rules is neither wholly included within nor wholly includes the scope of terms in the other.

It is sometimes the case that consideration of the scope of terms alone will not succeed in determining a solution for rules in close contiguity either. For example, the rules *A.* 7.1.70 उगिदचां सर्वनामस्थाने ऽधातोः and *A.* 7.1.72 नपुँसकस्य झलचः come into conflict because they have overlapping domains. *A.* 7.1.70 provides that a stem (other than a root) marked with उ, ऋ, or ऌ, and the root अन्च् receive the augment न् after their last vowel before a nominal termination termed सर्वनामस्थान. (The neuter plural termination शि that replaces the plural first and second triplet terminations in the neuter, and the first triplet and second triplet singular and dual terminations are termed सर्वनामस्थान by *A.* 1.1.42–43.) *A.* 7.1.72 provides that a neuter stem ending in a non-nasal stop or spirant or in a vowel receives the augment न् after its last vowel before a termination termed सर्वनामस्थान. As shown in Figure 8, neither domain is wholly included within the other; each rule has its exclusive domain. The former alone applies when a masculine stem is marked with उ, ऋ, or ऌ. The latter alone applies when a neuter stem is not so marked. Yet the domains overlap. Both have scope when a
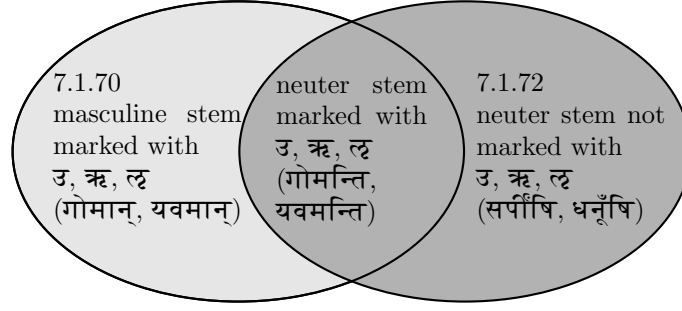
Figure 8: Overlapping domains. Example 5

7.1.70 उगिदचां सर्वनामस्थानेऽधातोः. A stem, other than a root, marked with उ, ऋ, or लृ, and the root अन्च् receive the augment नुम् before a nominal termination termed सर्वनामस्थान. 7.1.72 नपुँसकस्य झलचः. A neuter stem ending in a non-nasal stop or spirant or in a vowel receives the augment नुम् before a termination termed सर्वनामस्थान. 7.1.70 exclusive domain: masculine stem marked with उ, ऋ, लृ: गो-मत्, यव-मत् end in मतुप् marked with उ. 7.1.72 exclusive domain: neuter stem not so marked: सर्पिस्, धनुस्. Shared domain: neuter stem marked with उ, ऋ, लृ: श्र-ईयस् (5.3.60), भूयस्. The affix ईयसुन् is marked with उ.

neuter stem is marked with उ, ऋ, or लृ.

Kātyāyana and Patañjali count Example 5 as another case of conflict in which the latter rule takes precedence due to the application of *A.* 1.4.2. Vārttika 2 on *A.* 7.1.72 states, "It works because (the latter rule applies in cases) of conflict." (vt. 2 विप्रतिषेधात्सिद्धं MBh. 3.264.4.) Patañjali comments,

> It works because (the latter rule applies in cases) of conflict. In case of the conflict between the augment नुम् occurring because the stem terminates in a non-nasal stop or spirant, or because the stem is marked with उ, ऋ, or लृ, the augment will occur because the stem terminates in a non-nasal stop or spirant because (the latter rule applies in cases) of conflict. The scope of the augment due to the stem terminating in a non-nasal stop or spirant is, for example, सर्पींषि (< सर्पिस् 'ghee') and धनूँषि (< धनुस् 'a bow'). The scope of the augment due to the stem being marked with उ, ऋ, or लृ is, for example, गोमान् (< गोमत् 'possessing cattle') and यवमान् (< यवमत् 'possessing barley'). Both have scope here for example: गोमन्ति ब्राह्मणकुलानि 'Brahmin families

possessing cattle', यवमन्ति ब्राह्मणकुलानि 'Brahmin families pos-
sessing barley,' श्रेयाँसि (< श्रेयस् 'very splendid'), भूयाँसि (< भूयस्
'very abundant'). The augment will occur because the stem ter-
minates in a non-nasal stop or spirant. (विप्रतिषेधात्सिद्धमेतत्।
झल्लक्षणः क्रियतामुगिल्लक्षण इति झल्लक्षणो भविष्यति विप्रतिषेधेन।
झल्लक्षणस्यावकाशः — सर्पींषि धनूँषि। उगिल्लक्षणस्यावकाशः —
गोमान् यवमान्। इहोभयं प्राप्नोति। गोमन्ति ब्राह्मणकुलानि। यवमन्ति
ब्राह्मणकुलानि। श्रेयाँसि भूयाँसीति। झल्लक्षणो भविष्यति विप्रतिषेधेन॥
MBh. 3.264.5–8.)

Instead of resolving the conflict by applying the principle that the latter
rule takes precedence in cases of conflict, which does not apply universally,
one could attempt to resolve the conflict by determining which of the terms
that describes the shared domain has narrower scope as demonstrated above
regarding Example 3. Since only stems that end in non-nasal stops are
marked with उ, the term अच् in *A.* 7.1.72 is not relevant to the consideration
of the scope of terms that apply to the overlapping domain; the overlapping
domain includes only neuter stems marked with उ that end in non-nasal
stops. Yet the scope of the term उगित् in *A.* 7.1.70 is neither wholly included
within nor wholly includes the scope of the term नपुँसक, even limited to the
domain of the term झल् which it qualifies in *A.* 7.1.72. For there are stems
marked with उ that are not neuter (गोमान्), and there are neuter stems
ending in a non-nasal stop that are not marked with उ (सर्पींषि). The term
उगित् in *A.* 7.1.70 and the term नपुँसक, as a qualifier of the term झल् in *A.*
7.1.72, both refer to specific sets of stems that end in non-nasal stops. The
domains of the two terms intersect, yet neither is wholly included within the
other, so no clear criterion emerges to determine precedence in the shared
domain. Consideration of the scope of terms alone does not succeed in
determining rule precedence.

   Where the relation of total inclusion does not hold between the scope
of terms that describe the shared domain of conflicting rules, regardless
of whether the two conflicting rules occur in close contiguity or in different
contexts in the *Aṣṭādhyāyī*, a specificity ranking may help to determine rule
precedence. The scope of technical terms and qualifiers used to describe the
shared domain is still relevant in determining which of two rules that have
overlapping domains more specifically describes the overlapping region. Yet
an additional factor may be considered. In determining specificity of refer-
ence one may establish a hierarchy in which certain types of reference are
considered more specific than others. One possible scale of specificity is
from concrete to abstract. In linguistics, most concrete is phonetics. More
abstract is phonology: phonetic terms that depend on a greater degree of
phonological classification are more specific than phonetic terms that do

not. More concrete still is morphology: terms that describe contexts morphologically with reference to larger, fixed sequences of phonetic elements with functional or semantic properties, such as terms for stems and affixes, are more specific than terms that describe contexts purely phonetically. Finally more specific still are terms that describe contexts semantically, such as terms for gender and number. Within this hierarchy, clearly certain phonetic terms are more specific than other phonetic terms, certain morphological terms are more specific than other morphological terms, etc. The hierarchy of specificity therefore is

$$phonetic < phonological < morphological < semantic \qquad (1)$$

Specificity ranking could account for rule application correctly in examples 1 and 2 in section II and III above. In Example 1 (see Figure 2), the term सवर्ण in *A.* 6.1.101 is higher in specificity rank than the other terms in the two sūtras. Rules *A.* 6.1.77 and *A.* 6.1.101, which have overlapping domains, describe their domains exclusively in phonetic terms. Yet the latter rule describes the overlapping domain using the very specific phonological term सवर्ण 'belonging to the same class' in addition to the simpler phonetic terms अक् + अच्. *A.* 6.1.77 describes the overlapping domain simply in general phonetic terms: इक् + अच्. Although the phonetic term इक् in *A.* 6.1.77 is narrower than the phonetic term अक् in *A.* 6.1.101, the phonological term सवर्ण in the latter is more restrictive. The domain referred to does not consist merely of one set of sounds plus another independent set of sounds. It is restricted to abstract relations between the phonetic features of sounds in one set and the sounds in the other. Phonological abstraction is more restrictive than simple phonetics. Both rules apply within the phonetic domain of इक् + इक्; only the latter rule contains an additional restriction that the subsequent इक् be the same as the preceding इक्.

Specificity ranking similarly could account for rule application correctly in Example 2 as well (see Figure 9; cf. Figure 3). Both rules occur within the section headed by *A.* 6.4.1 अङ्गस्य and therefore deal with morphology: they both concern operations on stems (अङ्गस्य) followed by nominal terminations (सुपि). Yet most of the other terms that restrict which stems and affixes are involved are phonetic. The term अतः, stated in the first and recurring in the second, limits the domain of the rules to stems that are अ-final. The term यजि in the first rule limits its domain to contexts in which affixes begin with a sound in the pratyāhāra यञ्. The term झलि in the second rule similarly limits its scope to contexts in which affixes begin with a sound in the pratyāhāra झल्. Since the intersection of यञ् and झल् is the sounds झ् and भ्, and no nominal terminations begin with the former, just considering the intersection of the domains described by these terms, the overlapping domain is that in which a stem ending in अ is followed by
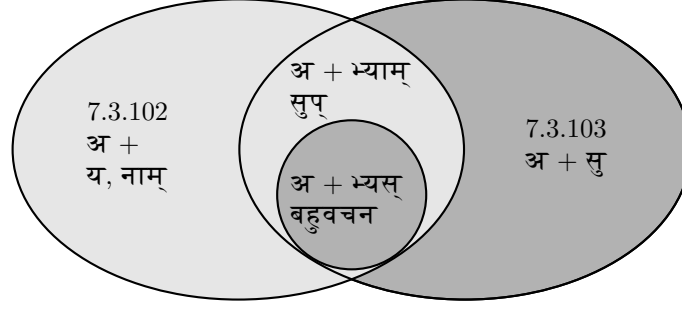
Figure 9: Solution to Example 2

(Cf. Figure 3. See Cardona 1997: 407.) 7.3.102 has domain य, नाम्, भ्याम् defined by the term यञ्. 7.3.103 has domain सु, भ्यस् defined by the term झल्. 7.3.102 exclusive domain: य, नाम्. 7.3.103 exclusive domain: सु. Shared domain: भ्याम्, भ्यस्. In the conflicting domain, बहुवचन (103) is wholly included within सुप् (102), so 103 takes precedence. Examination of the terms used, rather than simply the ultimate referents of the statements, justifies Cardona's description of the solution as domain inclusion within an overlapping domain.

a nominal termination beginning with भ्. Even without the term बहुवचने, the term झल् in *A.* 7.3.103 and the term यञ् in *A.* 7.3.101 constitute overlapping domains. The term बहुवचने in *A.* 7.3.103 is a semantic term that carves out a subdomain within the overlapping domain described by the other terms. Hence *A.* 7.3.103 takes precedence by virtue of having the narrower scope. The rule has narrower scope by virtue of the principle of the specificity ranking described above in (1).

Now let us consider the applicability of specificity ranking to the conflict of *A.* 7.1.70 and *A.* 7.1.72 (see Figure 10; cf. Figure 8). Although both rules occur in the section headed by *A.* 6.4.1 अङ्गस्य and therefore refer to stems followed by affixes, which are morphological elements, some of the terms used in these rules refer to these elements in phonetic terms. The terms झल् and अच् in the compound झलचः in *A.* 7.1.72 characterize stems subject to augmentation with नुम् most generally solely in phonetic terms. The terms उगित् and अच् in the compound उगिदचां in *A.* 7.1.70 characterize such stems more specifically in morphological terms. The term उगित् refers to stems formed with affixes marked with particular markers, and the term अच् refers to a particular verbal root.[3] Given the characterization of the stem provided by the phonetic and morphological terms झलचः in *A.* 7.1.72

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[3]The root is listed in *Mādhavīya Dhātuvṛtti* 595 (Shastri 1983: 221) with a

and उगिदचां in *A.* 7.1.70, the term नपुँसकस्य adds an additional restriction in the latter rule in semantic terms by reference to gender. If the latter rule did not have the term नपुँसकस्य, the scope of the former rule would be entirely included within the scope of the latter, since nominative stem-forming affixes marked with उ, ऋ, or लृ all end in non-nasal stops or spirants. The scope of the term उगित्, as well as the root अन्च्, in the former rule is included within the scope of the term झल् in the latter rule. (The root अन्च् restricts the augment नुम् to just this root in non-neuter forms. *A.* 7.1.71 allows it in the root युज् too when not in a compound.) Within the overlapping domain of the two rules, the added semantic term नपुँसकस्य in *A.* 7.1.72 constitutes an addition to a situation of domains already described in phonetic and morphological terms that resolves the conflict. Within the shared domain described in phonetic and morphological terms, नपुँसक states a semantic restriction higher on the specificity hierarchy so that *A.* 7.1.72 has the narrower domain. The rule with the narrower domain applies.

Sometimes where two rules occur in the same section it is the preceding rule that is desired to take precedence. For example (see Figure 11), *A.* 7.1.73 इको ऽचि विभक्तौ (see Figure 5) and *A.* 7.1.92 सख्युरसंबुद्धौ (सर्वनामस्थाने 86, णित् 90, अङ्गस्य 6.4.1) come into conflict, and it is *A.* 7.1.73 that is desired to take precedence. *A.* 7.1.92 provides that a termination termed सर्वनामस्थान following the stem सखि is marked with ण् except in the vocative singular. The domain of *A.* 7.1.73 is neuter stems (नपुँसकस्य) ending in इ, उ, or ऋ (इकः) followed by vowel-initial nominal terminations (अचि विभक्तौ). The domain of *A.* 7.1.92 is the stem सखि (सख्युः) followed by a nominal termination termed सर्वनामस्थान other than the vocative singular (असंबुद्धौ). The domains of the two rules overlap when सखि occurs in the neuter plural as in the compound अतिसखि in the phrase अतिसखीनि ब्राह्मणकुलानि (MBh. 3.275.26–276.1). To derive the desired forms, the augment नुम् provided by *A.* 7.1.73 must occur; not vṛddhi conditioned by marking with ण् brought about by *A.* 7.1.92. Now the topicality principle formulated in section VI would erroneously give *A.* 7.1.92 precedence over *A.* 7.1.73. The topic set by *A.* 7.1.72 is apparently narrowed by the term इक् in *A.* 7.1.73, to a neuter stem that ends in a vowel of the pratyāhāra इक्, namely, इ, उ, ऋ, or लृ. The term सख्युः in *A.* 7.1.92 limits the topic to a particular stem. Even though *A.* 7.1.92 applies to the stem सखि in the masculine and feminine as well, the broader scope of the term सखि does not change the topic. The topicality principle does not permit earlier terms with narrower reference to limit the scope of the terms introduced later. It does not permit the term

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penultimate nasal and marker उ, i.e. अन्चु; however, Sāyaṇa cites Maitreya's citation that some read the root अच: 'अचु इत्येके' इति मैत्रेयः. Kṣīrasvāmī's reading of a root अन्चि marked with इ is not accepted by others.
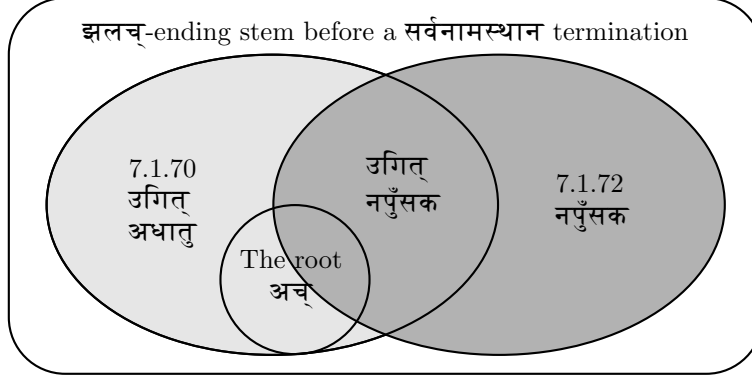
Figure 10: Solution to Example 5

(Cf. Figure 8.) The two rules occur within the section headed by *A.* 6.4.1 अङ्गस्य; hence they refer to morphological elements, namely stems. Yet, the term झलच् in *A.* 7.1.72 नपुँसकस्य झलचः specifies the universe in which the augment नुम् occurs in phonetic terms: a nominal stem ending in a non-nasal stop or vowel. The augment नुम् does not occur under any other conditions. Within this universe, the term सर्वनामस्थान in 7.1.70 उगिदचां सर्वनामस्थाने ऽधातोः recurs in 7.1.72; thereby it limits both rules to contexts in which a nominal termination so termed follows the stem. For consideration of the scope of these two rules, the term may be taken as part of the specification of the universe. The term उगित् in 7.1.70 limits the scope of the rule to stems marked with उ, ऋ, or ऌ or formed by the provision of affixes so marked. The root अच् is so marked. While the term अधातु in 7.1.70 limits the domain of the rule to stems that are not verbal roots, the term अच् in 7.1.70 excepts the root from the exclusion. All stems marked with उ, ऋ, or ऌ end in non-nasal stops, i.e. by sounds in the pratyāhāra झल् so that 7.1.70 falls entirely within the domain of 7.1.72 devoid of the term नपुँसक. The term नपुँसक in 7.1.72 stipulates a limitation that specifies the domain of 7.1.72. The gender term must be understood to be higher on the specificity scale to override the term उगित् in the shared domain of neuter stems marked with उ, ऋ, or ऌ.
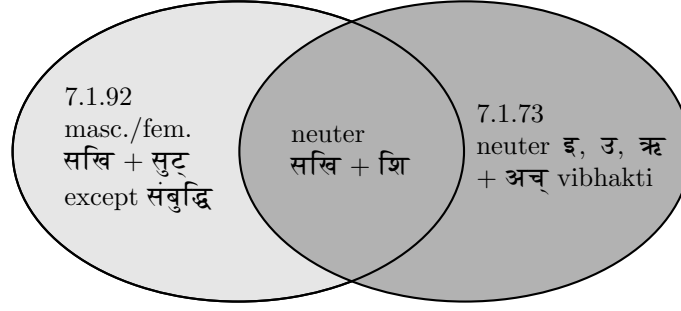
Figure 11: Example 6

7.1.73 इको ऽचि विभक्तौ (नपुँसकस्य 72, नुम् 58). Followed by a vowel-initial nominal termination, the last vowel of a neuter stem ending in a vowel in the pratyāhāra इक् receives the augment न् (नुम्). 7.1.92 सख्युरसंबुद्धौ (सर्वनामस्थाने 86, णित् 90, अङ्गस्य 6.4.1). A nominal termination termed सर्वनामस्थान following the stem सखि is marked with ण् except in the vocative singular. 7.1.73 domain: नपुँसक 'neuter' इ, उ, ऋ stems + अच् vibhakti. 7.1.92 domain: सखि in the masculine and feminine + a सर्वनामस्थान ending, i.e. a termination in the pratyāhāra सुट् (सु, औ, जस्, अम्, औट्), except vocative singular; सखि in the neuter + a सर्वनामस्थान ending, i.e. शि. 7.1.73 exclusive domain: (neuter इ, उ, and ऋ stems other than सखि) + अच् vibhakti. 7.1.92 exclusive domain: सखि in the masculine and feminine + a termination in the pratyāhāra सुट्, except vocative singular. Shared domain: neuter सखि + शि.

नपुँसक to limit the term सखि. Hence the principle would force *A.* 7.1.92 to take precedence over *A.* 7.1.73 undesirably. To produce the correct form, *A.* 7.1.73 must take precedence.

The specificity principle produces the correct results, as it does in the case of the conflict between *A.* 7.1.73 and *A.* 7.3.111 (see Figure 5, Example 4). There, the fact that the term नपुँसकस्य, which recurs from *A.* 7.1.72, is a semantic qualifier rather than a phonetic one makes *A.* 7.1.73 more specific than *A.* 7.3.111. Within the overlapping domain, one considers scope of the phonetic terms describing that domain first, then the morphological ones, then the semantic ones; more general qualifiers before more specific ones. Both rules concern morphological elements, namely stems with following affixes, not merely phonetic elements. Yet some of the terms used refer to items in phonetic terms. The terms इक् in *A.* 7.1.73 and घि in *A.* 7.3.111 refer to stems that terminate in certain vowels. The term घि specifies a narrower domain than the scope of the term इक्, since all stems termed घि
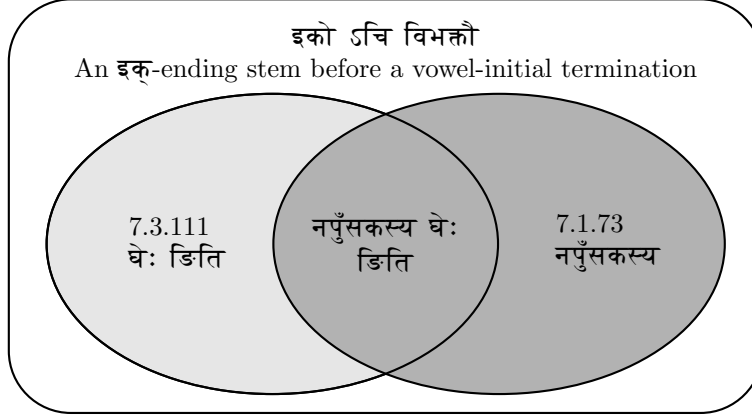
Figure 12: Specificity solution to Example 4

(Cf. Figure 5.) The two rules 7.1.73 इको ऽचि विभक्तौ (नपुँसकस्य 72, नुम् 58) and 7.3.111 घेर्ङिति (गुणः 108) occur within the section headed by *A.* 6.4.1 अङ्गस्य; hence they refer to morphological elements, namely stems. Yet, the terms इकः ऽचि विभक्तौ in 7.1.73 specify the universe in which the two rules apply in phonetic terms: a nominal stem ending in a vowel other than अ followed by a vowel-initial nominal termination. Neither rule applies under any other conditions. Within this universe, the terms घेः ङिति in 7.3.111 limit the scope of the rule to stems termed घि followed by nominal terminations marked with ङ्. Hence the domain of 7.3.111 falls entirely within the domain of 7.1.73 devoid of the term नपुँसक. The term नपुँसक, which recurs in 7.1.73 from 7.1.72, stipulates a limitation that specifies the domain of 7.1.73. The gender term must be understood to be higher on the specificity scale to override the term घि in the shared domain of neuter stems ending in इ or उ so that 7.1.73 takes precedence over 7.3.111.

end in the vowels इ and उ which are included within the pratyāhāra इक्. The terms ङिति in *A.* 7.3.111 and विभक्ति in *A.* 7.1.73 are morphological terms. The term ङिति specifies a narrower domain than, and is wholly included within, the domain specified by अच् विभक्ति, since all four nominal terminations marked with ङ् are vowel-initial. Now the term नपुँसक 'neuter' in *A.* 7.1.73, a semantic term, carves out a subdomain within the domain specified by the phonetic term घि in *A.* 7.3.111. Hence *A.* 7.1.73 describes the more specific domain and is the exception that takes precedence in the overlapping domain, as shown in Figure 12.

Similarly, in the case of conflict between *A.* 7.1.73 इको ऽचि विभक्तौ and *A.* 7.1.92 सख्युरसंबुद्धौ (see Figure 11, Example 6), the morphological term

नपुँसक 'neuter' in *A. 7.1.73* must be understood to carve out a subdomain within the domain specified by other terms. The two rules occur within the section headed by *A. 6.4.1* अङ्गस्य; hence the rule refers to morphological elements: inflectional terminations after stems. Nevertheless, इकः अचि in *A. 7.1.73* specifies the domain in phonetic terms: a nominal stem ending in a vowel in the pratyāhāra इक् before an affix beginning with a vowel. The morphological terms सख्युः असंबुद्धौ in *A. 7.1.92* with सर्वनामस्थाने read in from *A. 7.1.86* specify the domain of the stem सखि followed by a nominal termination termed सर्वनामस्थान other than the vocative singular (असंबुद्धौ). The common domain specified by these terms is the nominal stem सखि followed by vowel-initial terminations termed सर्वनामस्थान, i.e. the dual and plural of the first triplet, and the dual of the second triplet in the masculine and feminine, and the plural of the first two triplets in the neuter. The morphological term नपुँसक in *A. 7.1.73* now specifies a subdomain within that common domain consisting of the stem सखि in the neuter followed by शि, the neuter nominative, vocative, accusative plural termination. In order for *A. 7.1.92* to take precedence over *A. 7.1.73*, the term नपुँसख in the *A. 7.1.73* must limit the domain already specified by the other terms; it must be considered a more specific qualifier than morphological terms such as अङ्ग 'stem' and विभक्ति 'affix', even more specific than terms for particular stems such as सखि, as shown in Figure 13.

In order to account for proper rule precedence in the preceding examples the specificity hierarchy must explicitly rank semantic qualifiers such as number and gender as more specific than morphological qualifiers. The specificity ranking that places semantics at the top of the scale more specific than morphological qualifiers correctly resolves rule conflicts in a number of other cases besides between *A. 7.1.73* and *A. 7.3.111*, and between *A. 7.1.73* and *A. 7.1.92* where it is desired that the preceding rule take precedence. For example, it correctly gives priority to the preceding rule in the conflict between *A. 7.1.73* and *A. 7.1.97* विभाषा तृतीयादिष्वचि and between *A. 7.1.73* and *A. 7.3.119* अच्च घेः (which are not dealt with in the present paper). The resolution of these conflicts by virtue of ranking gender at the top of the specificity hierarchy agrees with the resolution specified by Kātyāyana in vārttika 10 under *A. 7.1.95–96*: गुणवृद्ध्यौत्त्वतृज्वद्भावेभ्यो नुम्पूर्वविप्रतिषिद्धम् (MBh. 3.295.23–296.5).

VIII   Yena nāprāpte

Three principles of determining domain specificity have been articulated in order to determine rule precedence in overlapping domains. In section VI, the topicality principle was introduced according to which terms in earlier rules declare the topic of the section that terms in later rules specify; later
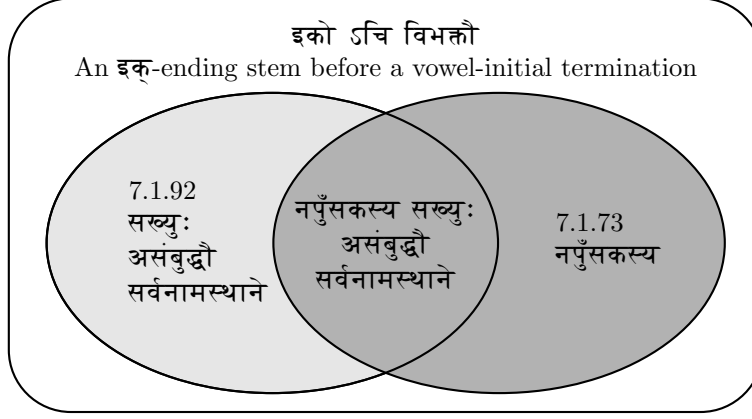
Figure 13: Specificity solution to Example 6

(Cf. Figure 11.) The two rules 7.1.73 इको ऽचि विभक्तौ (नपुँसकस्य 72, नुम् 58) and 7.1.92 सख्युरसंबुद्धौ (सर्वनामस्थाने 86, णित् 90) occur within the section headed by 6.4.1 अङ्गस्य, and 7.1.73 includes the term विभक्तौ; hence the two rules refer to morphological elements, namely a stem followed by a nominal termination. Yet, the terms इकः ऽचि in 7.1.73 specify the universe in which the two rules apply in phonetic terms so that the rules apply to a nominal stem ending in a vowel other than अ followed by a vowel-initial nominal termination. Neither rule applies under any other conditions. Within this universe, the terms सख्युः असंबुद्धौ in 7.1.92, and सर्वनामस्थाने which recurs in it, limit the scope of the rule to the stem सखि followed by nominal terminations termed सर्वनामस्थान other than the vocative singular. Hence the domain of 7.1.92 falls entirely within the domain of 7.1.73 devoid of the term नपुँसकस्य. The term नपुँसक, which recurs in 7.1.73 from 7.1.72, stipulates a limitation that specifies the domain of 7.1.73. The gender term must be understood to be higher on the specificity scale to override the terms सख्युः असंबुद्धौ सर्वनामस्थाने in the shared domain of the stem सखि followed by the neuter nominative/vocative/accusative plural nominal termination शि so that 7.1.73 takes precedence over 7.1.92.

rules therefore constitute exceptions to earlier rules in the same section. Later in section VI, the principle was introduced according to which rules in which terms that describe the shared domain more narrowly take precedence. This principle operates regardless of the order of the conflicting rules. Then in section VII, the specificity ranking was introduced, whereby semantic qualifiers such as gender are more specific than morphological qualifiers, which are more specific than phonological qualifiers, which are more specific than simple phonetics. None of these three principles succeeds by itself to resolve all of the cases of rule conflict in overlapping domains.

The specificity ranking described in section VII does not resolve rule conflict correctly in all circumstances. The specificity ranking that places gender at the top of the scale more specific than morphological qualifiers fails to resolve rule conflict correctly between *A.* 7.1.54 ह्रस्वनद्यापो नुट् (आमि 52) and *A.* 7.1.73 (see Figure 14). The earlier rule must take precedence even though the latter rule includes the term नपुँसक. *A.* 7.1.54 provides that the initial augment न् (नुट्) is attached to the plural sixth triplet nominal termination आम् after stems ending in a short vowel (ह्रस्व), after feminine stems ending in the long vowels ई and ऊ termed नदी (which they are optionally before आम् by *A.* 1.4.5 वामि), and after stems ending in the feminine affix आप्. *A.* 7.1.73 इको ऽचि विभक्तौ (नपुँसकस्य 72, नुम् 58) provides that the last vowel of a neuter stem ending in a vowel in the pratyāhāra इक् receives the augment न् (नुम्) when followed by a vowel-initial nominal termination. Both rules occur in the section headed by *A.* 6.4.1 अङ्गस्य, so they apply to morphological elements, namely to stems and affixes. Yet some of the terms that describe these elements are phonetic. The term इक् in *A.* 7.1.73 is a more specific phonetic term than ह्रस्व in *A.* 7.1.54. Conversely the morphological reference to the specific termination आम् that recurs in *A.* 7.1.54 is more specific than the reference to a nominal termination (विभक्ति) in phonetic terms as beginning with a vowel (अच्) in *A.* 7.1.73. Without consideration of the gender term नपुँसक in *A.* 7.1.73, the specification of the particular morphological termination आम् would carve out the more specific domain making *A.* 7.1.54 an exception to *A.* 7.1.73 by virtue of the specificity hierarchy. However, if gender ranks higher in the specificity hierarchy than morphological references as determined in section VII, then *A.* 7.1.73 would incorrectly take precedence. In this case one must consider that the stem is the topic. After neuter stems in इ, उ, ऋ, the specific morphological reference to the nominal termination आम् specifies a narrower domain than the phonetic term अच् that refers to any vowel-initial nominal termination. Similarly designating particular stems as the topic and allowing the specific reference to the termination to determine the more specific domain is required to obtain correct results in determining rule precedence between *A.* 7.1.54 and *A.* 7.1.97 विभाषा तृतीयादिष्वचि (तृज्वत् क्रोष्टुः 95), and between

A. 7.1.54 and *A.* 7.2.100 अचि र ऋतः (विभक्तौ 84).[4] Otherwise criteria are lacking to give preference to specificity of the termination over specificity of the stem.

The specificity hierarchy similarly does not correctly resolve rule conflict between *A.* 6.1.89 एत्येधत्यूठसु (आत् 87, वृद्धिः एचि 88) and *A.* 6.1.95 ओमाङोश्च (आत् 87, पररूपम् 94). *A.* 6.1.89 provides that the sequence of a preceding short or long अ and the following ए belonging to the roots इ or एध्, as well as ऊठ् (a replacement for व् provided by *A.* 6.4.19–20), is replaced by the single vṛddhi sound corresponding to the latter. *A.* 6.1.95 provides that the sequence of a preceding short or long अ and an ए or ओ of the following word ओम् or preverb आ (the latter combined with a vowel इ or उ to yield ए or ओ) is replaced by the latter form alone. Both rules specify short or long अ as the preceding phonetic context. The following context in the domain of the former rule is one of the roots इ or एध्, or the replacement ऊठ्. The following context in the domain of the latter rule is the word ओम् or the preverb आ. The shared domain is where a short or long अ is followed by the preverb आ combined with the initial vowel इ in a form of the root इ. Both rules specify the overlapping domain specifically by mentioning a particular morphological form. The former rule mentions the root इ; the latter rule mentions the preverb आ. The specificity hierarchy described in section VII does not provide criteria to determine rule precedence. Given प्र + एतः (< प्र + [आ + इतः]), one can equally well argue that the specific mention of आ by *A.* 6.1.95 is an exception to प्र + forms of the root इ provided by *A.* 6.1.89 as one can argue that the specific mention of the root इ by *A.* 6.1.89 is an exception to प्र + आ combined with a following इ or उ provided by *A.* 6.1.95.

It does not appear to be possible to settle the question of rule precedence considering just the two rules in question *A.* 6.1.89 and *A.* 6.1.95 ओमाङोश्च. One must consider the relationships of the rules with other rules in related contexts. Vāmana, in the *Kāśikā* under *A.* 6.1.89, states that in the context where the roots इ and एध् follow a short or long vowel अ, the rule is an exception to *A.* 6.1.94 एङि पररूपम् (एत्येधत्योः तु एङि पररूपापवादः). The latter rule provides that the sequence of a short or long अ followed by any vowel ए or ओ is replaced by the single replacement consisting of the following vowel alone. The mention of the particular roots इ and एध् in *A.* 6.1.89 clearly specifies a subset of the domain specified by the phonetic term एङ्. Now if *A.* 6.1.89 had not been stated, there would be no reason to state *A.* 6.1.95 because *A.* 6.1.94 would already achieve the desired result. It is therefore only because *A.* 6.1.89 would undesireably obtain that *A.* 6.1.95 is stated. Therefore *A.* 6.1.95 is the exception to *A.* 6.1.89 and not vice versa.

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[4]not dealt with in the present paper; see MBh. 3.276.6–12.

ह्रस्वनद्यापः अचि विभक्तौ
short vowel-final and ई-, ऊ-, and आप्-final feminine stem
+ vowel-initial termination
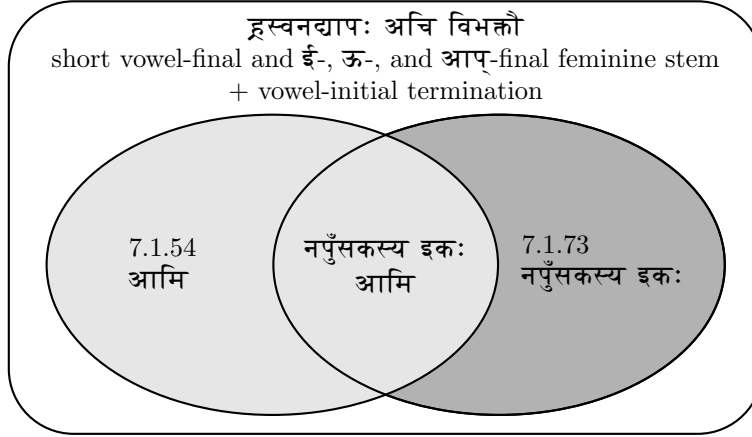
7.1.54
आमि

नपुँसकस्य इकः
आमि

7.1.73
नपुँसकस्य इकः

Figure 14: Example 7

(Cf. Figure 11.) The two rules 7.1.54 ह्रस्वनद्यापो नुट् (आमि 52) and 7.1.73 इको ऽचि विभक्तौ (नपुँसकस्य 72, नुम् 58) occur within the section headed by 6.4.1 अङ्गस्य; hence they refer to morphological elements, namely stems. The terms ह्रस्वनद्यापः in 7.1.54 and अचि विभक्तौ in 7.1.73 specify the universe in which the two rules apply in a mixture of phonetic and morphological terms: stems ending in a short vowel (ह्रस्व), feminine stems ending in the long vowels ई and ऊ termed नदी, and stems ending in the feminine affix आप् followed by a vowel-initial nominal termination. Neither rule applies under any other conditions. Within this universe, the phonetic term इक् in 7.1.73 limits the scope of this rule to a nominal stem ending in a vowel other than अ, and the morphological term आमि in 7.1.54 limits the scope of that rule to stems followed by the nominal termination आम्. The additional term नपुँसक, which recurs in 7.1.73 from 7.1.72, determines the scope of that rule. The shared domain of the terms besides the term नपुँसक is a nominal stem ending in a vowel other than अ followed by the nominal termination आम्. Within this shared domain, the term नपुँसक stipulates an additional limitation. If the gender term is understood to be higher on the specificity scale than a particular nominal termination, 7.1.73 would erroneously take precedence over 7.1.45. The reverse is the case: 7.1.54 takes precedence over 7.1.73.

7.1.54 domain: stems ending in a short vowel, feminine affix नदी ई/ऊ, feminine आ + आम् (ह्रस्वनद्यापः आमि). 7.1.73 domain: neuter stems ending in इ, उ, ऋ followed by a vowel-initial nominal termination (नपुँसकस्य इकः अचि विभक्तौ). 7.1.54 exclusive domain: non-neuter stems, neuter अ-final stems + आम्. 7.1.73 exclusive domain: neuter stems in इ, उ, ऋ + vowel-initial terminations other than आम्. Shared domain: neuter stems in इ, उ, ऋ + आम् (नपुँसकस्य इकः आमि).
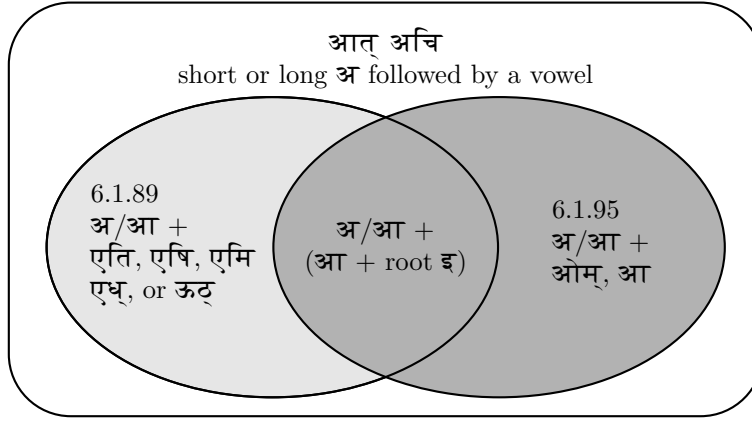
Figure 15: Example 8

(Cf. Figure 11.) The two rules 6.1.89 एत्येधत्यूठ्सु (आत् 87, वृद्धिः एचि 88) and 6.1.95 ओमाङोश्च (आत् 87, पररूपम् 94) occur within the section headed by *A.* 6.1.72 सँहितायाम् and *A.* 6.1.84 एकः पूर्वपरयोः: In continuous speech, a single replacement occurs in place of the sequence of a preceding and subsequent sound. The universe in which the two rules apply is specified by the phonetic terms आत्, which recurs in both rules from 6.1.87, and अचि stated in 6.1.77, which is superseded and further specified by terms in each rule: a vowel of the class अ followed by a vowel. Within this universe, the morphological terms एति, एधति, and ऊठ् in 6.1.89 limit the scope of the rule to contexts in which the subsequent sound is the initial vowel of the root इ, the root एध्, or the replacement ऊठ्. The morphological terms ओम् and आङ् in 6.1.95 limit the scope of the rule to contexts in which the subsequent sound is the initial vowel of the word ओम्, or the word आ marked with ङ्. The shared domain of the terms is where the guṇa vowel ए resulting from the sandhi of the preverb आ with the initial इ of a form of the verbal root इ follows a vowel of the class अ. Both the root इ specified in 6.1.89 and the word आ specified in 6.1.95 are morphological terms. The specificity hierarchy does not provide grounds on which to determine rule precedence.

6.1.89 domain: अ/आ + roots इ or एध्, or replacement ऊठ्. 6.1.95 domain: अ/आ + word ओम्, or preverb आ. 6.1.89 exclusive domain: अ/आ + एति, एषि, एमि, root एध्, or replacement ऊठ्. 6.1.95 exclusive domain: अ/आ + word ओम्, or preverb आ combined with a vowel other than of the root इ. Shared domain: अ/आ + (आ + root इ).

Vāmana explains why *A.* 6.1.95 blocks *A.* 6.1.89 by citing the principle that an operation provided (by rule 1) where another would obtain (by rule 2) blocks the other operation (provided by rule 2). He states in the *Kāśikā* under *A.* 6.1.89, "But the latter form (पर-रूप) provided by *A.* 6.1.95 is not blocked because of the principle that an operation provided where another would obtain blocks the other." ('ओमाङोश्च' इत्येतत्तु पररूपं न बाध्यते, 'येन नाप्राप्ते यो विधिरारभ्यते स तस्य बाधको भवति' इति). As stated, the principle appears to take only the two rules in question into account. But considering just the two rules does not provide grounds for a determination. In their shared domain, each of the two rules is provided where the other would obtain. However, the principle includes a double negative: the term नाप्राप्ते, literally 'not un-obtained'. The principle requires not just that the blocked rule would obtain, but that if it didn't obtain the rule in question would not have to be stated. This requires considering not just rule 1 and rule 2 but also the more general rule or rules to which rule 2 is an exception. In the overlapping domain, if *A.* 6.1.95 were not stated, *A.* 6.1.89 would still have to be stated in order to block *A.* 6.1.94; the operation it provides would not obtain otherwise. But if *A.* 6.1.89 were not stated, *A.* 6.1.95 would not have to be stated, since the operation it provides would already be obtained by *A.* 6.1.94. Therefore, *A.* 6.1.95 blocks *A.* 6.1.89 and not vice versa.

Insisting on the significance of the double negative in the term नाप्राप्ते in the येन नाप्राप्ते principle solves the problem of rule precedence in the case of *A.* 6.1.89 and 95 in Example 15. However, the principle in this stronger form is inapplicable to rule precedence in cases such as *A.* 7.1.54 and *A.* 7.1.73 in Example 14. The operations provided by each of these rules would not obtain by any more general rule in the absence of the other.

IX   Conclusion

Pāṇini's *Aṣṭādhyāyī* presents a complex system of interrelated rules. While it is clear that rules that apply to included domains take precedence over the rules that apply to the domain in which they are included, some of the rules have overlapping domains. Four different principles were resorted to in the present paper to attempt to determine rule precedence: the topicality principle, the principle that narrowness of the scope of terms referring to the shared domain determines rule precedence, the specificity hierarchy principle, and the strong form of the येन नाप्राप्ते principle. While these principles appear to solve all of the cases considered, none of them by itself solved all of the cases. Determining which rule has precedence in the shared domains is not reducible to a single principle. Moreover, the scope of these four principles overlap. The criteria for deciding which principle should have

priority in their overlapping domain is as much of a problem as deciding which rule should apply to the shared domain of two rules. It is not clear that these principles are implementable without detailed knowledge of the rules and their intended outcomes. Nor is it clear that there may not be additional principles required for unconsidered cases of the conflict of rules with overlapping domains. It is possible that a different principle altogether provides the correct ordering in some cases. For example, in order to solve cases of conflict such as in Example 3, there may be a principle that rules that apply to affixes take precedence over rules that add augments.

A thorough consideration of the topic of rule precedence requires examination of all cases of conflict. While all cases mentioned in commentaries may be collected and brought under consideration, commentators themselves may not have noticed all such cases. A full examination of the problem will probably require the assistance of computational modeling of Pāṇini's grammar. A broad spectrum of conflicting rules could then be discovered and various possible solutions could then be tested. The author of the present paper is working to develop such a computational model, as are other colleagues in the Sanskrit Computational Linguistics Consortium.

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