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

Dieter Gunkel
University of Richmond, dgunkel@richmond.edu

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Vina Diem Celebrent

Studies in Linguistics and Philology
in Honor of

Brent Vine

edited by

Dieter Gunkel
Stephanie W. Jamison
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Kazuhiko Yoshida

Beech Stave Press
Ann Arbor • New York
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vi
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 mimihí in the meter similarly to the way that they localize forms of the same metrical/phonological shape, e.g. didihi ‘shine’, šībhi ‘sharpen’, grnyihí ‘sing’. Instead, they localize them like forms of the shape *mimihí, e.g. kṛñihí ‘make’, śṛṇuhí ‘hear’, tanuhí ‘stretch’. Thus we should restore *mimihí. I then suggest that *mimihí should be understood as the regular phonological development of *mimh₁d₁hi, a form that had not yet undergone the analogical process that produced the i in Class III reduplicated present stems of the type mim₁-₁, ši₁-, 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 padapātha-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 Vālakhiliya, 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.*
Localizational Evidence for the Restoration of Rigvedic *mimihí ‘measure’

(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 (−) 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.

\[
\begin{align*}
(1) & & 8σ \\
& & × − × − × − × − × − × − × − × − × − × −
\end{align*}
\]

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, − × − − × −). 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 (− × − − × −).

\[
\begin{align*}
(2) & & 11σ \\
& & × − × − × − × − × − × − × − × − × − × − × − × − × − × − × − × − × − × − × − × − × − × − × − × −
\end{align*}
\]

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

\[
\begin{align*}
(3) & & 12σ \\
& & × − × − × − × − × − × − × − × − × − × − × − × − × − × − × − × − × − × − × − × − × − × − × − × −
\end{align*}
\]

Counting by pāda, the corpus includes 83% of the Rigveda.\(^8\)

---

\(^1\)For epic anuṣṭubh, also known as “late(σ)” 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 164.

\(^4\)For pentad, see Prolegomena 95–8 and VM 238–40.

\(^5\)For virāṭsthānā, 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 under-studied) metrical differences that depend on the position of the pāda in the larger structure of the stanza. For
The most prominent meters made up of these pāda types are gāyatrī and anuśṭubh (8σ), triṣṭubh (11σ), and jagatī (12σ).

3 Localization of C-LHL-V

To assess the metrical evidence for the restoration of mimihī to *mimihī, I compare the localization of mimihī to the localization of other words of the shape mimihī, 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×)
  mādāya ‘exhilaration’ M.DAT.SG (71×)
  vīśīnī ‘goods’ N.NOM/ACC/VOC.PL (62×)
  jūśāva ‘enjoy’ 2SG.PRES.IPV.MID (35×)
  sūtāsya ‘pressed’ M/N.GEN.SG (50×)
  rāthena ‘chariot’ M.INSTR.SG (47×)
  rājāmsi ‘realms’ N.NOM/ACC/VOC.PL (38×)
  purāṇi ‘many’ N.NOM/ACC/VOC.PL (36×)
  cāranti ‘proceed’ 3PL.PRES.IND.ACT (36×)
  vāhantu ‘convey’ 3PL.PRES.IPV.ACT (36×)

In 8σ, 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 mādāya as a stand-in for the class:

(6) C-LHL-V in 8σ

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>má dā ya</td>
<td>54%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>má dā ya</td>
<td>28%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In 11σ, three placements account for 92% of the forms. The most frequent is páda-final (68%). The other two are as in 8σ, i.e. spanning 3–5, which is only compatible with the late caesura, and páda-initial.

(7) \[ C\text{-LHL-V in } 11\sigma \]

\[
\begin{array}{ccccccccccc}
1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 \\
\hline
\text{má dā ya} & & & & & \text{68%} & & & & & \\
\text{má dā ya} & & & & \text{14%} & & & & & & \\
\times & \times & \times & \times & \times & \times & \times & \times & \times & \times & \times \\
\times & \times & \times & \times & \times & \times & \times & \times & \times & \times & \times \\
\end{array}
\]

In 12σ, four placements account for 90% of the forms. The three most frequent are familiar from 8σ and 11σ. The placement spanning 9–11 (16%), which requires a páda-final monosyllable, is far less popular than it is in 11σ (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 caraniti after the early caesura and vi caraniti after the late one. That placement is quite a bit less frequent in 11σ (5%) and thus not shown in (7).

(8) \[ C\text{-LHL-V in } 12\sigma \]

\[
\begin{array}{ccccccccccc}
1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 \\
\hline
\text{má dā ya} & & & & & \text{41%} & & & & & & \\
\text{má dā ya} & & & & \text{21%} & & & & & & & \\
\times & \times & \times & \times & \times & \times & \times & \times & \times & \times & \times & \times \\
\times & \times & \times & \times & \times & \times & \times & \times & \times & \times & \times & \times \\
\end{array}
\]

4 The localization of \( C\text{-LLL-V} \)

To assess the metrical evidence for the restoration of mimihí to *mimihí, I also compare the localization of mimihí 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) váruna ‘Varuṇa’ M.VOC.SG (64×)
bhávati ‘becomes, is’ 3SG.PRES.IND.ACT (34×)
cára ti ‘moves’ 3SG.PRES.IND.ACT (33×)
vrśabhya ‘bull’ M.VOC.SG (27×)
kṛṣṇah ‘make’ 2SG.PRES.IPV.ACT (26×)
bhávatu ‘let be(come)’ 3SG.PRES.IPV.ACT (16×)
bhávasti ‘you become, are’ 2SG.PRES.IND.ACT (13×)
vádati ‘speaks’ 3SG.PRES.IND.ACT (11×)

bhárata ‘bring’ 2SG.PRES.IPV.ACT (10×)

In 8σ, 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 mádáya 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 mádáya type with 28% in 1–3 and 12% in 5–7). váruna stands in for the class.

(10) C-LLL-V in 8σ

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>va</td>
<td>ru</td>
<td>ŋa</td>
<td>51%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>va</td>
<td>ru</td>
<td>ŋa</td>
<td>18%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vá</td>
<td>ru</td>
<td>ŋa</td>
<td>16%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>va</td>
<td>ru</td>
<td>ŋa</td>
<td>13%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>×</td>
<td>–</td>
<td>×</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>

In 11σ, 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 11σ

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>va</td>
<td>ru</td>
<td>ŋa</td>
<td>68%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>va</td>
<td>ru</td>
<td>ŋa</td>
<td>30%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>×</td>
<td>–</td>
<td>×</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>×</td>
<td>–</td>
<td>×</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

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

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

(12) C-LLL-V in 12σ

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>va</td>
<td>ru</td>
<td>ŋa</td>
<td>65%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>va</td>
<td>ru</td>
<td>ŋa</td>
<td>26%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>×</td>
<td>–</td>
<td>×</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>×</td>
<td>–</td>
<td>×</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contrast the mádáya 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, nú carati follows the early caesura.
5 The localization of mimihí

mimihí occurs once in 8σ and three times in 11σ; it is not attested in 12σ. The occurrence in 8σ 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
mimihí slōkam āṣyè
parjānya iva tatanah
Bellow [/measure] the call that is in your mouth. Like Parjanya, you will thunder [/stretch it out].

In 11σ, mimihí occurs twice spanning 6–8. One is a repeated pāda (3.54.22b = 5.4.2d = 6.19.3b), in which sām mimihí ‘measure out, distribute’ follows the early caesura.

3.54.22b
asmadrং kā sām mimihí śravānśi
Mete out fame in our direction.

In the other, mimihí follows the late caesura. Note the presence of the preverb úpa and the ellipsis of mimihí in the second clause in 11c [ úpa no vājān mimihíy ] [ úpa stīn mimihí].

7.19.11cd
úpa no vājān mimihíy úpa stīn
yūyām pāta sarśvībhiḥ sādā naḥ
Measure out prizes to us, measure out beings [= people]. Do you protect us always with your blessings.

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

3.1.15cd
devāir āvo mimihí sām jariitré
rākṣa ca no dām yeblīr āṅkaitiḥ
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 11σ 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

60 Unless otherwise indicated, translations of the Rigveda are taken from Jamison and Brereton.
with mi. In 11σ, 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 mimíbi in 8σ is:

\[ (13) \quad \begin{array}{cccccccccccc} I & O & O & O & O & O & O \\ \end{array} \]

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 mimíbi’s overall localization vector by conjoining the vectors for 8σ, 11σ, and 12σ. (Here I add spaces between them for greater legibility.)

\[ (14) \quad \textit{mimíbi} \]

\[ \begin{array}{cccccccccccc} I & O & O & O & O & O & O & O & O & O & 0 \\ \end{array} \]

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-\textit{dbi}, i.e. for all 2sg active imperatives in -\textit{dbi} that have the shape C-LHL-V. If mimíbi’s shape is transmitted correctly, these are its -\textit{dbi} imperative “shapemates.”

\[ (15) \quad \text{C-LHL-\textit{dbi}} \]

<table>
<thead>
<tr>
<th>Verbal Form</th>
<th>8σ</th>
<th>11σ</th>
<th>12σ</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>didíbi 'shine' (11×)</td>
<td>0, 0, 0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 1, 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>siúsíbi 'sharpen' (10×)</td>
<td>1, 0, 0, 0, 1, 0, 0, 0, 0, 2, 0, 0, 0, 0, 0, 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>grúntíbi 'sing' (9×)</td>
<td>1, 0, 2, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cikiddíbi 'take note' (7×)</td>
<td>1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>puníbi 'purify' (7×)</td>
<td>0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rírthí 'give' (7×)</td>
<td>1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mumugdbí 'release' (6×)</td>
<td>0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>šírthí 'pound' (6×)</td>
<td>0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yuyodíbi 'keep away’ (5×)</td>
<td>0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>šiidábi 'sharpen' (4×)</td>
<td>1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mimíbi 'measure' (4×)</td>
<td>0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mambaddíbi</td>
<td>0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>'get exhilarated’ (2×)</td>
<td>0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pipgdbí 'mix' (1×)</td>
<td>1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mamamíbi 'wait’ (1×)</td>
<td>0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mríbi 'crush' (1×)</td>
<td>0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>šíwodíbi 'blaze’ (1×)</td>
<td>0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There are 16 types and 82 tokens. By adding the vectors together, we get the overall localization vector for C-LHL-\textit{dbi}. 82
Localizational Evidence for the Restoration of Rigvedic *mimihí ‘measure’

(16)  C-LHL-dbi

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 *mimihí and the other C-LHL-dbi 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 -dbi imperative shapemates of a putative *mimihí in the C-LLL-dbi subclass have the following vectors:

(18)  C-LLL-dbi

krubhi ‘make’ (26×) 1, 0, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
šrubi ‘hear’ (6×) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
tamši ‘stretch’ (4×) 0, 0, 0, 1, 0, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
pipši ‘carry, rescue’ (2×) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
cinši ‘clear (?)’ (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,
binši ‘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.

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

(19)  C-LLL-dbi

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

7 Comparing localization vectors

As noted above, the localization of mimihí 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.\(^\text{11}\) 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, šrubi 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.
It is localized very much like its shapemates. mimihi 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.\(^\text{12}\) 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\( \times \) with (a) the localization of other C-LHL-dhi and (b) the localization of other C-LHL-V’s. I have taken siśih and its byform siśadh (with anomalous full grade and -dhi for expected -hi) together because they are in complementary distribution in the Rigveda (cf. Baum 2006:171).\(^\text{13}\) The forms are sorted by the correlation coefficient \( r \) (for C-LHL-dhi) in descending order. I interpret the first row as follows: śṛṇīhi ‘pound’ occurs 6\( \times \) (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.

\[
\begin{array}{cccccc}
\text{N} & r \text{ (C-LHL-dhi)} & p \text{ (C-LHL-dhi)} & r \text{ (C-LHL-V)} & p \text{ (C-LHL-V)} \\
\hline
\text{śṛṇīhi} & 6 & 0.89 & < 0.05 & 0.92 & < 0.05 \\
\text{dīdīhi} & 11 & 0.87 & < 0.05 & 0.89 & < 0.05 \\
\text{cikidhi} & 7 & 0.83 & < 0.05 & 0.85 & < 0.05 \\
\text{śśih/sśadh} & 14 & 0.77 & < 0.05 & 0.85 & < 0.05 \\
\text{vīrīhi} & 7 & 0.65 & < 0.05 & 0.85 & < 0.05 \\
\text{grūdhi} & 9 & 0.40 & < 0.05 & 0.38 & 0.06 \\
\text{yuvadhi} & 5 & 0.34 & 0.09 & 0.33 & 0.11 \\
\text{mumugdhi} & 6 & 0.04 & 0.85 & -0.02 & 0.94 \\
\text{pumih} & 7 & 0.03 & 0.89 & 0.01 & 0.95 \\
\text{mimih} & 4 & -0.04 & 0.86 & -0.08 & 0.69 \\
\end{array}
\]

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

\(\text{Footnotes:}
\]

\(^\text{12}\)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 \( p < 0.005 \) \((0.05 \text{ divided by the number of tests performed, i.e. 10})\). With the correction, one borderline case \( (\text{grūdhi}) \) would become insignificant.

\(^\text{13}\)Descriptively, we find sāṭu sīśadh instead of sāṭu siśih páda-finally in 119—-a pattern that lacks a satisfactory explanation.

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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. pibadhya ‘to drink’, yajadhyai ‘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 mumugdhī and punībī

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

Six of the seven occurrences of punībī ‘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 8σ, the localization of mumugdhī is skewed towards that pāda type. This is not the place to reproduce the entire spell, but a glance at the pādas in which punībī occurs reveals that the repetition of the phrase [ NP


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

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.

Possibly also by its participation in the more complex phrases [NP pŕa mumugdhi asmāt] ‘release NP from us’ (2×) and post-caesural [vi mumugdhi NP] ‘release NP’ (2×), both stretching from the late caesura to pāda-end in 11σ.

If we look at the repetition alone, this would appear to be a counterexample to the usual [ [ a b ] c ]
9.16.3ab
sūnām pāvītra ā srja
punihindrāya pātave
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 $8\sigma$ and an overrepresentation in the third most popular placement there, i.e. spanning 5–7, due to the repetition of punih punihā in the spell—a surprising localization pattern.

mumugdhī and punihī 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 mimihī, so we turn to two proposals for restoration, both made in passing.

9 Meillet on mimihī

As noted above, two attestations of mimihī 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 mimihī may have originally had a byform *mimihī like didihī/didihī ‘shine’. Meillet’s suggestion is not particularly plausible on morphophonological grounds, since innovative preconsonantal weak-stem variants of the type didī-, tūtū-, etc. (vs. older didī-, tūtū-, etc.) are restricted to perfects formed to set roots of the shape CaU (cf. Kümmel 2000:21–2, Baum 2006:121).

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

$$(22)\quad \text{didihī + didihī}$$

$$\begin{align*}
0, 0, 0, 0, 1, 8, & \quad \begin{align*}
0, 0, 0, 0, 0, 2, 0, 0, 7, & \quad 0, 0, 0, 0, 1, 1, 0, 0, 1, 3.
\end{align*}
\end{align*}$$

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

10 Oldenberg on mimihī

In his Noten on 3.1.15, 7.19.11, and 1.120.9, Oldenberg suggested restoring/reconstructing *mimihī, referring to Wackernagel’s discussion of i and i 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-pādās form a sentence with the b-pādās.
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 *mimh₁dh₁ (to PIE *meh₁-), which was later replaced by analogical mim¯ıhí.

For rhythmic reasons, Oldenberg also suggested restoring *mimitám and *mimitam for mimıtám and mimıtam at 1.120.9bc, and *mimitám for mimıtám 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 11σ. As transmitted, they would result in the heavy realization of the second position after the early caesura in 11σ (only 6% heavy). As *mimitám/mimitam, they would not.

1.120.9ab
rāyē ca no mimitám vājavatya
iṣe ca no mimitam dhenumātaya
Measure us for wealth accompanied by prizes of victory, and measure us for nourishment accompanied by cattle.

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

5.51.11ab
svastī no mimitám aśvinā bhāgah
svastī devy āditir anarvānah
Well-being let the Aśvins, let Fortune mete out to us; well-being let the goddess Aditi, let the unassailable ones.

II The localization evidence for *mimihí

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

We can quantify the localizational bias of mimihí away from C-LHL-dhi and toward C-LLL-dhi by subtraction: $r_{C-LHL-dhi} - r_{C-LLL-dhi}$. The bias value ($B$) for mimihí 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-LLL-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 ($B = -1$).

I thank Kevin Ryan for pointing this out to me.
Dieter Gunkel

Chart 1 shows the bias values for all C-LHL-\textit{dbi} and C-LLL-\textit{dbi} with a frequency greater than 3×. With the exception of \textit{mimihí}, all C-LHL-\textit{dbi} are biased toward their shapemates, and all C-LLL-\textit{dbi} are biased toward theirs; \textit{mimihí} patterns with C-LLL-\textit{dbi} (i.e. \textit{krñuhí}, \textit{ṣṛñuhí}, and \textit{tanuhí}).

![Chart showing bias values for C-LHL-\textit{dbi} and C-LLL-\textit{dbi}]

Chart 1. Positive values reflect a localizational bias towards C-LHL-\textit{dbi}; negative values reflect a bias towards C-LLL-\textit{dbi}.

In sum, \textit{mimihí} is localized more like C-LLL-\textit{dbi} than C-LHL-\textit{dbi}. In this respect, it differs from other C-LHL-\textit{dbi} but is similar to C-LLL-\textit{dbi}. The evidence from localization strongly supports the restoration of \textit{*mimihí}.

12 The linguistic status of \textit{*mimihí}

In closing, let me discuss the linguistic status of \textit{*mimihí}. I see only one straightforward analysis, taking Jamison 1988 as a point of departure.\footnote{Building on Jamison 1988, see Werba 2005; Byrd 2015, 2016; Kümmel 2016. For a divergent account, see Lipp 2009:351–487.} Word-finally, inter-consonantal laryngeals developed into \textit{i} in Indic, e.g. \textit{*(b̄)t} > \textit{avamīt} ‘vomited’. Elsewhere, they developed into \textit{i}, e.g. \textit{uembti} > \textit{vamiti} (TS, MS) ‘vomits’. Thus the phonologically regular development would be \textit{*mimh\text{\textit{d}}\text{\textit{i}}} > \textit{*mimihí}. Parallel outcomes are \textit{*stenh\text{\textit{d}}\text{\textit{i}}} > \textit{stanihí} ‘thunder’ and \textit{*kneth\text{\textit{d}}\text{\textit{i}}} > \textit{snathihí} ‘pierce’. As Jamison discusses at length, the long \textit{i} is exceptional and presumably due to analogical change in Class III reduplicated presents of the type \textit{mimihíte}, \textit{jihíté} ‘moves’, \textit{śśíté} ‘sharpens’\footnote{See Sandell 2011 for a collection and discussion of Class III reduplicated present in Vedic and further references.} and Class IX presents of the type \textit{punīté} ‘purifies’, \textit{grūnīté} ‘is sung’, \textit{ni rinīṭe} ‘spills down’.

\footnote{Given the analogical change of \textit{*mimihí} >> \textit{mimihí} (§12) and the nature of the \textit{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.}
Localizational Evidence for the Restoration of Rigvedic *mimihí ‘measure’

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 jahimah ‘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 nah pāpman ná jāhāsi
tām u tvā jahīmo vayām

You, o evil one, who do not leave us—we leave you.

As noted above, we may consider *mimitám and *mimit¯am 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 -n¯ı- in the Class IX presents ran its course before the analogy that produced i 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 /CnHC/ as [CnHC] was avoided in PIE in favor of [Cn2HC] (my notation) in order for suffixal n to be non-allyic throughout the inflectional paradigm. In other words, strong ∼ weak alternations such as *[gʰTBNAH₂₂TI] ∼ *[gʰTBNAH₂₂TOI] were preferred to potential alternations such as *[gʰTBNAH₂₂TI] ∼ *[gʰTBNAH₂₂TOI]. The further development to -ni- 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 i in reduplicated presents is by analogy to the stem-final i in Class IX presents, quasi punáti : punité :: śíšáti : X; X = śíšíte. It is possible that the analogy began before the sound change VH] > V, as Praust envisages (2004:380–1). What the post-Rigvedic and -Atharvavedic changes of *mimihí >> mimihí and jahimah >> jahimah show is that at least some, if not all, of the analogical replacements postdated that sound change.

Abbreviations


²¹For 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 -ni- is carried over from -na-, 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.
²²For discussion of Praust 2004, see Lipp 2009:392–4 n. 97.
²³See Praust 2004:380 n. 23 for references.
References


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Dieter Gunkel

