

# Phonological Evidence for Pāda Cohesion in Rigvedic Versification

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## Preliminaries

The Rigvedic meters that figure most prominently in this study are the “dimeter” meters *gāyatrī* and *anuṣṭubh*.<sup>1</sup> Both meters employ the same octosyllabic pāda (verse-line). The rhythm of the pāda is underlyingly iambic. As the poets approach the end of the pāda, they regulate syllable weight more strictly, and the iambic rhythm emerges more clearly. All pāda-final syllables count as long/heavy. A rough approximation of the surface rhythm of the pāda will serve our current purposes: × – × – ∪ – ∪ –. The *gāyatrī* stanza consists of three such pādas, the *anuṣṭubh* of four.

(1)	<i>gāyatrī</i>	<i>anuṣṭubh</i>
	a × – × – ∪ – ∪ –	a × – × – ∪ – ∪ –
	b × – × – ∪ – ∪ –	b × – × – ∪ – ∪ –
	c × – × – ∪ – ∪ –	c × – × – ∪ – ∪ –
		d × – × – ∪ – ∪ –

After the composition of the poems, oral editors – “orthoepic diaskeuasts” – made minor, mostly systematic changes to its phonological form, some of which disrupt the meter. Modern editors reverse those changes, thereby creating a “metrically restored” text that more closely approximates the phonological form at the period of composition. In the passages cited below, restorations are subscripted to the transmitted Saṃhitā text of Aufrecht (1877). For example, if *eṣām* is transmitted, and *\*eṣaam* is to be restored, we print *eṣ<sub>a</sub>ām*.<sup>2</sup> It is generally held that each pāda is metrically autonomous (on which more below), and in the metrically restored text of van Nooten and Holland (1994),

1 The most important and extensive works on Rigvedic meter are Oldenberg (1888) and Arnold (1905).

2 It is in fact very difficult to decide on the metrical evidence alone whether to restore *\*aam* or *\*aām* in genitive plural forms. We follow Kümmel (2013) in restoring the former.

each is printed on a separate line as above. However, in the Saṃhitā text, pādas *a* and *b* are treated as a unit and marked off by a daṇḍa (“|”), as are *c* and *d* in *anuṣṭubh*. The stanza is marked off by a double daṇḍa. We have added superscripted daṇḍas to mark the other pāda-ends.

(2)	<i>gāyatrī</i>		<i>anuṣṭubh</i>	
	ab	x-x-∪-∪-∪-∪- x-x-∪-∪-∪-∪-	ab	x-x-∪-∪-∪-∪- x-x-∪-∪-∪-∪-
	c	x-x-∪-∪-∪-∪-	cd	x-x-∪-∪-∪-∪- x-x-∪-∪-∪-∪-

Superscripted daṇḍas thus mark pāda boundaries, single daṇḍas mark couplet boundaries, and double daṇḍas mark stanza boundaries. A variant of the *anuṣṭubh* referred to as the “late” or “epic” *anuṣṭubh* is introduced below (11). For the structure of the “trimeter” meters *triṣṭubh* and *jagatī*, which figure less prominently in the present study, see Paul Kiparsky’s contribution to this volume.

### 1 A Synopsis of Previous Evidence for the Couplet in Rigvedic Composition

As a number of scholars have noted, from a standpoint of syntax and sense, the Rigvedic poets tend to compose in couplet-like structures.<sup>3</sup> Jamison and Brereton (2014: 74) offer one of the more explicit discussions of the phenomenon:

Syntactic constituents often occupy single pādas, for example, and metrical boundaries (the beginning and end of the line, as well as the position immediately after the caesura) are favored sites for positioning emphatic elements. The hemistich [= couplet] is a particularly salient unit, dividing the verse [= stanza] into syntactic and semantic halves. In fact, we have discovered that it is almost always possible, and generally desirable, to render the hemistich division in English – that is, to translate the first half and the second half of the verse as separate units. This is reflected in the physical layout of our translation, with the second hemistich starting a new line.

In dimeter verse in particular, the four pādas of the *anuṣṭubh* often seem to be divided on syntactic and semantic grounds into two pāda-pairs, which we refer

3 See also Oldenberg (1909b: 220 fn. 4, 221 fn. 2); Gonda (1958, 1975: 173–175, 223); and Migron (1985: 65 *et passim*).

to as couplets, schematically ((ab)(cd)). Consider 5.10.1, given in (3), where each couplet conveys an utterance.

(3) a	<i>ághna</i> Agni:VOC	<i>ójiṣṭham</i> most.powerful:ACC.SG	<i>á</i> here	<i>bhara</i>   bring:2SG.IMP
b	<i>dyumnám</i> brilliance:ACC	<i>asmábhyam</i> us:DAT	<i>adhriḡo</i>   never.poor:VOC.SG	
c	<i>prá</i> forth	<i>no</i> us:DAT	<i>rāyá</i> wealth:INS	<i>pářiṇasā</i>   abundance:INS
d	<i>rátsi</i> cut:2SG.IMP	<i>vájāya</i> prize:DAT	<i>pánth<sub>a</sub>ā<sub>a</sub>m</i>    path:ACC	

ab 'O Agni, who are never poor, bring here the most powerful brilliance to us.

cd With wealth and abundance, cut a path to victory's prize for us' (Jamison and Brereton 2014)<sup>4</sup>

This suggests that the *metrical* structure of the stanza is ((ab)(cd)), and the poets abided by a general rule: the larger the metrical boundary, the more important that it coincide with a larger prosodic boundary. Since prosodic phrasing is to a great extent determined by syntactic phrasing, we expect to find a hierarchy of coincidence of syntactic and metrical boundaries.<sup>5</sup> Regarding utterance boundaries, for example, we expect the highest rate of coincidence at stanza boundary, then couplet boundary, then pāda boundary. Stanza 4.47.2 in (4) meets those expectations.

(4) a	<i>índras</i> Indra:NOM	<i>ca</i> and	<i>vāyav</i> Vāyu:VOC	<i>eṣāā<sub>a</sub>m̃</i>   these:GEN
b	<i>sómānām</i> somas:GEN	<i>pītīm</i> drinking:ACC	<i>arhathaḥ</i>   deserve:2DU	

4 We cite the Rigveda translation of Jamison and Brereton (2014) here and throughout.

5 See Hayes (1989) and Devine and Stephens (1996: 410 with further references). An in-depth study of the alignment of syntax and meter in the Rigveda was announced in a preliminary article on the topic by Dunkel (1985), but has not yet appeared.

c	<i>yuvāñ</i> you:ACC.DU	<i>hí</i> for	<i>yánti</i> go.3PL	<i>ñdavo</i>   drops:NOM
d	<i>nimnám</i> deep:ACC	<i>ápo</i> waters:NOM	<i>ná</i> like	<i>sadhrṇàk</i>    convergingly
ab	‘O Indra and Vāyu, you have the right to the drinking of these soma drinks,			
cd	for the drops go to you like waters, converging, to the deep.’			

The stanza has the following syntactic structure: [ ... *pītīm arhathaḥ* [ *yuvāñ hí yánti* *ñdavo* [ *nimnám ápo ná sadhrṇàk* ] ] ], roughly [ ... *you deserve to drink* [ *because the drops go to you* [ *like waters converging to the deep* ] ] ]. The utterance boundary coincides with stanza end, the boundary between the main clause and the explanatory *hí*-clause falls between the couplets, and the boundary between the *hí*-clause and the comparative *ná*-clause coincides with the couplet-internal boundary between pādas *c* and *d*.<sup>6</sup> The boundary between pādas *a* and *b*, however, interrupts the noun phrase [ *eṣāññá | sómānām* ] ‘of these somas’.<sup>7</sup>

Couplets are not as clearly represented in *gāyatrī* as in *anuṣṭubh*. This is noted by Oldenberg (1909b: 220 fn. 4),<sup>8</sup> and by Jamison and Brereton, immediately following the discussion cited above (74):

The hemistich division is less important and more often syntactically breached in *gāyatrī*, since the division results in uneven parts: two pādas followed by one, but even in *gāyatrī* the third pāda is often independent of the first two.

6 Note that in dimeter verse, the enclitic *ná* is virtually restricted to the 3rd and 5th metrical positions (Vine 1978), and where it occurs in the 5th, it may follow the second word in the *ná*-clause, e.g. 1.38.1b *pitá putrám ná* ‘like a father (his) son ...’. The word order thus permits interpreting *nimnám* as belonging to the *ná*-clause, and the sense seems to require it.

7 Strictly speaking, *eṣām* and *sómānām* could be in apposition here ‘of these, (namely) the somas’ and in the two other occurrences of the bigram (8.93.33ab, 1.134.6ab). However, where the same phrase occurs in the nominative, it is continuous and contained within the same pāda: *eté sómāḥ* (9.8.1a, 9.62.22a, 9.69.9a, 9.87.5a, 9.88.6a, 9.97.20a) and *eté sómāsaḥ* (9.22.1a, 9.46.3a). Whether the phrase is versified in the same pāda or not apparently depends on the metrical-phonological shape of the words.

8 “Wenn bei dem Vers aus vier Reihen (Anuṣṭubh, später Śloka) die Gliederung 2+2 evident ist, so glaube ich jetzt (anders Hymnen des Ṛv I, 23 A. 2 [= 1888: 23 fn. 2]), daß auch bei dem dreireihigen Vers (Gāyatrī) die von der Tradition gegebene Gliederung 2+1 dem Wesen der Sache entspricht. Satzbau und Sinnesgliederung zahlreicher Verse scheint mir darauf zu führen.”

Following them, we will assume that *gāyatrī* tends to exhibit an ((ab)c) structure in terms of syntax and semantics, as in 3.11.9, given in (5), in which (ab) contains the first utterance and *c* the second.

- (5) a    *ágne*                            *vísvāni*                            *vāryā* |  
           Agni:VOC                        all:ACC.PL                        desirables:ACC |  
       b    *vājeṣu*                        *saniṣāmahe* |  
           victory.prizes:LOC            gain:1PL.SUBJ |  
       c    *t<sub>u</sub>vé*                            *devāsa*                            *érire* ||  
           you:LOC.SG                     gods:NOM                        have.placed:3PL ||
- ab    ‘O Agni, we shall gain all desirable things among the prizes of victory.  
 c     In you the gods have placed them.’

The same holds for 9.65.7, given in (6), where the appositionally additive *c*-pāda could again be taken as evidence for a metrical ((ab)c) structure.

- (6) a    *prá*                                *sómāya*                            *v<sub>1</sub>yāśvavát* |  
           forth                                soma:DAT                            Vyaśva-like:ADV |
- b    *pávamānāya*                        *gāyata* |  
           self-purifying:DAT.SG            sing:2PL.IMP |  
       c    *mahé*                                *sahásracakṣase* ||  
           great:DAT.SG                     thousand-eyed:DAT.SG ||
- ab    ‘Sing forth to self-purifying Soma, as Vyaśva did –  
 c     to the great one with a thousand eyes’

Further evidence for the couplet as a compositional unit comes from the couplet-initial localization of emphatic elements (cf. Jamison and Brereton 2014: 77), couplet-sized refrains (repeated phrases that close hymns), couplet-sized domains of concatenation (a type of linking repetition treated in Bloomfield 1916), and various other forms of stylistic repetition, which have been studied in a number of publications by Jared Klein, e.g. *responson* (2006) and the repetition of deictic pronouns (2013). Migron (1985) provides an in-depth study of the structure of the trimeter stanza.

Beyond syntax and meaning, metrical/phonological evidence for couplet-like cohesion that is unambiguously attributable to the period of composition as opposed to the later transmission is scant. To be sure, in the transmitted

text, there are a number of phonological processes that regularly distinguish between pāda boundary and couplet boundary. One such process is the gemination of word-final *n* where preceded by a short vowel and followed by a vowel-initial word, i.e.  $n \rightarrow nn / \check{V}_\#V$ .<sup>9</sup> The gemination process applies across pāda boundaries but not across couplet boundaries.

- (7) pāda boundary      ... *vardháyann* | *abhímātīḥ* ...      3.62.15ab  
 couplet boundary    ... *akṣaran* | *apapróthantaḥ* ...    9.98.11bc

However, it is possible that the orthoepic diaskeuasts – the editors mentioned above – introduced the distinction between pāda boundary and couplet boundary to the text after its composition. Unfortunately, the nature of the meter makes it difficult if not impossible to determine whether the distinction can be attributed to the compositional period or whether it was introduced later, because pāda-final metrical positions are (relatively) indifferent to weight. As is sometimes the case with evidence of an ambiguous nature, some scholars take *n*-gemination and related processes to be clear evidence for a compositional distinction (e.g. Hale 1995: 46),<sup>10</sup> and others consider the distinction to clearly post-date the compositional period (e.g. Oldenberg 1888: 392 n. 1).<sup>11</sup> For this reason, we briefly sketch the issues and clarify our stance on them.

It is clear that pāda-internally, at least, the diaskeuasts applied the processes that distinguish between pāda and couplet boundary differently than the poets did. This is true of *n*-gemination. The meter shows that pāda-internally, at least, at the time when the Rigveda was composed, *n*-gemination was mostly if not completely restricted to etymologically “justified” cases, i.e. where *n* derives from a historical cluster *\*nt(s)* or *\*ns*.<sup>12</sup> Consider (8), where *nn* derives from *\*nt* and makes the preceding syllable heavy “by position,” resulting in a regular diiambic cadence in *jagatī* and dimeter, respectively.

- (8) *saṃvartáyanto ví ca vartayann áhā*      5.48.3d  
*yáñti śubhrá riṇánn apáḥ*                      8.7.28c

9 See Kobayashi (2004: 92); note that the process also applies to the velar nasal *ṅ*.

10 “... there is a clear contrast between the line-boundary [= pāda boundary] and the hemistich boundary [= couplet boundary] ...”

11 “... bei Erscheinungen, die so sicher unursprünglich sind, wie der Sandhi an der Pādagrenze ...”

12 See Oldenberg (1908: 486ff.) with references to further literature, especially Arnold (1905: 142) and Oldenberg (1888: 424ff.). “Completely” would do without further qualification were it not for a handful of frequent vocatives including *maghavan*, whose localization may support prevocalic *maghavann*; the issue requires a fresh look.

Contrast this with (9), where *nn* derives from \**n* and the geminate creates metrical irregularities. These include vocative singular forms of *n*-stems (9a) and locative singulars (9b). The gemination here post-dates the composition of the text. Undoing it restores the normal cadential rhythm in the examples in (9). By superscripting the second *n*, we tag it as a diaskeuastic innovation. For simplicity, we present only dimeter verses, but delenda of this kind are found in other verse types, too, as expected.<sup>13</sup>

- |      |   |          |
|------|---|----------|
| (9a) | <i>śáviṣṭha vajrin<sup>n</sup> ójasā</i>              | 1.80.1c  |
|      | <i>píbā sú śíprin<sup>n</sup> ándhasaḥ</i>            | 8.17.4c  |
|      | <i>áganma vajrin<sup>n</sup> āśásaḥ</i>               | 8.92.13c |
| (9b) | <i>ácyutā cid vo ájman<sup>n</sup> á</i>              | 8.20.5a  |
|      | <i>sám ha bruvaté<sub>a</sub> dhvan<sup>n</sup> á</i> | 1.37.13b |
|      | <i>kṣiyánto yānto ádhvan<sup>n</sup> á</i>            | 8.83.6b  |

Both etymologically justified (7) and unjustified gemination (10a) take place across pāda boundaries but not across couplet boundaries. This shows us that the diaskeuasts actively made that distinction and that they introduced it into the text.

- |       |                  |                                      |          |
|-------|------------------|--------------------------------------|----------|
| (10a) | pāda boundary    | ... <i>rjīṣinn</i>   <i>idám</i> ... | 7.24.3ab |
|       | couplet boundary | ... <i>vajrin</i>   <i>áhinn</i> ... | 5.32.2bc |

This raises the possibility that the diaskeuasts, as opposed to the poets, introduced the distinction between pāda and couplet boundaries to *n*-gemination. However, since pāda-final metrical positions are (relatively) indifferent to weight, it is difficult or impossible to tell. The same holds for other sandhi processes that affect weight but not syllable count (e.g. prevocalic shortening), as well as for those that affect neither weight nor syllable count, e.g. voicing assimilation (exemplified by *t* → *d* in 10b), another process that applies across pāda boundaries but not couplet boundaries in the received text. That is our view.

- |       |                  |                                      |          |
|-------|------------------|--------------------------------------|----------|
| (10b) | pāda boundary    | ... <i>brhád</i>   <i>índram</i> ... | 1.7.1ab  |
|       | couplet boundary | ... <i>brhát</i>   <i>ágne</i> ...   | 1.75.5bc |

13 For example, the PP *ájman<sup>n</sup> á* ‘on the drive’ occurs finally in *jagatī* at 1.112.17b, and *ájman<sup>n</sup> á* *te* closes a *trīṣṭubh* stanza at 6.31.2d.

What could the rationale be for departing from Oldenberg on this question?<sup>14</sup> It is likewise possible that in the original text, prepausal sandhi occurred between pādas *b* and *c* most frequently, but not necessarily there and not only there; it was perhaps originally more sensitive to linguistic (i.e. syntactic/prosodic rather than metrical) structure. The diaskeuasts then generalized the most frequent pattern. We consider this plausible, and as such it can be added to the list further below, but we do not think that it is the *only* plausible explanation for the transmitted pattern. First, as we will argue below, phonological phenomena such as hiatus and resyllabification avoidance suggest at least a preference for metrical couplet structure at the time of composition, but these phenomena do not entail that other types of sandhi (such as the preservation of *nn* < \**nt(s)* and \**ns* or voicing assimilation) also occurred at those junctures. Moreover, one can imagine numerous other factors that could conceivably favor couplet-formation over time even if no sandhi occurred between couplets at composition. Such considerations include the fact that couplets tend to align with sense chunks, as we have already discussed, drift in recitational norms, substrata/contact, reversion to universal tendencies (eight syllables being on the short side for a recitational line typologically), and so forth. Since processes such as *nn*-sandhi and voicing assimilation are not metrically verifiable, we focus on verifiably compositional evidence in this article.

The view represented by Oldenberg is more widespread. In fact, it is conventionally assumed that stanzas exhibit a “flat” metrical structure. Macdonell (1917: 3) articulates this at the outset of his *Vedic Reader for Students*, in the note on RV 1.1.1: “The first two verses are in the Saṃhitā treated as a hemistich [= couplet]; but there is no reason to suppose that in the original text the second verse was more sharply divided from the third than from the first.” As Arnold (1905: 9) puts it, “In all metres in the Rigveda [...] each verse [= pāda] (with some exceptions) is independent in structure.” The exception in dimeter verse that Arnold has in mind is the “epic” *anuṣṭubh*, on which see (11). The main reason to hold this view has to do with sandhi processes that affect syllable count, e.g. abhinihita sandhi, the loss or resolution of word-initial *a* after (what would be) word-final *e*, *o*, or *aḥ* (in the citation form). In the transmitted text, abhinihita sandhi, like *n*-gemination and voicing assimilation, applies across pāda boundaries but not across couplet boundaries (10c).

(10c)	pāda boundary	... <i>sādhano</i>   <i>’yám</i> ...	9.105.3ab
	couplet boundary	... <i>randháyah</i>   <i>ayám</i> ...	6.43.1bc

14 We would like to thank Mark Hale for discussing this question with us at generous length.

Since abhinihita sandhi affects syllable count, the meter is informative. It shows us that abhinihita sandhi did not take place across pāda boundaries (or couplet boundaries) at the time of composition. All of the word-initial *a*-vowels affected by abhinihita sandhi must be restored, e.g. *ayām*. Oldenberg and others assume that since syllable count-altering sandhi across pāda boundaries must be undone, so must the other sandhi phenomena that regularly apply across pāda boundaries, e.g. *n*-gemination. This is also plausible, but not necessarily correct, since different phonological processes can be sensitive to different levels of juncture. For example, it is possible that at the time of composition, *n*-gemination applied across pāda boundary but abhinihita sandhi did not.

Metrical/phonological evidence for couplets that can plausibly be projected back to the time of composition may be scant, but it is not completely absent. It includes the greater incidence of departures from iambic rhythm in the cadences of *a*-pādas in the *gāyatrī* (Oldenberg 1909b: 221),<sup>15</sup> and a hierarchy of hiatus avoidance at metrical-prosodic boundaries in trimeter verse (Gunkel and Ryan 2011).<sup>16</sup> Moreover, perhaps the best-known case of metrical pāda cohesion in the Rigveda is the development during the compositional period of what Arnold termed the “epic” *anuṣṭubh*, a subtype of the *anuṣṭubh* in which the odd-numbered pādas begin to deviate metrically from even-numbered pādas. The epic *anuṣṭubh* is a nascent form of the meter that would eventually become the main vehicle of epic narrative, the *śloka*.<sup>17</sup> The most salient manifestation of this metrical change is reflected in the development of the “semi-cadence”  $\boxed{\cup - - -}$  in pādas *a* and *c*.

(11)	<i>anuṣṭubh</i> stanza
ab	x - x - $\cup$ - $\cup$ - $\cup$ -   x - x - $\cup$ - $\cup$ -
cd	x - x - $\cup$ - $\cup$ -   x - x - $\cup$ - $\cup$ -
	↓ ↓
	epic <i>anuṣṭubh</i> stanza
ab	x - x - $\boxed{\cup - - -}$   x - x - $\cup$ - $\cup$ -
cd	x - x - $\boxed{\cup - - -}$   x - x - $\cup$ - $\cup$ -

15 This remark by Oldenberg, also cited by Korn (1998: 12), has to our knowledge never been verified, nor has it been taken into account in textual restoration.

16 In trimeter verse, the poets avoid vowel hiatus at boundaries between couplets < couplet-internal pādas < hemistichs (i.e. pāda-internal units separated by the caesura) < (hemistich-internal) words.

17 For the entire developmental trajectory from the early Rigvedic *anuṣṭubh* to the *śloka*, see Oldenberg (1888: 26–31, 1909b); for the “epic” *anuṣṭubh* of the Rigveda, see Arnold (1905: 149–174).

Further evidence for the metrical couplet, which may or may not date to the compositional period, may be sought in the traditional location of the *avasāna* ‘pause’ and in a rare sandhi process that applies across pādas within couplets.

The *Ṛkprātiśākhya* 18.46–48 (Shastri 1931: 496) prescribes the following recitation practice.<sup>18</sup>

- (12) *dvābhyām avasyet tripadāsu pūrvam pādena paścāt kvacid anyathaitat*  
 || 46 ||  
*madhye ’vasānam tu catuṣpadānām* || 47 ||  
*tribhiḥ samastair avaraiḥ parair vā* || 48 ||

‘In three-pāda stanzas, one should first pause after two (pādas), then again after a pāda; sometimes it’s the other way around. || 46 || The pause of four-pāda (stanzas) is in the middle. || 47 || (And) with three (pādas) in a group, either the first or the last (three). || 48 ||’

The order of presentation in the *Ṛkprātiśākhya* shows that the default or usual location of the *avasāna* is *ab|c* and *ab|cd*, which is reflected in the location of the *daṇḍa* (“|”) in the *Samhitā* text. It is not clear what the exceptions refer to, but it seems unlikely to us that they refer to a manner of recitation in which the *avasāna* was intimately related to high-level syntactic/prosodic boundaries, since the *Ṛkprātiśākhya* only recognizes all the possible pāda-groupings involving a *single* pause. In other words, the rule does not permit a mode of recitation in which an *avasāna* is realized at each pāda-final utterance boundary in stanzas such as 3.41.2, where two or more stanza-internal pāda boundaries coincide with an utterance boundary, as in (13), where the stanza likely includes three independent utterances.

- (13) a     *sattó*                             *hótā*                             *na*     *ṛtvíyas* |  
           seated:NOM.SG             Hotar:NOM                     our     timely:NOM.SG |
- b     *tistiré*                             *barhír*                             *ānuśák* |  
           has.been.strewn:3SG     ritual.grass:NOM             in.due.order:ADV |
- c     *áyujran*                             *prātár*                             *ádrayaḥ* ||  
           were.yoked:3PL             in.morning:ADV             pressing.stones:NOM ||

18 We would like to thank Tim Felix Aufderheide for discussing prescriptions regarding *avasāna* with us.

- ab 'Our Hotar was seated at his season; the ritual grass has been strewn in due order.  
c The pressing stones were yoked in the early morning.'

To judge by Uvaṭa's commentary, the exceptions (*a|bc*, *abc|d*, *a|bcd*) refer to relatively rare and/or difficult meters in which the location of the *daṇḍa* in the Saṃhitā text has little or nothing to do with the syntactic and semantic structure of the stanza.<sup>19</sup>

According to Oldenberg (1909a: 33–34) and Lubotsky (1993), the sandhi phenomenon that converts pāda-final *-ā* to *-āñ* before pāda-initial *é-* and *ó-* within couplets should be attributed to the diaskeuasts, since the poets themselves would have produced \**upásthān* to avoid hiatus at 1.35.6ab, where the Saṃhitā text reads

(14) ab *tisró dyāvaḥ savitúr dvā upásthāñ | ékā yamásyā bhúvane virāṣāṭ |*

- ab 'There are three heavens: two are the laps of Savitar, one is the hero-vanquishing one in the world of Yama.'

While the *Ṛkprātiśākhya*'s rules regarding *avasāna* and this particular sandhi phenomenon may both post-date the compositional period, it is possible that the default organization into ((ab)c) and ((ab)(cd)) originates – at least to a certain extent – with the poets.

## 2 New Compositional Evidence for Couplet-Like Cohesion: Hiatus

Some clear phonological evidence for cohesion datable to composition comes from the study of vowel hiatus across pādas. Despite the conventional view that hiatus was not felt across pāda boundaries,<sup>20</sup> the Rigvedic poets do avoid it, and they do so more strictly couplet-internally (at pāda boundary) than couplet-externally (at couplet/stanza boundary), as one would expect if the former exhibits a lower level of juncture (cf. Gunkel and Ryan 2011). Consider, for instance, 4.47, where hiatus occurs once couplet-internally:  $\tilde{V} \uparrow \tilde{V}$ ; and three

19 Uvaṭa's examples are more accessible in Müller's edition (1889: 350).

20 Arnold (1905: 71): "Each verse in the Rigveda is an independent metrical unit as regards Sandhi: a final vowel may therefore stand at the end of any verse, whether the next verse begins with a vowel or not, without hiatus arising."

times couplet-externally, i.e. between two couplets V |<sup>!</sup> V or between two stanzas V ||<sup>!</sup> V.

- (15) ab *vāyo śukró ayāmi te* | *mádhvo ágraṃ díviṣṭiṣu* |<sup>!</sup>  
 cd *á yāhi sómapītaye* | *spārhó deva nīyútvatā* ||<sup>!</sup>  
 ab *índras ca vāyav eṣāāma* | *sómānām pītīm arhathaḥ* |  
 cd *yuvāṃ hí yánti índavo* | *ninnám ápo ná sadhr̥yāk* ||  
 ab *vāyav índras ca śuṣmīnā* | *saráthaṃ śavasas patī* |  
 cd *nīyútvantā na útāya* | *á yātaṃ sómapītaye* ||  
 ab *yá vāṃ sánti puruspr̥ho* | *nīyúto dāsúse narā* |<sup>!</sup>  
 cd *asmé tá yajñavāhasā* | *índravāyū ní yacchatam* ||

- ab 'Vāyu, the clear (soma) has been held out to you, the foremost of the honey, at the rituals of daybreak.  
 cd (Since you are) craved, drive here to drink the soma, o god, (on a chariot) with a team.  
 ab O Indra and Vāyu, you two have the right to the drinking of these soma drinks,  
 cd for the drops go to you like waters, converging, to the deep.  
 ab O Vāyu and Indra, tempestuous ones, lords of power, on the same chariot,  
 cd provided with teams, drive here to help us, to drink the soma.  
 ab Your teams, craved by many, which are for the pious, o men,  
 cd stop them by us, o Indra and Vāyu, you whose vehicle is the sacrifice.'

In the present study, we compare the incidence of hiatus across couplet-internal pādas to that across couplet-external pādas. For the purposes of this test, the dimeter corpus includes all and only the stanzas of the Rigveda that meet the following criteria: (1) every pāda has exactly eight syllables; (2) the stanza comprises either three or four pādas; and (3) the stanza is not considered to be either trochaic *gāyatrī* or epic *anuṣṭubh*.<sup>21</sup> We also exclude the Vālahkilya.<sup>22</sup> We will refer to the corpus as “standard” dimeter. The tests here rely on two electronic texts of the Rigveda, namely the “Sāsapāṭha,” a Padapāṭha-like text created by Alexander Lubotsky, which serves to approximate its underlying

21 In trochaic *gāyatrī*, the penultimate position is preferentially implemented with a heavy syllable.

22 The hymns of the Vālahkilya (8.49–59) are a later supplement to the Rigveda and consequently excluded.

phonological form (as employed by Lubotsky 1997), as well as a metrically restored text, derived from van Nooten and Holland (1994) via the slightly improved version provided by Thomson and Slocum (2006).

As before, for the purposes of these tests, couplets are defined as (ab) in *gāyatrī*, and (ab) as well as (cd) in *anuṣṭubh*. Non-couplets are defined as *b|c* in both meters, *c||a* in *gāyatrī*, and *d||a* in *anuṣṭubh*. Hiatus is defined as an underlying vowel-vowel juncture, as assessed by the Sāśapāṭha. This excludes surface [V#V] from underlying /VC#V/, e.g. [sutā́ | úpa] < /sutā́ḥ | úpa/ (1.2.4ab). We will use “§” as the cover symbol for all three types of juncture, pāda (“|”), couplet (“|”), and stanza (“||”).

In order to control for the possibility that the poets might have exercised a weight preference (for either a heavy or a light syllable) in pāda-final position, however slight or unlikely such a preference might be, we consider only the junctures  $\check{V}\S V$  vs.  $\check{V}\S CV$ , i.e. a short-vowel-final pāda followed by a pāda that begins with either a null or simple onset.  $\check{V}\S V$  is counted as hiatus,  $\check{V}\S CV$  as non-hiatus, and all other junctures are set aside.  $\bar{V}\S V$  and  $V\S CC+V$  are set aside because these are both contexts for which there is a possibility (however likely or unlikely) of weight-altering phonology, namely, prevocalic shortening for the former and leftward resyllabification for the latter. The poets might therefore avoid (or prefer) these sequences for reasons independent of hiatus. By considering only  $\check{V}\S V$  vs.  $\check{V}\S CV$ , we preclude any possible interference from those factors.

The usable dimeter corpus – “standard” *anuṣṭubh* or *gāyatrī* only, as characterized above – comprises 2,594 pādas (1,297 pairs). Of the pairs, 421 are couplets, e.g. *a* and *b*, while the remaining 876 are adjacent pādas that belong to different couplets, e.g. *b* and *c*. These couplet-internal vs. -external counts are not simple multiples of each other due to the exclusions listed in the previous paragraph.

Hiatus is found to be avoided significantly more within couplets than between them. The couplet-internal rate of hiatus is 24%, vs. external 36%, as summarized in (16).

(16)	couplet-internal rate of hiatus:	24%	(99 hiatus vs. 322 no hiatus)
	couplet-external rate of hiatus:	36%	(319 hiatus vs. 557 no hiatus)

The odds ratio here is 0.54, meaning that if a poet closes a pāda with  $\check{V}\S$ , the odds of him opening the next pāda with a V-initial word, as opposed to a CV-initial word, are only 0.54 times as great couplet-internally as they are -externally. The corresponding *p*-value is less than 0.0001, meaning that there



- (19) ab *yá āṅayat parāvataḥ | sūnīti turvásaṃ yádum |*  
 c *índraḥ sá no yúvā sákhā || 6.45.1*

- ab 'Who with good leading led Turvaśa and Yadu here from afar,  
 c he is Indra, our youthful comrade.'

That said, as the next test will reveal, the poets treat junctures which have the *potential* to resyllabify (i.e. VCŠV) differently, depending on whether they are couplet-internal or -external. In particular, they avoid “setting up” VCŠV more stringently within couplets than between them. Possible explanations for this discrepancy follow the discussion of the test results.

Taking the same dimeter corpus as in the previous section, we now compare the incidence of ČCŠV (potential resyllabification) to that of ČCŠC (no potential resyllabification) couplet-internally vs. -externally. ČC does not include diphthongs. The results of this test are summarized in the table below (20). Within couplets, the poets apparently avoid ČCŠV, where resyllabification could take place, more than they avoid that juncture couplet-externally.

- (20) couplet-internal rate of ČCŠV: 25% (512 vs. 1,532)  
 couplet-external rate of ČCŠC: 34% (686 vs. 1,311)

The odds ratio in this case is 0.64, meaning that if a poet closes a pāda with ČCŠ, the odds of him opening the next pāda with a V-initial word, as opposed to a C-initial word, are approximately two thirds as great couplet-internally as they are couplet-externally. This asymmetry is once again highly significant ( $p < 0.0001$ ).

We have shown that poets avoid ČCŠV more within couplets, though the explanation for this avoidance is not as obvious as in the hiatus case. First, it could be the case that resyllabification across a pāda boundary is marked *per se*. Second, it is also plausible that resyllabification after a short vowel is avoided because it results in a light pāda-final syllable, while the poets prefer (however weakly) to implement that position with a heavy one.

If the poets avoid resyllabification across pādas *per se*, we would expect to find similar results for ČCŠV vs. ČCŠC junctures, where resyllabification would also take place, but the pāda-final syllable would remain heavy. This is not the case, as (21) reveals.

- (21) couplet-internal rate of ČCŠV: 29% (78 vs. 189)  
 couplet-external rate of ČCŠC: 29% (51 vs. 127)

Here, the odds ratio is 1.03, meaning that if a poet closes a pāda with  $\check{V}C\check{S}$ , the odds of him opening the next pāda with a V-initial word, as opposed to a C-initial word, are virtually the same couplet-internally as they are couplet-externally. The difference in this case is nowhere near significant, with  $p = 0.90$ . Thus, the poets appear not to be avoiding resyllabification *per se*, rather the final light syllable that results from it.

Indeed, an iambic cadence such as that of dimeter verse implies a heavy final position on some level, even if the general license of *brevis in longo* masks this polarity on the surface. If *brevis in longo* is licensed by pause, one might expect it to be less applicable under cohesion, potentially explaining the greater avoidance of  $\check{V}C\check{S}V$  within couplets than across them. Finally, note that even if this explanation is incorrect, the sizable discrepancy between couplets and non-couplets with respect to  $\check{V}C\check{S}V$  junctures remains, and the asymmetry itself supports the reality of the dimeter couplet.

#### 4 Cohesion in Dimeter vs. Trimeter Verse

We have seen that the poets' treatment of hiatus and resyllabification supports greater cohesion between couplets in dimeter verse. The same holds for trimeter verse, where the effects are significant, but weaker. The smaller the odds ratio in (22) and (23), the greater the avoidance within couplets vs. couplet-externally. All odds ratios are significant unless otherwise noted.

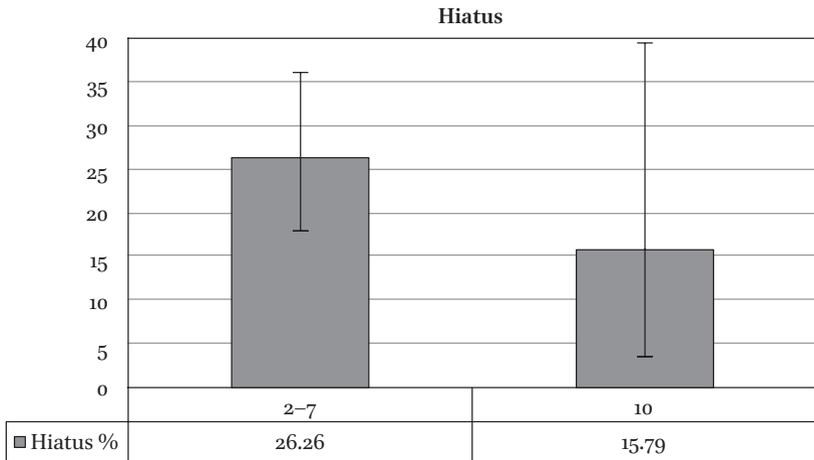
- (22) Odds ratios for hiatus avoidance in dimeter vs. trimeter (*triṣṭubh* and *jagatī*)  
 8-syllable (dimeter): 0.54  
 11-syllable (trimeter): 0.70  
 12-syllable (trimeter): 0.74
- (23) Odds ratios for resyllabification avoidance in dimeter vs. trimeter  
 8-syllable (dimeter): 0.64  
 11-syllable (trimeter): 0.80  
 12-syllable (trimeter): 0.86 (non-significant)

The data display a correlation between verse length and couplet cohesion, with greater cohesion in the shorter dimeter verses.

## 5 Some Notes on Diachrony

We can refer to a diachronic increase in couplet-like cohesion of *pādas* as “copulation” (a precursor to *syzygy*). The development of the early Rigvedic *anuṣṭubh* to the later Rigvedic epic *anuṣṭubh* sketched above, and eventually to the epic Sanskrit *śloka* is a textbook case. Did copulation also take place in “standard” dimeter? Comparing the incidence of hiatus avoidance in books 2–7 to that in book 10, and excluding any verses identified as epic *anuṣṭubh* or trochaic *gayatrī* from both subcorpora, we find that the numerical trend suggests greater avoidance in book 10. This is consistent with a greater degree of cohesion in that (presumably later) subcorpus, which is what we would expect to find if copulation took place between the composition of the (presumably earlier) Family Books (2–7) and the composition of book 10. However the sample sizes are reduced considerably when subsetting by book in this manner, and the difference is non-significant (Fisher’s  $p = 0.40$ ), as reinforced by the overlapping error bars in the plot in (24).

(24)



This apparent null result raises the question of why copulation (then *syzygy*) obtained for the *anuṣṭubh* > epic *anuṣṭubh* (then > *śloka*) but not for the *gāyatrī* or trimeter meters. We offer two speculative answers here to be taken up in future research. First, the even parity of the *anuṣṭubh* may have facilitated the reinterpretation of the two *pādas* as a single metrical unit; in *gāyatrī*, the final odd *pāda* underscores the autonomy of the eight-syllable unit. Second,

this cohesion might have been more likely in the dimeter than the trimeter because each pāda of the latter is longer. Indeed, as we saw in the previous section, trimeter couplets appear to be less cohesive than dimeter couplets judging by hiatus and resyllabification.

## 6 Conclusion

In terms of syntax and sense, Rigvedic verse seems often to be composed in pāda couplets. Further evidence from metrics and sandhi supports the same conclusion, though some of it cannot be reliably projected back to composition. We provide new phonological support for the existence of the couplet at composition based on two tests. First, the poets avoid hiatus more within couplets than between them. Second, the poets avoid  $\check{V}C\#V$  junctures, where the C could potentially be resyllabified, more within couplets than between them. Both results can be explained if one assumes a lower-level metrical/prosodic boundary within couplets as opposed to between them at the time of composition.

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