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Localizational evidence for the restoration of Rigvedic *mimihí 'measure'." In Vina Diem Celebrent: Studies in Linguistics and Philology in Honor of Brent Vine

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Vina Diem Celebrent

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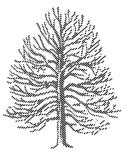

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VINA DIEM CELEBRENT

Localizational Evidence for the Restoration of Rigvedic **mimihí* 'measure'*

DIETER GUNKEL

1 Introduction

The purpose of this study is to provide new evidence for the existence of the 2sg present active imperative **mimihí* 'measure' in the *Rigveda*. Controlling to an extent for the effects of morphosyntax, I show that the poets do not localize the forms transmitted as *mimīhí* in the meter similarly to the way that they localize forms of the same metrical/phonological shape, e.g. *didīhí* 'shine', *śiśīhí* 'sharpen', *gṛṇīhí* 'sing'. Instead, they localize them like forms of the shape **mimihí*, e.g. *kṛṇuhí* 'make', *śṛṇuhí* 'hear', *tanuhi* 'stretch'. Thus we should restore **mimihí*. I then suggest that **mimihí* should be understood as the regular phonological development of **mimh*$_1$*d*^{h}*i*, a form that had not yet undergone the analogical process that produced the *ī* in Class III reduplicated present stems of the type *mimī-*, *śiśī-*, i.e. preconsonantal weak stems formed to roots of the shape *Cā-*.

2 The corpus

The study is based on two electronic texts of the *Rigveda*, a *padapāṭha*-like text created by Alexander Lubotsky to produce his 1997 concordance, and Thomson and Slocum 2006, a metrically restored text derived from van Nooten and Holland 1994, with further improvements by Kevin Ryan and me.

The corpus used for the quantitative aspects of the study consists of all of the *Rigveda* except the *Vālakhilya*, repeated pādas (save the first instance), "epic" anuṣṭubh

*It is a pleasure to dedicate this modest study in Rigvedic metrics to my teacher and dissertation advisor Brent Vine, whose own work in that area (e.g. Vine 1977, 1978, 1990), as in so many others, serves as an inspirational example. I began work on Rigvedic localization patterns for my dissertation, and I have continued it in collaboration with Kevin M. Ryan, without whom this contribution would not be possible.

(1,621 pādas),[1] uneven lyric (612),[2] trochaic gāyatrī (554),[3] pentad (259),[4] virāṭsthānā (80),[5] gautamī (64),[6] and bhārgavī (40).[7]

This leaves us with meters constructed of three basic pāda types. The shortest of these is a rhythmically iambic, eight-syllable pāda (8σ) with no caesura. In the rough representations below, the breve ($\breve{}$) marks positions that are realized with a heavy syllable 0–33% of the time, the anceps (×) positions that are 34–66% heavy, and the longum (–) those that are 67–100% heavy.

(1) 8σ
× – × – $\breve{}$ – $\breve{}$ –

At this juncture, it is important to note two principles that are at work in all meters of the *Rigveda*. The first is final strictness, which applies to the pāda as a whole: the later in the pāda, the more strictly syllable weight is regulated. Final strictness is partly reflected in the notation above, where the opening (positions 1–4, × – × –) is more loosely iambic than the cadence (positions 5–8, $\breve{}$ – $\breve{}$ –). The second principle is final indifference: pāda-final position is indifferent as to weight. However, as argued by Ryan (2013, forthcoming), in some if not all quantitative meters, final indifference only partly overrides final strictness, such that final position still exhibits weight preferences.

The longer pāda types have a caesura (|) after either the fourth or fifth position. In the eleven-syllable type (11σ), the opening (positions 1–4) is loosely iambic (× – × –), and the cadence (positions 8–11) is more strictly trochaic (– $\breve{}$ – –).

(2) 11σ
× – × – | $\breve{}$ $\breve{}$ – – $\breve{}$ – –
× – × – × | $\breve{}$ $\breve{}$ – $\breve{}$ – –

The twelve-syllable type (12σ) is virtually identical to the 11σ up through the tenth position, after which it closes with an iamb ($\breve{}$ –).

(3) 12σ
× – × – | $\breve{}$ $\breve{}$ – – $\breve{}$ – $\breve{}$ –
× – × – × | $\breve{}$ $\breve{}$ – $\breve{}$ – $\breve{}$ –

Counting by pāda, the corpus includes 83% of the *Rigveda*.[8]

[1] For epic anuṣṭubh, also known as "late(r)" anuṣṭubh, see *Prolegomena* 31 and *VM* 166–9.

[2] For uneven lyric, see *VM* 154, 244 (Appendix III).

[3] For trochaic gāyatrī, see *Prolegomena* 25 and *VM* 165.

[4] For pentad, see *Prolegomena* 95–8 and *VM* 238–40.

[5] For virāṭsthāna, see *Prolegomena* 86–95 and *VM* 240–1, 246.

[6] For gautamī, see *VM* 240–1.

[7] For bhārgavī, see *VM* 240–1.

[8] In treating all 8σ/11σ/12σ pādas alike, I am abstracting away from minor (though interesting and understudied) metrical differences that depend on the position of the pāda in the larger structure of the stanza. For

(4) Corpus

8*σ*	11,235 pādas
11*σ*	15,431 (8,170 early, 7,261 late)
12*σ*	6,352 (2,986 early, 3,366 late)

The most prominent meters made up of these pāda types are gāyatrī and anuṣṭubh (8*σ*), triṣṭubh (11*σ*), and jagatī (12*σ*).

3 Localization of *C*-LHL-*V*

To assess the metrical evidence for the restoration of *mimīhí* to **mimihí*, I compare the localization of *mimīhí* to the localization of other words of the shape *mimīhí*, i.e. to words that begin in one consonant (*C*-), have a light-heavy-light syllable-weight template (LHL), and end in a short vowel (-*V*). In what follows, I refer to that class of words as *C*-LHL-*V*. The class contains 3,561 tokens. The ten most frequent forms make up 15% of those.

(5) *pávasva* 'purify yourself' 2SG.PRES.IPV.MID (97×)
mádāya 'exhilaration' M.DAT.SG (71×)
vásūni 'goods' N.NOM/ACC/VOC.PL (62×)
juṣásva 'enjoy' 2SG.PRES.IPV.MID (55×)
sutásya 'pressed' M/N.GEN.SG (50×)
ráthena 'chariot' M.INSTR.SG (47×)
rájāṃsi 'realms' N.NOM/ACC/VOC.PL (38×)
purúṇi 'many' N.NOM/ACC/VOC.PL (36×)
cáranti 'proceed' 3PL.PRES.IND.ACT (36×)
váhantu 'convey' 3PL.PRES.IPV.ACT (36×)

In 8*σ*, three placements account for 94% of *C*-LHL-*V*: the placement spanning positions 3–5 (54%), the verse-initial placement (spanning 1–3, 28%), and the placement spanning 5–7 (12%). They are the three one would expect, given the shape. Note that the least popular of the three, i.e. the placement spanning positions 5–7, requires a pāda-final monosyllable. To use *mádāya* as a stand-in for the class:

(6) *C*-LHL-*V* in 8*σ*

1	2	3	4	5	6	7	8	
		má	*dā*	*ya*				54%
má	*dā*	*ya*						28%
				má	*dā*	*ya*		12%
×	–	×	–	⏑	–	⏑	–	

example, Oldenberg (1909:221) claims that in gāyatrī, departures from iambic rhythm in the cadence of a-pādas is more frequent than in the cadence of b- and c-pādas. For further evidence of this sort, see Gunkel and Ryan 2011, 2018, with references.

In 11*σ*, three placements account for 92% of the forms. The most frequent is pāda-final (68%). The other two are as in 8*σ*, i.e. spanning 3–5, which is only compatible with the late caesura, and pāda-initial.

(7) *C*-LHL-*V* in 11*σ*

1	2	3	4	5	6	7	8	9	10	11	
								má	*dā*	*ya*	68%
		má	*dā*	*ya*							14%
má	*dā*	*ya*									10%
×	–	×	–|	⏑	⏑	–	–	⏑	–	–	
×	–	×	–	×|	⏑	⏑	–	⏑	–	–	

In 12*σ*, four placements account for 90% of the forms. The three most frequent are familiar from 8*σ* and 11*σ*. The placement spanning 9–11 (16%), which requires a pāda-final monosyllable, is far less popular than it is in 11*σ* (68%). My impression regarding the fourth, i.e. the placement spanning 7–9, is that it is often occupied by verbs that immediately follow their preverbs, e.g. *pári caranti* after the early caesura and *ví caranti* after the late one. That placement is quite a bit less frequent in 11*σ* (5%) and thus not shown in (7).

(8) *C*-LHL-*V* in 12*σ*

1	2	3	4	5	6	7	8	9	10	11	12	
		má	*dā*	*ya*								41%
má	*dā*	*ya*										21%
								má	*dā*	*ya*		16%
						má	*dā*	*ya*				12%
×	–	×	–|	⏑	⏑	–	–	⏑	–	⏑	–	
×	–	×	–	×|	⏑	⏑	–	⏑	–	⏑	–	

4 The localization of *C*-LLL-*V*

To assess the metrical evidence for the restoration of *mimīhí* to **mimihí*, I also compare the localization of *mimīhí* to the localization of words of the shape **mimihí*, i.e. to words that begin with one consonant (*C*-), have a light-light-light syllable weight template (LLL), and end in a short vowel (-*V*). In what follows, I will refer to that class as *C*-LLL-*V*. The class contains 557 tokens. The ten most frequent forms make up 44% of those.

(9) *váruṇa* 'Varuṇa' M.VOC.SG (64×)
bhávati 'becomes, is' 3SG.PRES.IND.ACT (34×)
cárati 'moves' 3SG.PRES.IND.ACT (33×)
vŕ̥ṣabha 'bull' M.VOC.SG (27×)
kr̥ṇuhí 'make' 2SG.PRES.IPV.ACT (26×)
bhávatu 'let be(come)' 3SG.PRES.IPV.ACT (16×)

bhávasi 'you become, are' 2SG.PRES.IND.ACT (13×)
váhati 'conveys' 3SG.PRES.IND.ACT (11×)
vádati 'speaks' 3SG.PRES.IND.ACT (10×)
bhárata 'bring' 2SG.PRES.IPV.ACT (10×)

In 8*σ*, four placements account for 98% of the attestations of *C*-LLL-*V*. The most frequent spans 3–5, accounting for about half of the occurrences (compare the *mádāya* type with 54% (6)). The rest of the forms are relatively evenly spread over the remaining placements. Note that 13% are placed pāda-finally, which results in a rhythmically unusual cadence (contrast the *mádāya* type with 28% in 1–3 and 12% in 5–7). *váruṇa* stands in for the class.

(10) *C*-LLL-*V* in 8*σ*

1	2	3	4	5	6	7	8	
		va	*ru*	*ṇa*				51%
			va	*ru*	*ṇa*			18%
vá	*ru*	*ṇa*						16%
					va	*ru*	*ṇa*	13%
×	–	×	–	⏑	–	⏑	–	

In 11*σ*, two placements account for 98% of the forms. The most popular spans 5–7, which immediately follows the early caesura. The other spans 6–8, which almost always follows the late caesura.[9]

(11) *C*-LLL-*V* in 11*σ*

1	2	3	4	5	6	7	8	9	10	11	
				va	*ru*	*ṇa*					68%
					va	*ru*	*ṇa*				30%
×	–	×	–|	⏑	⏑	–	–	⏑	–	–	
×	–	×	–	×|	⏑	⏑	–	⏑	–	–	

Contrast *C*-LHL-*V* (7) with 68% in 9–11, 14% in 3–5, and 10% in 1–3.

The pattern in 12*σ* is very similar to 11*σ*: 5–7 and 6–8 account for 91%, and the former is two and a half times more frequent.

(12) *C*-LLL-*V* in 12*σ*

1	2	3	4	5	6	7	8	9	10	11	12	
				va	*ru*	*ṇa*						65%
					va	*ru*	*ṇa*					26%
×	–	×	–|	⏑	⏑	–	–	⏑	–	⏑	–	
×	–	×	–	×|	⏑	⏑	–	⏑	–	⏑	–	

Contrast the *mádāya* type (8) with 41% in 3–5, 21% in 1–3, 16% in 9–11, and 12% in 7–9.

[9] Cases with an early caesura followed by a monosyllable + *C*-LLL-*V* appear to be quite rare. At 1.95.4d, *níś carati* follows the early caesura.

5 The localization of *mimīhí*

mimīhí occurs once in 8*σ* and three times in 11*σ*; it is not attested in 12*σ*. The occurrence in 8*σ* is pāda-initial, which is the second most frequent placement for *C*-LHL-*V* (28%) and the third most frequent one for *C*-LLL-*V* (16%). There is a pun on *mā-* 'bellow' (on which see Jamison's *Commentary* ad loc.).

> 1.38.14ab
> ***mimīhí*** *ślókam āṣ́ yè*
> *parjánya iva tatanaḥ*
> Bellow [/measure] the call that is in your mouth. Like Parjanya, you will thunder [/stretch it out].[10]

In 11*σ*, *mimīhí* occurs twice spanning 6–8. One is a repeated pāda (3.54.22b = 5.4.2d = 6.19.3b), in which *sám mimīhi* 'measure out, distribute' follows the early caesura.

> 3.54.22b
> *asmadr̥ àk sám* ***mimīhi*** *śrávāṃsi*
> Mete out fame in our direction.

In the other, *mimīhi* follows the late caesura. Note the presence of the preverb *úpa* and the ellipsis of *mimīhí* in the second clause in 11c [*úpa no vā́jān* ***mimīh*** *ı́ y*] [*úpa stī́n* ~~*mimīhi*~~].

> 7.19.11cd
> *úpa no vā́jān* ***mimīh*** *ı́ y úpa stī́n*
> *yūyám pāta s*„*vastíbhiḥ sádā naḥ*
> Measure out prizes to us, measure out beings [= people]. Do you protect us always with your blessings.

The placement spanning 6–8 in 11*σ* accounts for less than 1% of *C*-LHL-*V* but 30% of *C*-LLL-*V*. *mimīhí* also occurs once in 11*σ* spanning 5–7, where it follows the early caesura.

> 3.1.15cd
> *deváir ávo* ***mimīhi*** *sáṃ jaritré*
> *rákṣā ca no dám*ı*yebhir ánīkaiḥ*
> With the gods, give help in full measure to the singer, and guard us with your faces that belong to the house.

The placement spanning 5–7 in 11*σ* accounts for less than 1% of *C*-LHL-*V* but 68% of *C*-LLL-*V*.

The attestations at 7.9.11c and 3.1.15c are anomalous from a rhythmic perspective as well, since they result in the heavy realization of the second post-caesural position

[10] Unless otherwise indicated, translations of the *Rigveda* are taken from Jamison and Brereton.

with *mī*. In 11*σ*, after the early caesura (cf. 3.1.15c), that position is only 6% heavy; after the late caesura (cf. 7.9.11c), it is only 2% heavy. These rhythms motivated the restorations proposed by Meillet and Oldenberg (see §§9–10).

6 Localization vectors

In order to compare localization patterns, we can translate them into vectors. The localization vector for *mimīhí* in 8*σ* is:

(13) 1, 0, 0, 0, 0, 0.

The vector may be read from left to right as "is localized once starting in position 1 (i.e. verse-initially, spanning positions 1–3), zero times starting in position 2 (i.e. spanning 2–4), zero times starting in position 3 (i.e. spanning 3–5)," etc. We arrive at *mimīhí*'s overall localization vector by conjoining the vectors for 8*σ*, 11*σ*, and 12*σ*. (Here I add spaces between them for greater legibility.)

(14) *mimīhí*
1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

In a sense, this vector is the form's metrical fingerprint.

To arrive at the localization vector for a class, we add the individual vectors together. Consider the individual vectors for *C*-LHL-*dhi*, i.e. for all 2sg active imperatives in *-dhí* that have the shape *C*-LHL-*V*. If *mimīhí*'s shape is transmitted correctly, these are its *-dhi* imperative "shapemates."

(15) *C*-LHL-*dhi*

didīhí 'shine' (11×)	0, 0, 0, 0, 1, 0,	0, 0, 0, 0, 0, 1, 0, 0, 7,	0, 0, 0, 0, 1, 0, 0, 0, 1, 0
śiśīhí 'sharpen' (10×)	3, 0, 0, 0, 0, 0,	1, 0, 0, 0, 1, 0, 0, 0, 2,	0, 0, 1, 0, 1, 0, 1, 0, 0, 0
gṛṇīhí 'sing' (9×)	1, 0, 2, 0, 1, 0,	0, 1, 0, 0, 0, 0, 1, 0, 1,	0, 0, 0, 0, 1, 0, 1, 0, 0, 0
cikiddhí 'take note' (7×)	0, 0, 1, 0, 0, 1,	0, 0, 0, 0, 0, 0, 0, 0, 4,	0, 0, 0, 0, 0, 0, 0, 0, 1, 0
punīhí 'purify' (7×)	1, 0, 1, 0, 5, 0,	0, 0, 0, 0, 0, 0, 0, 0, 0,	0, 0, 0, 0, 0, 0, 0, 0, 0, 0
rirīhi 'give' (7×)	0, 0, 0, 0, 0, 0,	1, 0, 2, 0, 0, 0, 0, 0, 3,	0, 0, 1, 0, 0, 0, 0, 0, 0, 0
mumugdhí 'release' (6×)	0, 0, 0, 0, 1, 0,	1, 0, 0, 0, 0, 0, 4, 0, 0,	0, 0, 0, 0, 0, 0, 0, 0, 0, 0
śṛṇīhí 'pound' (6×)	0, 0, 0, 0, 0, 0,	0, 0, 0, 0, 0, 0, 1, 0, 5,	0, 0, 0, 0, 0, 0, 0, 0, 0, 0
yuyodhí 'keep away' (5×)	0, 0, 0, 0, 0, 0,	1, 0, 0, 0, 0, 1, 0, 0, 1,	0, 0, 0, 0, 0, 0, 0, 0, 2, 0
śiśādhi 'sharpen' (4×)	0, 0, 0, 0, 0, 0,	0, 0, 0, 0, 0, 0, 0, 0, 4,	0, 0, 0, 0, 0, 0, 0, 0, 0, 0
mimīhí 'measure' (4×)	1, 0, 0, 0, 0, 0,	0, 0, 0, 0, 1, 2, 0, 0, 0,	0, 0, 0, 0, 0, 0, 0, 0, 0, 0
mamaddhí 'get exhilarated' (2×)	0, 0, 1, 0, 0, 0,	1, 0, 0, 0, 0, 0, 0, 0, 0,	0, 0, 0, 0, 0, 0, 0, 0, 0, 0
pipṛgdhi 'mix' (1×)	0, 0, 0, 0, 0, 0,	0, 0, 0, 0, 0, 0, 0, 0, 1,	0, 0, 0, 0, 0, 0, 0, 0, 0, 0
mamandhi 'wait' (1×)	0, 0, 0, 0, 0, 0,	0, 0, 0, 0, 0, 0, 0, 0, 1,	0, 0, 0, 0, 0, 0, 0, 0, 0, 0
mṛṇīhi 'crush' (1×)	0, 0, 0, 0, 0, 0,	0, 0, 0, 0, 0, 0, 1, 0, 0,	0, 0, 0, 0, 0, 0, 0, 0, 0, 0
śuśugdhí 'blaze' (1×)	0, 0, 1, 0, 0, 0,	0, 0, 0, 0, 0, 0, 0, 0, 0,	0, 0, 0, 0, 0, 0, 0, 0, 0, 0

There are 16 types and 82 tokens. By adding the vectors together, we get the overall localization vector for *C*-LHL-*dhi*.

(16) *C*-LHL-*dhi*

6, 0, 6, 0, 8, 1, 5, 1, 2, 0, 2, 4, 7, 0, 29, 0, 0, 2, 0, 3, 0, 2, 0, 4, 0

Taking *mimīhí* and the other *C*-LHL-*dhi* forms together with the rest of their shapemates, regardless of morphosyntax, the localization vector of the entire *C*-LHL-*V* class is:

(17) *C*-LHL-*V*

214, 42, 419, 1, 94, 5, 230, 24, 333, 0, 18, 15, 108, 2, 1580, 87, 11, 168, 1, 28, 3, 51, 0, 65, 0.

The *-dhi* imperative shapemates of a putative **mimihí* in the *C*-LLL-*dhi* subclass have the following vectors:

(18) *C*-LLL-*dhi*

kṛṇuhí 'make' (26×)	1, 0, 2, 0, 0, 0,	0, 0, 0, 0,	15, 5, 1, 0, 0,	0, 0, 0, 0, 2, 0, 0, 0, 0, 0
śṛṇuhí 'hear' (6×)	0, 0, 0, 0, 0, 0,	0, 0, 0, 0,	2, 1, 0, 0, 0,	0, 0, 0, 0, 1, 2, 0, 0, 0, 0
tanuhí 'stretch' (4×)	0, 0, 0, 1, 0, 0,	0, 0, 0, 0,	1, 1, 0, 0, 0,	0, 0, 0, 0, 1, 0, 0, 0, 0, 0
piprhí 'carry, rescue' (2×)	0, 0, 0, 0, 0, 0,	0, 0, 0, 0,	1, 0, 0, 0, 0,	0, 0, 0, 0, 1, 0, 0, 0, 0, 0
cinuhí 'clear (?)' (1×)	1, 0, 0, 0, 0, 0,	0, 0, 0, 0,	0, 0, 0, 0, 0,	0, 0, 0, 0, 0, 0, 0, 0, 0, 0
hinuhí 'urge on' (1×)	0, 0, 0, 1, 0, 0,	0, 0, 0, 0,	0, 0, 0, 0, 0,	0, 0, 0, 0, 0, 0, 0, 0, 0, 0

The subclass with its 6 types and 40 tokens is smaller than *C*-LHL-*dhi*. Their overall localization vector is:

(19) *C*-LLL-*dhi*

2, 0, 2, 2, 0, 0, 0, 0, 0, 0, 19, 7, 1, 0, 0, 0, 0, 0, 0, 5, 2, 0, 0, 0, 0.

The localization vector of the larger *C*-LLL-*V* class is:

(20) *C*-LLL-*V*

12, 2, 39, 14, 0, 10, 2, 0, 1, 0, 231, 103, 2, 0, 2, 2, 1, 7, 0, 91, 36, 1, 1, 0, 0.

7 Comparing localization vectors

As noted above, the localization of *mimīhí* is not particularly like that of other *C*-LHL-*V*. In order to quantify how like or unlike two localization patterns are, we can test for correlation using the Pearson correlation coefficient *r*.[11] The value of *r* ranges between 1 and −1, such that 1 is a total positive correlation, 0 is no correlation, and −1 is a total negative correlation. In practice, for the data here, the values range from close to 1 (a strong positive correlation) to close to zero (virtually no correlation). For example, *śṛṇīhí* exhibits a strong positive correlation with other *C*-LHL-*V*

[11] Cf. Gunkel 2010 and Sandell 2016, where localization vectors are compared using probability values from Fisher's Exact Test. For the data addressed here, Fisher's *p* is too computationally expensive to generate, at least with standard computing capabilities. The problem is familiar to computational linguists and statisticians using *R* (R Core Team 2017); see Desagulier 2017:185–6.

(r = 0.92). It is localized very much like its shapemates. *mimīhí* exhibits a slight negative correlation with its shapemates (r = −0.08). However, as the probability value returned by the correlation test shows, that slight correlation can be attributed to chance (p = 0.69); in other words, there may be no correlation at all. By convention, if p is less than 0.05, we can regard the correlation as significant.[12] If it is greater than or equal to 0.05, we can consider it to be insignificant, meaning that there is a reasonable chance that the true correlation is zero.

The table in (21) compares the localization of all *C*-LHL-*dhi* attested more than 3× with (a) the localization of other *C*-LHL-*dhi* and (b) the localization of other *C*-LHL-*V*'s. I have taken *śiśīhí* and its byform *śiśādhi* (with anomalous full grade and *-dhi* for expected *-hi*) together because they are in complementary distribution in the *Rigveda* (cf. Baum 2006:171).[13] The forms are sorted by the correlation coefficient r (for *C*-LHL-*dhi*) in descending order. I interpret the first row as follows: *śṛṇīhí* 'pound' occurs 6× (N) in the corpus; there is a strong positive correlation with *C*-LHL-*dhi* (r = 0.89), meaning that it is localized very much like its *-dhi* imperative shapemates; the correlation is statistically significant ($p < 0.05$), meaning that it should not be attributed to chance; there is a strong positive correlation with its broader *C*-LHL-*V* shapemates (r = 0.92); it is also significant ($p < 0.05$). The first five forms have a significant positive correlation with their shapemates. The last three exhibit a very weak and insignificant correlation.

(21)

	N	r (*C*-LHL-*dhi*)	p (*C*-LHL-*dhi*)	r (*C*-LHL-*V*)	p (*C*-LHL-*V*)
śṛṇīhí	6	0.89	< 0.05	0.92	< 0.05
didīhí	11	0.87	< 0.05	0.89	< 0.05
cikiddhí	7	0.83	< 0.05	0.90	< 0.05
śiśīhí/*śiśādhi*	14	0.77	< 0.05	0.85	< 0.05
rirīhi	7	0.65	< 0.05	0.85	< 0.05
gṛṇīhí	9	0.40	< 0.05	0.38	0.06
yuyodhí	5	0.34	0.09	0.33	0.11
mumugdhí	6	0.04	0.85	−0.02	0.94
punīhí	7	0.03	0.89	0.01	0.95
mimīhí	4	−0.04	0.86	−0.08	0.69

Note that the two r values for a given imperative are quite similar. At least for words of the shape *C*-LHL-*V*, controlling for morphosyntax does not appear to have much of an effect. In fact, *C*-LHL-*dhi* are localized very much like other *C*-LHL-*V* (r = 0.93, $p < 0.0001$).

Does that mean that word order in the *Rigveda* is solely determined by the meter? No: the poets composed utterances that are both grammatically and metrically

[12] For present purposes and for the sake of simplicity, I do not penalize p-values for multiple testing. A Bonferroni correction would lower the criterion for significance to $p < 0.005$ (0.05 divided by the number of tests performed, i.e. 10). With the correction, one borderline case (*gṛṇīhí*) would become insignificant.

[13] Descriptively, we find *sáṃ śiśādhi* instead of *sáṃ śiśīhi* pāda-finally in 11σ—a pattern that lacks a satisfactory explanation.

well formed. The requirement of metrical well-formedness results in the similar localization of similarly shaped forms. There is also clear evidence for grammatical well-formedness affecting localization. For example, the localization of *C*-LHH-*VV*-shaped infinitives in *-dhyai* (e.g. *píbadhyai* 'to drink', *yájadhyai* 'to sacrifice') is similar to the localization of their broader *C*-LHH-*VV* shapemates, but the infinitives are significantly skewed towards placements later in the pāda. That is obviously an effect of syntax: as in other verb phrases, infinitives are phrase-final.[14]

8 *mumugdhí* and *punīhí*

Surprising localization patterns do not necessarily point to *restauranda*. The localization of *mumugdhí* 'release' (6×) is made surprising by its collocation with the preverbs *ví* and *prá*.[15] In four of the five occurrences in 11*σ*, *prá*/*ví mumugdhi* occurs after the late caesura, such that the preverb + verb "complex" spans 6–9. As a result, *mumugdhi* spans 7–9, an unusual placement that only accounts for 5% of *C*-LHL-*V* in 11*σ*. If we hypothesize that the poets localized *prá mumugdhi* and *ví mumugdhi* similarly to single words of the shape *CC*-LLHL-*V* and *C*-LLHL-*V*, the localization of *mumugdhí* is far less surprising: for both shapes, the placement spanning 6–9 accounts for 84% in 11*σ*.

Six of the seven occurrences of *punīhí* 'purify' are found in 9.67.22–7, "a self-contained purificatory spell, calling on various gods . . . to purify us with their own characteristic instruments" (Jamison and Brereton ad loc.). Its localization is thus strongly influenced by the poetics of a particular poem. Since the spell is in 8*σ*, the localization of *mumugdhí* is skewed towards that pāda type. This is not the place to reproduce the entire spell, but a glance at the pādas in which *punīhí* occurs reveals that the repetition of the phrase [NP_{INSTR} *punīhi naḥ*] 'purify us with NP' and variants thereof determines the localization of *punīhí*.

9.67.23c	*bráhma téna* ***punīhi*** *naḥ*
9.67.24b	*ágne téna* ***punīhi*** *naḥ*
9.67.24c	*brahmasaváiḥ* ***punīhi*** *naḥ*
9.67.25c	*mắm* ***punīhi*** *viśvátaḥ*
9.67.26c	*ágne dákṣaiḥ* ***punīhi*** *naḥ*
9.67.27d	*jắtavedaḥ* ***punīhí*** *mā*

Outside of the spell, *punīhí* occurs spanning 1–3 in 8*σ* in a repeated pāda (9.16.3bc = 9.51.1bc).[16]

[14] This is the "neutral" order. On the syntax of Vedic infinitives, see *AiWf* 33–5, *AiS* 18, Verpoorten 1977:49–50, and Keydana 2013, especially pp. 88, 140, 170, and 184–5.

[15] Possibly also by its participation in the more complex phrases [NP *prá mumugdhi asmát*] 'release NP from us' (2×) and post-caesural [*ví mumugdhi* NP] 'release NP' (2×), both stretching from the late caesura to pāda-end in 11*σ*.

[16] If we look at the repetition alone, this would appear to be a counterexample to the usual [[a b] c]

9.16.3ab
sómam pavítra á́ srja
***punīhí**ndrāya pā́tave*
Send the soma surging into the filter. Purify it for Indra to drink. (after Jamison and Brereton)

Taken together, we have a total restriction to 8σ and an overrepresentation in the third most popular placement there, i.e. spanning 5–7, due to the repetition of *punīhi naḥ/punīhí mā* in the spell—a surprising localization pattern.

mumugdhí and *punīhí* show us that the restriction to a particular poem and/or the participation in regular collocations can lead to a surprising distribution. However, neither of these factors explains the distribution of *mimīhí*, so we turn to two proposals for restoration, both made in passing.

9 Meillet on *mimīhí*

As noted above, two attestations of *mimīhí* are also surprising from a rhythmic perspective, because they involve the heavy realization of the second post-caesural position. Regarding the rhythm of 3.1.15c, Meillet (1897:268–9) suggested that *mimīhí* may have originally had a byform **mīmihí* like *didīhí/dīdihí* 'shine'. Meillet's suggestion is not particularly plausible on morphophonological grounds, since innovative preconsonantal weak-stem variants of the type *dīdi-*, *tūtu-*, etc. (vs. older *didī-*, *tutū-*, etc.) are restricted to perfects formed to *seṭ* roots of the shape *CaU̯^{i}* (cf. Kümmel 2000:21–2, Baum 2006:121).

We can essentially rule the suggestion out on localizational grounds. If *mimīhí* originally had a byform **mīmihí* that was lost in transmission, and if the poets chose between the two as they chose between *didīhí* and *dīdihí*, then Meillet would predict that (the forms transmitted as) *mimīhí* should be localized like *didīhí* and *dīdihí* taken together, whose combined localization vector is:

(22) *didīhí + dīdihí*
0, 0, 0, 0, 1, 8, 0, 0, 0, 0, 0, 2, 0, 0, 7, 0, 0, 0, 0, 1, 1, 0, 0, 1, 3.

The correlation between the localization of *mimīhí* and (22), however, is weak and insignificant (r = 0.007, p = 0.97).

10 Oldenberg on *mimīhí*

In his *Noten* on 3.1.15, 7.19.11, and 1.120.9, Oldenberg suggested restoring/reconstructing **mimihí*, referring to Wackernagel's discussion of *i* and *ī* as reflexes of laryngeals (*AiGr* 1.19–20). As I will argue, this is in all likelihood correct. First, localization

structure of the gāyatrī stanza (cf. Gunkel and Ryan 2018). However, from the standpoint of syntax and semantics, both stanzas have the usual structure: the a-pādas form a sentence with the b-pādas.

patterns provide strong support for restoring a form of the shape *C*-LLL-*V*. Second, **mimihí* is plausibly understood as the regular phonological development of **mimh*$_1$*d*^{h}*i* (to PIE **meh*$_1$-), which was later replaced by analogical *mimīhí*.

For rhythmic reasons, Oldenberg also suggested restoring **mimitám* and **mimitam* for *mimītám* and *mimītam* at 1.120.9bc, and **mimitām* for *mimītām* at 5.51.11a. Since the first two occur in uneven lyric, they are excluded from our corpus, and there is no point in applying our localization methods to the one remaining form. This certainly does not invalidate them as evidence, though. Despite the weird metrical form of the hymn, the first two occurrences are at least comparable to locations spanning 5–7 in 11*σ*. As transmitted, they would result in the heavy realization of the second position after the early caesura in 11*σ* (only 6% heavy). As **mimitám*/*mimitam*, they would not.

> 1.120.9ab
> *rāyé ca no* ***mimītáṃ*** *vā́javatyai*
> *iṣé ca no* ***mimītaṃ*** *dhenumátyai*
> Measure us for wealth accompanied by prizes of victory, and measure us for nourishment accompanied by cattle.

The third occurrence spans 5–7 in 12*σ*, apparently resulting in the heavy realization of position 6 after the early caesura (8% heavy).

> 5.51.11ab
> *svastí no* ***mimītām*** *aśvínā bhágaḥ*
> *svastí dev*$_i$*y áditir anarvāṇaḥ*
> Well-being let the Aśvins, let Fortune mete out to us; well-being let the goddess Aditi, let the unassailable ones.

11 The localizational evidence for **mimihí*

The correlation between the localization of *mimīhí* and other *C*-LLL-*dhi* is positive and significant ($r = 0.63$, $p < 0.001$). In other words, *mimīhí* is localized like *-dhi* imperatives of the shape **mimihí*. The correlation between the localization of *mimīhí* and *C*-LLL-*V* is similarly positive and significant ($r = 0.62$, $p < 0.001$).

We can quantify the localizational bias of *mimīhí* away from *C*-LHL-*dhi* and toward *C*-LLL-*dhi* by subtraction: $r_{C\text{-LHL-}dhi} - r_{C\text{-LLL-}dhi}$.[17] The bias value (*B*) for *mimīhí* is −0.66 (= −0.04 − 0.63). The nature of our data being what it is, in practice *B* will range between 1 and −1. Given a total positive correlation with *C*-LHL-*dhi* ($r = 1$) and no correlation with *C*-LLL-*dhi* ($r = 0$), we will get a full bias towards *C*-LHL-*dhi* ($B = 1$). Given no correlation with *C*-LHL-*dhi* ($r = 0$) and a total positive correlation with *C*-LLL-*dhi* ($r = 1$), we will get a full bias towards *C*-LLL-*dhi* ($B = -1$).

[17] I thank Kevin Ryan for pointing this out to me.

Chart 1 shows the bias values for all *C*-LHL-*dhi* and *C*-LLL-*dhi* with a frequency greater than 3×. With the exception of *mimīhí*, all *C*-LHL-*dhi* are biased toward their shapemates, and all *C*-LLL-*dhi* are biased toward theirs; *mimīhí* patterns with *C*-LLL-*dhi* (i.e. *kr̥ṇuhí*, *śr̥ṇuhí*, and *tanuhi*).

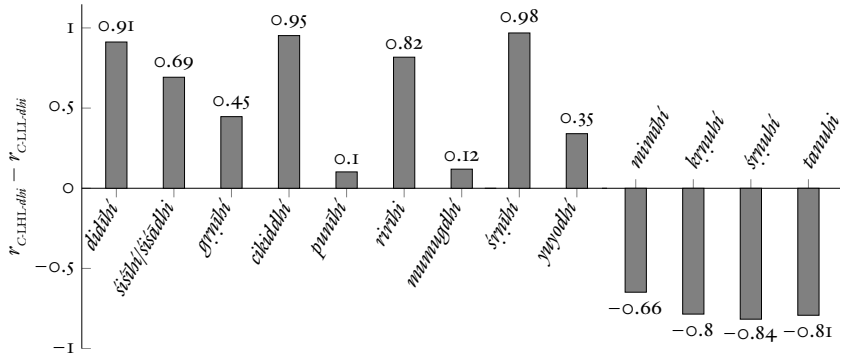

Chart 1. Positive values reflect a localizational bias towards *C*-LHL-*dhi*; negative values reflect a bias towards *C*-LLL-*dhi*.

In sum, *mimīhí* is localized more like *C*-LLL-*dhi* than *C*-LHL-*dhi*. In this respect, it differs from other *C*-LHL-*dhi* but is similar to *C*-LLL-*dhi*. The evidence from localization strongly supports the restoration of **mimihí*.[18]

12 The linguistic status of **mimihí*

In closing, let me discuss the linguistic status of **mimihí*. I see only one straightforward analysis, taking Jamison 1988 as a point of departure.[19] Word-finally, interconsonantal laryngeals developed into *ī* in Indic, e.g. **(h₁)e̯ue̯mh₁t* > *avamīt* 'vomited'. Elsewhere, they developed into *i*, e.g. **u̯emh₁ti* > *vamiti* (TS, MS) 'vomits'. Thus the phonologically regular development would be **mimh₁dʰi* > **mimihí*. Parallel outcomes are **stenh₂dʰi* > *stanihi* 'thunder' and **k̂neth₂dʰi* > *śnathihi* 'pierce'. As Jamison discusses at length, the long *ī* is exceptional and presumably due to analogical change in Class III reduplicated presents of the type *mímīte*, *jíhīte* 'moves', *śíśīte* 'sharpens'[20] and Class IX presents of the type *punīté* 'purifies', *gr̥ṇīté* 'is sung', *ní riṇīte* 'spills down'.

[18] Given the analogical change of **mimihí* >> *mimīhí* (§12) and the nature of the *Rigveda*, it is of course possible that the text contained younger forms, too, e.g. at 3.54.22b. If so, the older forms were nevertheless attested robustly enough to result in the bias shown in Chart 1.

[19] Building on Jamison 1988, see Werba 2005; Byrd 2015, 2016; Kümmel 2016. For a divergent account, see Lipp 2009:351–487.

[20] See Sandell 2011 for a collection and discussion of Class III reduplicated present in Vedic and further references.

I am not aware of any evidence for phonologically regular **-ni-* in the Class IX presents, but there is at least one reduplicated present that is transmitted with a short vowel and appears to preserve the inflectional alternation *jahā-* ∼ *jahi-* in the AVŚ, namely *jahimaḥ* 'we leave'. The short *i* of the syllable *hi* is reasonably well secured by its placement in the 5th position of an even pāda in anuṣṭubh.

> 6.26.2ab
> *yó naḥ pāpman ná jáhāsi*
> *tám u tvā* ***jahimo*** *vayám*
> You, o evil one, who do not leave us—WE leave YOU.

As noted above, we may consider **mimitám* and **mimitām* as additional evidence. The apparent asymmetry between Class IX presents and reduplicated presents is most compatible with a historical scenario in which the analogy that produced *-nī-* in the Class IX presents ran its course before the analogy that produced *ī* in the reduplicated presents was complete. Here, I adopt the analysis of Praust 2004 with a very slight modification (see below).[21]

According to Praust, the realization of /Cn*HC*/ as [C̥n*HC*] was avoided in PIE in favor of [C*nə*H*C*] (my notation) in order for suffixal *n* to be non-syllabic throughout the inflectional paradigm. In other words, strong ∼ weak alternations such as *[gʰr̥bnah₂ti] ∼ *[gʰr̥bnəh₂toi] were preferred to potential alternations such as *[gʰr̥bnah₂ti] ∼ *[gʰr̥bnn̥h₂toi]. The further development to *-nī-* in Indic was the result of regular sound change, not Indic-internal analogy.[22] With Praust and others,[23] I consider it likely that the stem-final *ī* in reduplicated presents is by analogy to the stem-final *ī* in Class IX presents, quasi *punáti* : *punīté* :: *śíśāti* : X; X = *śíśīte*. It is possible that the analogy began before the sound change $VH]_{\sigma} > \bar{V}$, as Praust envisages (2004:380–1). What the post-Rigvedic and -Atharvavedic changes of **mimihí* >> *mimīhí* and *jahimaḥ* >> *jahīmaḥ* show is that at least some, if not all, of the analogical replacements postdated that sound change.

Abbreviations

AiGr I = Wackernagel, Jakob. 1896. *Altindische Grammatik*. Vol. I, *Lautlehre*. Göttingen: Vandenhoeck & Ruprecht.

AiS = Delbrück, Berthold. 1888. *Altindische Syntax*. Halle: Buchhandlung des Waisenhauses.

AiWf = Delbrück, Berthold. 1878. *Die altindische Wortfolge aus dem Çatapathabrāhmaṇa dargestellt*. Halle: Buchhandlung des Waisenhauses.

[21] For an alternative to Praust 2004, see Yoshida 2013. Yoshida adduces an Anatolian parallel to support Wackernagel's claim (*AiGr* 1.20) that the vowel length in *-nī-* is carried over from *-nā-*, a process that was "begünstigt durch den Trieb nach gleicher Quantität in starken und schwachen Formen." For a critique of Wackernagel's claim, see Jamison 1988:224.

[22] For discussion of Praust 2004, see Lipp 2009:392–4 n. 97.

[23] See Praust 2004:380 n. 23 for references.

Commentary = Jamison, Stephanie W. N.d. "Rigveda Translation: Commentary." Accessed June 1, 2018. http://rigvedacommentary.alc.ucla.edu.

Jamison and Brereton = Jamison, Stephanie W., and Joel P. Brereton (trans.). 2014. *The Rigveda: The Earliest Religious Poetry of India*. 2 vols. New York: Oxford University Press.

Noten = Oldenberg, Hermann. 1909–12. *Ṛgveda: Textkritische und exegetische Noten*. 2 vols. Berlin: Weidmann.

Prolegomena = Oldenberg, Hermann. 1888. *Die Hymnen des Ṛigveda*. Vol. 1, *Metrische und textgeschichtliche Prolegomena*. Berlin: Hertz.

VM = Arnold, E. Vernon. 1905. *Vedic Metre in Its Historical Development*. Cambridge, UK: Cambridge University Press.

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