

## Phonological evidence for pāda cohesion in Rigvedic versification

Dieter Gunkel and Kevin M. Ryan

### Abstract

We present new phonological evidence for the pāda-couplet as a Rigvedic compositional unit, e.g. ((ab)(cd)) in *anuṣṭubh* and ((ab)c) in *gāyatrī*. While these groupings are often implied by syntax and sense, phonological and metrical evidence for them that is unambiguously attributable to the period of the composition of the Rigveda as opposed to its later transmission has been less forthcoming. We show that the poets avoided both inter-pāda hiatus and  $\check{V}C\#V$  junctures within couplets significantly more than across them.

### o. 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: x – x – ∪ – ∪ –. The *gāyatrī* stanza consists of three such pādas, the *anuṣṭubh* of four.

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

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 these 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>ā<sub>a</sub>m*.<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), 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 – ∪ – ∪ –

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

<sup>2</sup> 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.

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

(3)	a	<i>áḡna</i> Agni:VOC	<i>óḡiṣṭham</i> most.powerful:ACC.SG	<i>á</i> here	<i>bhara</i> <sup>1</sup> bring:2SG.IMP <sup>1</sup>
	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>párīnasā</i> <sup>1</sup> abundance:INS <sup>1</sup>
	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,

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

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

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>índraś</i>	<i>ca</i>	<i>vāyav</i>	<i>eṣ<sub>a</sub>ā<sub>a</sub>ñ<sup>l</sup></i>
		Indra:NOM	and	Vāyu:VOC	these:GEN <sup>l</sup>
	b	<i>sómānām</i>	<i>pītīm</i>	<i>arhathaḥ</i>	
		somas:GEN	drinking:ACC	deserve:2DU	
	c	<i>yuváñ</i>	<i>hí</i>	<i>yánt<sub>i</sub></i>	<i>ñdavo<sup>l</sup></i>
		you:ACC.DU	for	go.3PL	drops:NOM <sup>l</sup>
	d	<i>nimnám</i>	<i>ápo</i>	<i>ná</i>	<i>sadhryàk</i>
		deep:ACC	waters:NOM	like	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* [ *yuváñ hí yánt<sub>i</sub> ñdavo* [ *nimnám ápo ná sadhryàk* ] ] ], 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 [ *eṣ<sub>a</sub>ā<sub>a</sub>ñ<sup>l</sup> 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):

<sup>5</sup> 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 Rīgveda was announced in a preliminary article on the topic by Dunkel (1985), but has not yet appeared.

<sup>6</sup> 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 *pítá putráṃ 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.

<sup>7</sup> 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.

<sup>8</sup> “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.”

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.

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

(5)	a	<i>ágne</i> Agni:VOC	<i>vísṽāni</i> all:ACC.PL	<i>vár̥yā</i> <sup>1</sup> desirables:ACC <sup>1</sup>
	b	<i>váj̥eṣu</i> victory.prizes:LOC	<i>saniṣāmahe</i>   gain:1PL.SUBJ	
	c	<i>t<sub>u</sub>vé</i> you:LOC.SG	<i>devása</i> gods:NOM	<i>éire</i>    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 (6), where the appositionally additive *c*-pāda could again be taken as evidence for a metrical ((ab)c) structure.

(6)	a	<i>prá</i> forth	<i>sómāya</i> soma:DAT	<i>vyaśvavát</i> <sup>1</sup> Vyaśva-like:ADV <sup>1</sup>
	b	<i>pávamānāya</i> self-purifying:DAT.SG	<i>gāyata</i>   sing:2PL.IMP	
	c	<i>mahé</i> great:DAT.SG	<i>sahásracakṣase</i>    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. *responsion* (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* | *abhúmātīh* ... 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  $*nt(s)$ .<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  
*yānti śubhrá riṣánn apáh* 8.7.28c

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>

<sup>9</sup> See Kobayashi (2004: 92); note that the process also applies to the velar nasal  $\check{n}$ .

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

<sup>11</sup> “... bei Erscheinungen, die so sicher unursprünglich sind, wie der Sandhi an der Pâdagrenze ...”

<sup>12</sup> 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.

<sup>13</sup> 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 *triṣṭubh* stanza at 6.31.2d.

- (9a) *śaviṣṭha vajrin<sup>n</sup> ójasā* 1.80.1c  
*píbā sú śiprin<sup>n</sup> ándhasaḥ* 8.17.4c  
*áganma vajrin<sup>n</sup> āśásaḥ* 8.92.13c
- (9b) *ácyutā cid vo ájman<sup>n</sup> á* 8.20.5a  
*sám ha bruvaté<sub>a</sub> dhvan<sup>n</sup> á* 1.37.13b  
*kṣiyánto yánto ádhvan<sup>n</sup> á* 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 ... *rjīṣinn<sup>l</sup> idám* ... 7.24.3ab  
 couplet boundary ... *vajrin | áhiṃ* ... 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 ... *brhád<sup>l</sup> índram* ... 1.7.1ab  
 couplet boundary ... *brhát | ágne* ... 1.75.5bc

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) 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.

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

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>sādhanō</i>   <i>yám</i> ...	9.105.3ab
	couplet boundary	... <i>randháyāḥ</i>   <i>ayám</i> ...	6.43.1bc

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. *yám*. 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”  $\boxed{\cup \text{---}}$  in pādas *a* and *c*.

<sup>15</sup> 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.

<sup>16</sup> 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.

<sup>17</sup> 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).



To judge by Uvāṭa'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 *-āṃ* before pāda-initial *é-* and *ó-* within couplets should be attributed to the diaskeuasts, since the poets themselves would have produced *\*upásthāv* to avoid hiatus at 1.35.6ab, where the Saṃhitā text reads

(14) ab *tisró dyāvaḥ savitúr dvā upásthāṃ | ékā yamásyā bhúvane virāśāt |*

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

While the *Ṛkprāṭisākhya*'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  $V \uparrow V$  and three times couplet-externally, i.e. between two couplets  $V \uparrow V$  or between two stanzas  $V \uparrow V$ .

(15) ab *vāyo śukró ayāmi te | mádhvo ágram dívīṣṭiṣu |*  
 cd *ā yāhi sómapītaye | spārhó deva nīyútvatā ||*  
 ab *índras ca vāyav eṣā āṃ | sómānām pītīm arhathaḥ |*  
 cd *yuvāṃ hí yānti índavo | nimnām āpo ná sadhr̥yāk ||*  
 ab *vāyav índras ca śuṣmīṇā | saráthaṃ śavasas patī |*  
 cd *nīyútvantā na útāya | ā yātaṃ sómapītaye ||*  
 ab *yā vāṃ sánti puruspr̥ho | nīyúto dāsúṣe narā |*  
 cd *asmé tá yajñavāhasā | índravāyū níyacchatam ||*

<sup>19</sup> Uvāṭa's examples are more accessible in Müller's edition (1889: 350).

<sup>20</sup> 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."

- 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 Vāḷakhilya.<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 “Sāśapāṭha,” a Padapāṭha-like text created by Alexander Lubotsky, which serves to approximate its underlying 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. [sutá<sup>1</sup> úpa] < /sutáh<sup>1</sup> 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 ṽ§V vs. ṽ§CV, i.e. a short-vowel-final pāda followed by a pāda that begins with either a null or simple onset. ṽ§V is counted as hiatus, ṽ§CV as non-hiatus, and all other junctures are set aside. ṽ§V and V§CC<sup>+</sup>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 ṽ§V vs. ṽ§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.

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

<sup>22</sup> The hymns of the Vāḷakhilya (8.49–59) are a later supplement to the Rigveda and consequently excluded.

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 is less than a 1 in 10,000 chance that an asymmetry this great or greater arose by chance, assuming the null hypothesis that the poets treated internal and external contexts identically. That null hypothesis can be securely rejected.

In sum, then, on the evidence of hiatus, the poets treat the couplet-internal juncture more like a pāda-internal position than the couplet-external juncture, providing phonological evidence for ((ab)(cd))((a ... in *anuṣṭubh* and ((ab)c)((a ... in *gāyatrī*, as illustrated in (17).

- (17a) *anuṣṭubh*  
 x - x - ~ - ~ - - | x - x - ~ - ~ - - | x - x - ~ - ~ - - | x - x - ~ - ~ - - || x - x - ~ - ~ -
- (17b) *gāyatrī*  
 x - x - ~ - ~ - - | x - x - ~ - ~ - - | x - x - ~ - ~ - - || x - x - ~ - ~ -

As an addendum to this hiatus test, even if couplet-external junctures are drawn only from stanza-internal junctures, viz.  $b|c$ , now putting aside stanza-straddling junctures altogether, the aforementioned result, though attenuated slightly in magnitude, remains significant (rates of 24% vs. 32%, odds ratio 0.66,  $p < 0.01$ ).

### 3. More evidence for couplet-like cohesion: $\check{V}C\#V$ juncture

Pāda-internally, word-final  $\check{V}C$  scans as light when followed by a V-initial word, since the latter recruits the consonant as an onset, so to speak; thus,  $\check{V}C\#V$  is syllabified as  $\check{V}.C\#V$ . If a C-initial word follows, no resyllabification takes place, and the word-final syllable scans as heavy. Two examples are provided in (18).

- (18) resyllabification: *agním ȳe* vs. no resyllabification: *agním dūtám*  
 -        ~        -        -        -        -        -        -  
 ag    ní    mī    ȳe    ag    ním    dū    tám

Given the evidence from hiatus, we might expect resyllabification to be more likely couplet-internally than -externally, as the former is apparently a lower-level juncture prosodically, at least in the aggregate. Nevertheless, it is generally difficult to determine whether or not resyllabification takes place across pādas in cases such as *yádum | índraḥ* in (19), especially since pāda-final position is (relatively) indifferent to weight.

- (19) ab *yá ánayāt parāvátah<sup>1</sup> súnītī 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. VC§V) differently, depending on whether they are couplet-internal or -external. In particular, they avoid “setting up” VC§V 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  $\check{V}C\check{S}V$  (potential resyllabification) to that of  $\check{V}C\check{S}C$  (no potential resyllabification) couplet-internally vs. -externally.  $\check{V}C$  does not include diphthongs. The results of this test are summarized in the table below (20). Within couplets, the poets apparently avoid  $\check{V}C\check{S}V$ , where resyllabification could take place, more than they avoid that juncture couplet-externally.

- (20) couplet-internal rate of  $\check{V}C\check{S}V$ : 25% (512 vs. 1,532)  
couplet-external rate of  $\check{V}C\check{S}C$ : 34% (686 vs. 1,311)

The odds ratio in this case is 0.64, 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 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  $\check{V}C\check{S}V$  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  $\bar{V}C\check{S}V$  vs.  $\bar{V}C\check{S}C$  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  $\bar{V}C\check{S}V$ : 29% (78 vs. 189)  
couplet-external rate of  $\bar{V}C\check{S}C$ : 29% (51 vs. 127)

Here, the odds ratio is 1.03, meaning that if a poet closes a pāda with  $\bar{V}C\check{S}$ , 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 *jaḡatī*)

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 *ḡayatrī* 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) [PLACE PLOT “hiatus.png” = (24) HERE]

This apparent null result raises the question of why copulation (then *syzygy*) obtained for the *anuṣṭubh* > epic *anuṣṭubh* (then > *śloka*) but not for the *ḡayatrī* 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 *ḡayatrī*, 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.

## References

- Aufrecht, Theodor. 1877. *Die Hymnen des Ṛigveda*. 2nd ed., 2 vols. Bonn: Adolph Marcus.
- Arnold, E. Vernon. 1905. *Vedic Metre in its Historical Development*. Cambridge: Cambridge University Press.
- Bloomfield, Maurice. 1916. *Rig-veda Repetitions: The Repeated Verses and Distichs and Stanzas of the Rig-veda in Systematic Presentation and with Critical Discussion* (Harvard Oriental Series, vols. 20, 24). Cambridge, MA: Harvard University Press.
- Devine, A. M. and Lawrence D. Stephens. 1996. *The Prosody of Greek Speech*. Oxford: Oxford University Press.
- Dunkel, George E. 1985. Verse-Internal Sentence Boundary in the Ṛg-Veda: A Preliminary Overview. In *Grammatische Kategorien. Funktion und Geschichte. Akten der VII. Fachtagung der Indogermanischen Gesellschaft, Berlin 20.–25. Februar 1983*, ed. Bernfried Schlerath, 119–133. Wiesbaden: Reichert.
- Gonda, Jan. 1958. Syntax and Verse Structure in the Veda. *Indian Linguistics* 20:35–43.
- . 1975. *Vedic Literature (Saṃhitās and Brāhmaṇas)*. Wiesbaden: Harrassowitz.
- Gunkel, Dieter and Kevin M. Ryan. 2011. Hiatus Avoidance and Metrification in the Rigveda. In *Proceedings of the 22nd Annual UCLA Indo-European Conference*, ed. Stephanie W. Jamison, H. Craig Melchert and Brent Vine, 53–68. Bremen: Hempen.
- Hale, Mark. 1995. *Wackernagel's Law. Phonology and Syntax in the Rigveda*. Montreal: Ms.
- Hayes, Bruce. 1989. The Prosodic Hierarchy in Meter. In *Rhythm and Meter*, ed. Paul Kiparsky and Gilbert Youmans, 201–260. Orlando, FL: Academic Press.
- Kobayashi, Masato. 2004. *Historical Phonology of Old Indo-Aryan Consonants*. Tokyo: Research Institute for Languages and Cultures of Asia and Africa, Tokyo University of Foreign Studies.
- Korn, Agnes. 1998. *Metrik und metrische Techniken im Ṛgveda*. Graz: Leykam.
- Klein, Jared S. 2006. Responion in the Rigveda. *Journal of the American Oriental Society* 122.2:311–317.
- . 2013. Deictic Pronoun Repetition in the Rigveda. In *Indic across the Millennia: from the Rigveda to Modern Indo-Aryan. 14th World Sanskrit Conference, Kyoto, Japan, September 1-5, 2009. Proceedings of the Linguistic Section*, ed. Jared S. Klein and Kazuhiko Yoshida, 59–76. Bremen: Hempen.
- Kümmel, Martin Joachim. 2013. Zur Endung des Genitivs Plural im Indoiranischen und Indogermanischen. *Indogermanische Forschungen* 118:193–211.
- Jamison, Stephanie W. and Joel P. Brereton. 2014. *The Rigveda. The Earliest Religious Poetry of India*. 2 vols. New York: Oxford University Press.

- Lubotsky, Alexander. 1993. Nasalization of the final *ā* in the Ṛgveda. *Indo-Iranian Journal* 36:197–210.
- . 1997. *A Ṛgvedic Word Concordance* (American Oriental Series 82–83). New Haven: American Oriental Society.
- Macdonell, Arthur Anthony. 1917. *A Vedic Reader for Students*. Oxford: Clarendon.
- Migron, Saul. 1985. The Ṛgvedic Stanza as a Syntactical Unit: A Study of Selected Trimeter Passages. Ph.D. dissertation, Hebrew University.
- Müller, Max. 1869. *Rig-Veda-Prātiśākhya. Das älteste Buch der vedischen Phonetik*. Leipzig: Brockhaus.
- Nooten, Barry A. van and Gary B. Holland. 1994. *Rig Veda: A Metrically Restored Text with an Introduction and Notes* (Harvard Oriental Series 50). Cambridge, MA: Harvard University Press.
- Oldenberg, Hermann. 1888. *Die Hymnen des Ṛgveda 1. Metrische und textgeschichtliche Prolegomena*. Berlin: Hertz.
- . 1908. Vedische Untersuchungen 28. Die Vokative auf *-an, -man, -van*. *Zeitschrift der Deutschen Morgenländischen Gesellschaft* 62.3: 486–493.
- . 1909a. *Ṛgveda. Textkritische und exegetische Noten. Erstes bis sechstes Buch*. Berlin: Weidmannsche Buchhandlung.
- . 1909b. Zur Geschichte des Śloka. *Nachrichten der Königlichen Gesellschaft der Wissenschaften zu Göttingen* 1909, 219–246. [= Oldenberg 1967: 1188–1215]
- . 1967. *Kleine Schriften*. Teil 2, ed. Klaus L. Janert. Wiesbaden: Steiner.
- Shastri, Mangal Deva. 1931. *The Ṛgveda-Prātiśākhya with the Commentary of Uvaṭa*. Vol. 2. Allahabad: Indian Press, Limited.
- Thomson, Karen and Jonathan Slocum 2006. *The Rigveda: Metrically Restored Text*. Linguistics Research Center, The University of Texas at Austin.  
URL: <http://www.utexas.edu/cola/centers/lrc/RV/>
- Vine, Brent. 1978. On the Metrics and Origin of Rig-Vedic *ná* ‘like, as’. *Indo-Iranian Journal* 20:171–193.