Unicode request for modifier-letter support

Kirk Miller, kirkmiller@gmail.com 2020 April 14

Background

This request expands on Peter Constable’s 2003 ‘Proposal to Encode Additional Phonetic Modifier Letters in the UCS’ (https://www.unicode.org/L2/L2003/03180-add-mod-ltr.pdf), and illustrates characters that were requested in that proposal, but not illustrated and therefore not accepted at the time. Constable’s notes (Section F of his proposal) included a good summary:

In general, modifier letters are used in phonetic transcription to represent secondary aspects of articulation. Secondary articulations may involve aspects of simultaneous articulation that are considered to be in some sense less dominant to the basic sound (for instance, nasalized vowels are typically conceived in terms of their oral counterparts but with the additional secondary articulation of nasalization); or they may involve a transitional articulation of a type that might otherwise be considered a complete speech sound in its own right but for various reasons is interpreted by the linguist as a secondary element in a complex speech sound (for instance, diphthongs, or nasal onset of oral stop consonants). In some situations, the recommended transcription [by the International Phonetic Association] would not involve a modifier letter; thus, many of the proposed characters are not officially approved IPA notation. Nevertheless, the use of these modifier letters if fairly commonplace among linguists, even those that advocate the use of IPA.

It’s notable that one of Constable’s illustrations, of ⟨ᶿ⟩, came from the IPA Handbook despite not being officially part of the alphabet. Such usage goes back over a century, with ⟨ʃᶜ̧⟩ given as an example in the IPA chart of 1900, and that among the linguists such usage is ‘commonplace among’ is Peter Ladefoged, president of the IPA from 1986 to 1991, organizer of the 1989 Kiel convention that overhauled the alphabet, and long-time editor of the IPA Journal (JIPA).

Modifier IPA letters may also be used to indicate lightly or incompletely articulated sounds. Several instances of this are included in the illustrations below. All consonant and vowel letters are potential modifiers. Of the IPA suprasegmentals, only the length marks are attested. As far as I can tell, IPA tone letters and prosodic marks have not been used in this fashion.

Modifiers are semantically distinct from their base values and can contrast with them, as illustrated by ⟨ɽ⟩ vs ⟨ᵊ˞⟩ in the narrow transcription ⟨dɔːᵊɽʐ⟩ in Figure 22. The productivity of usage is illustrated by the unexpected appearance of ⟨fᵊ⟩ in Figure 36. Precomposed letters such as ⟨a⟩ may not need support: cf. the precomposed modifiers ⟨aᵊ⟩ with the combining diacritic ⟨aᵊ´⟩ in Gentium Plus font. The Script Ad Hoc Committee suggested that ⟨aᵊ⟩ be added only if the IPA requests them. Likewise, ejectives seem to be fine with current support, e.g. ⟨kᵊ’⟩.

Figure 1. An example of modifier ⟨ᵊ⟩ in McDavid & O’Cain (1980: 121).

I haven’t been able to attest any non-pulmonic consonants, though it is easy to imagine their use. For example, Constable’s illustration of ⟨gb⟩ for Igbo [ɡ̥b] could be extended to ⟨gᵊb⟩ for those Igbo dialects that realize gb as implosive [ɡ̥b]. Likewise, click consonants described in the literature as having a lateral click release might be transcribed ⟨ǃl⟩, since strict IPA ⟨ǃl⟩ would suggest a lateral approximant release.
The lateral fricatives ⟨\l, \r⟩ are covered by my extIPA request and are not repeated here.

I am only requesting characters I have been able to attest. For Unicode support of the current IPA to be complete, the following characters would be needed in addition to those in this request:

- unattested: vowels ə æ, pulmonic consonants d ? v, all implosives (ɓ ɗ ɠ ʛ) and most clicks (ʘ ǀ ǁ).

Constable noted superscript variants of Americanist letters. I am requesting several of these as well, as well as conventions from the days of manual typewriters, as these are required to accurately digitize field notes. Unsupported superscript capitals are sometimes used alongside IPA.

**Americanist notation**

Americanist superscripts not already being proposed for IPA support are ⟨æ ɛ ɜ ʌ ɔ ɒ ɔɨ ɒɬ ɒɭ ɒɬɭ ɒɬɭɪ ɒɭɪ ɒɬɭɪɭ ɒɬɭɪɭɪ ɒɬɭɪɭɪɭ ɒɬɭɪɭɪɭɪ ɜɪ ɜɬ ɜɭ ɛɬ ɛɭ ɔɬ ɔɭ ɔɬɬ ɔɭɭ ɔɬɭɭ ɔɭɭɭ ɔɬɭɭɭ ɛɬɬ ɛɭɭ ɔɬɬɬ ɔɭɭɭ ɔɬɭɭɭ ɛɬɬɬɬ ɛɭɭɭ ɔɬɬɬɬɬ ɔɭɭɭɭ ɔɬɭɭɭɭ ɛɬɬɬɬɬɬ ɛɭɭɭɭ ɔɬɬɬɬɬɬɬ ɔɭɭɭɭɭ ɔɬɭɭɭɭɭ ɛɬɬɬɬɬɬɬɬ⟩ and perhaps ⟨^e, ^a⟩.

Americanist transcription is so entrenched that respected sources such as Mithun’s 2001 *The Languages of Native North America* and Golla’s 2011 *California Indian Languages* continue to use it for basic transcription, with the IPA only for occasional clarification.

In Sapir’s writings, a superscript consonant letter is used for a “weakly articulated consonant, echoed consonant, or consonantal glide” (Bright 1994 “Phonetic Key to Publications of Edward Sapir”, in *The Collected Works of Edward Sapir*, Walter de Gruyter, p. 515). Similarly, V’v (where V and v are any vowel) is used for glottal interruption of a vowel “when the post-glottal portion is weakly articulated”. This is also seen in Pike (1947) *Phonemics*, p. 203. More generally, any vowel may be superscript to indicate reduced prominence of the vowel (murmured, echoed) or “vocalic resonance of a preceding consonant”, or after a long vowel for an “‘over-long’ vowel with glide-like rearticulation” (Bright, p. 516). These conventions often carry over to IPA usage.

The American Anthropological Association (*Phonetic Transcription Of Indian Languages*, 1916, p. 9) repeats these recommendations, and goes further: “If it is desired to distinguish between vocalic timbres and weakly articulated voiceless vowels on the one hand and vocalic glides and weakly articulated voiced vowels on the other hand, superior vowels (^) may be used for the former, inferior vowels („) for the latter.” Two letters that are not supported in superscript are Greek ω (introduced on p. 10); η is used in some texts for nasalization of vowels, but unlike the ogonek I have not seen it superscript.

The following unitary consonant letters of Sapir’s do not have Unicode support as diacritics: q (also needed for IPA), ƛ ɬ ɭ and its allograph l, full cap (voiceless) M Y, though there is presumably little to no need for M. The lateral fricatives ƛ ɬ l/ɭ are ubiquitous. The use of capitals for voiceless sonorants is still common in Americanist transcription, though in later years Sapir would use small caps, and others shifted in the same direction. Many of these would be unsupported, but I’m not sure Unicode support is required if there is no semantic difference between full and small caps.
Americanist small-capital d (ᵝ), commonly used for a tap (vs Sapir’s ř for a flap), is not supported either. Similarly with X as a common alternative for ṭ. (I have always seen this as a full cap even where other letters are small cap, presumably to distinguish from minuscule x.) For Americanist authors who use Greek letters ⟨ᵠ ᴼ ᵃ ᵇ ᴼ ᵇ ᴾ ᶤ ᵅ⟩ for dentals or laminal alveolars, only ⟨ᵠ⟩ is supported.

**Typewriter conventions**

In the days of manual typewriters, it was common to create phonetic symbols by overstriking a letter with a hyphen or virgule. These may appear as superscripts for the same reasons as the IPA.

**Modifier capitals**

Capital letters are used alongside the IPA as wild cards for natural classes of sounds (e.g. C N P F S Z T K for ‘consonant’, ‘nasal’, ‘plosive’, ‘fricative’, ‘sibilant’, ‘voiced sibilant’, ‘alveolar’, ‘velar’ respectively), and are combined the same ways IPA letters are, including as modifier letters. E.g., a prenasalized consonant – or the set of all prenasalized stops – can be indicated as /NₐC/, a fricated release as [C ˢ], and voiceless and voiced sibilant affricates as /Tᵝ, Dᵥ/. Modifier capital letters are used in other conventions as well, such as tone marking.

**Modifier letters, IPA**

<table>
<thead>
<tr>
<th>Name</th>
<th>Code</th>
<th>Description</th>
<th>Figures</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE</td>
<td>U+A7D9</td>
<td>MODIFIER LETTER SMALL AE.</td>
<td>47–50</td>
</tr>
<tr>
<td>B</td>
<td>U+A7DA</td>
<td>MODIFIER LETTER SMALL CAPITAL B.</td>
<td>19</td>
</tr>
<tr>
<td>E</td>
<td>U+A7DB</td>
<td>MODIFIER LETTER SMALL REVERSED E.</td>
<td>52</td>
</tr>
<tr>
<td>H</td>
<td>U+A7DC</td>
<td>MODIFIER LETTER SMALL RAMS HORN.</td>
<td>38–39</td>
</tr>
<tr>
<td>G</td>
<td>U+A7DD</td>
<td>MODIFIER LETTER SMALL CAPITAL G.</td>
<td>30–32</td>
</tr>
<tr>
<td>H</td>
<td>U+A7DE</td>
<td>MODIFIER LETTER SMALL H WITH STROKE.</td>
<td>17–18</td>
</tr>
<tr>
<td>J</td>
<td>U+A7DF</td>
<td>MODIFIER LETTER SMALL HENG WITH HOOK.</td>
<td>36</td>
</tr>
<tr>
<td>O</td>
<td>U+A7E0</td>
<td>MODIFIER LETTER SMALL O WITH STROKE.</td>
<td>51</td>
</tr>
<tr>
<td>Q</td>
<td>U+A7E1</td>
<td>MODIFIER LETTER SMALL Q.</td>
<td>2–5</td>
</tr>
<tr>
<td>R</td>
<td>U+A7E2</td>
<td>MODIFIER LETTER SMALL R WITH FISHHOOK.</td>
<td>23–24</td>
</tr>
<tr>
<td>S</td>
<td>U+A7E3</td>
<td>MODIFIER LETTER SMALL R WITH TAIL.</td>
<td>21–23</td>
</tr>
<tr>
<td>T</td>
<td>U+A7E4</td>
<td>MODIFIER LETTER SMALL TURNED R WITH LONG LEG.</td>
<td>37</td>
</tr>
<tr>
<td>R</td>
<td>U+A7E5</td>
<td>MODIFIER LETTER SMALL CAPITAL R.</td>
<td>23 (87? waiting on ILL)</td>
</tr>
<tr>
<td>T</td>
<td>U+A7E6</td>
<td>MODIFIER LETTER SMALL T WITH RETROFLEX HOOK.</td>
<td>26–29</td>
</tr>
<tr>
<td>Y</td>
<td>U+A7E7</td>
<td>MODIFIER LETTER SMALL CAPITAL Y.</td>
<td>44–46</td>
</tr>
<tr>
<td>A</td>
<td>U+A7E8</td>
<td>MODIFIER LETTER SMALL TURNED Y.</td>
<td>33–35</td>
</tr>
<tr>
<td>ŋ</td>
<td>U+A7E9</td>
<td>MODIFIER LETTER REVERSED GLOTTAL STOP WITH STROKE.</td>
<td>6–10</td>
</tr>
<tr>
<td>⁶</td>
<td>U+A7EA</td>
<td>MODIFIER LETTER SUPERSCRIPT TRIANGULAR COLON.</td>
<td>58–59</td>
</tr>
<tr>
<td>⁷</td>
<td>U+A7EB</td>
<td>MODIFIER LETTER SUPERSCRIPT HALF TRIANGULAR COLON.</td>
<td>58</td>
</tr>
</tbody>
</table>
Modifier letters, IPA-derived

not found: ⟨ʃ ɻ ɷ ʊ 𫟴 ɀ ᶁ                                   ⟩.

 Modifier letter small reversed r with fishhook. Figure 53.
 Modifier letter small squat reversed esh. Figure 53.
 Modifier letter small n with curl. Figure 54.
 [add] Modifier letter small capital turned r. Figure 25.

Basic plane? Modifier letter small dezh digraph. Figures 56, 57.

Modifier letters, capital

unsupported basic Latin caps not found: ⟨S X Y Z⟩.

C U+A7ED Modifier letter capital C. Figures 75–78.
F U+A7EE Modifier letter capital F. Figure 79.
Q U+A7EF Modifier letter capital Q. Figure 80.

Modifier letters, Greek

unsupported Americanist not found: ⟨ζ η ν ρ σ ψ⟩ and η ξ ρ ς ψ

α Modifier letter small greek alpha. Figure 63.
μ U+A7EC Modifier letter small greek mu. Figures 81–84.

Omega also in Dolgopol’skij (2020 folder), contrants w actual w for labialization.

Modifier letters, Americanist and other

not found: ⟨g h d v⟩.

[add] Modifier letter small b with bar. Figure 62.
Modifier letter small l with stroke. Figure 60.
Modifier letter small l with bar. Figure 61. [equivalent to preceding?]
Modifier letter small turned r with bar. Figure 23 (86, waiting on ILL).

Modifier letter small sharp s. Figures 72–73.

A Modifier letter small capital a. Figure 66.
E Modifier letter small capital e. Figures 64–65.
O Modifier letter small capital o. Figure 67.
U Modifier letter small capital ou. Figure 74.
W Modifier letter small capital w. Figures 68–69.
Comments on additional letters

 dunk MODIFIER LETTER SMALL D WITH TAIL, dunk [no figure, between 87 and 88]
 z MODIFIER LETTER LATIN GLOTTAL STOP WITH STROKE, z [ibid.]
 x MODIFIER LETTER CAPITAL X. FIGURE 88.
 x MODIFIER LETTER SMALL LATIN CHI. Figures 89–90.
 b MODIFIER LETTER SMALL LATIN BETA. Figures 91–93.

Suggested annotations

Basic Latin letters

Modifier q (q)

Used in romanized Akha for glottal stop and by Khoisanists for vowel pharyngealization. Also for an unreleased [q] in the conventions of Pike (1947) Phonemics (not illustrated).

Probably pharyngealization. This is transliterated here by means of a superscript ‘q’, as in !gwa³-xtq ‘sky’. Concerning Lloyd’s annotation of ‘accompaniments’, Traill (1995) has determined that her use of a following letter ‘k’ almost certainly represented the ‘plain’ click, i.e., the click characterized by inaudible velar (i.e., posterior) release; while her

| ‘ayin’ (‘r’ | mû’ ð | ‘old man’ |
| ‘q’ |  ‘cold, winter’ |

Figure 2. du Plessis (2009: 30), with a description of the symbol as a superscript ‘q’.

Noisy dorsal burst which occurs after the anterior click burst. But, it is a convention which helps to distinguish the clicks in !Xôô from the /lq/ click in N|uu that has different timing characteristics. In using diacritics to transcribe /kl/ and /qh/, I suggest that these do not pattern phonetically as contour segments or clusters.

<table>
<thead>
<tr>
<th>Accompaniment</th>
<th>Ladejoged and Traill (1994)</th>
<th>Orthography (Traill 1994)</th>
<th>Transcription (Sands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voiceless un aspirated</td>
<td>kl</td>
<td>!</td>
<td>kl</td>
</tr>
<tr>
<td></td>
<td>q</td>
<td>lq</td>
<td>q</td>
</tr>
<tr>
<td>Voiced</td>
<td>gl</td>
<td>lg</td>
<td>g!</td>
</tr>
<tr>
<td></td>
<td>c!</td>
<td>lc</td>
<td>c!</td>
</tr>
<tr>
<td>Voiced aspirated</td>
<td>glh</td>
<td>glqh</td>
<td>9k!h</td>
</tr>
<tr>
<td></td>
<td>glh</td>
<td>glqh</td>
<td>9k!h</td>
</tr>
</tbody>
</table>

Figure 3. Sands (fc: 31), with the difference between superscript and baseline ‘q’.

The anterior click burst, the dorsal burst and the vowel onset are very similar for the clicks shown in Figures 1.14 and 1.15. The center of gravity of the uvular-alveolar /k!/ click shown in Figure 1.15 is lower than that of the velar-alveolar /k!/ click shown in Figure 1.14 (1000 Hz vs. 1390 Hz). This is consistent with a uvular vs. velar place difference. Formant transitions also suggest a contrast of dorsal place.

Nakagawa (2006: 197) notes timing differences between the anterior and dorsal bursts for uvular and velar accompaniments in Glui that are greater than those I have seen in the corresponding accompaniments in !Xôô but less than what is typically seen in N|uu clicks. Glui clicks might be transcribed with a superscripted dorsal stop symbol after the click, e.g., /9/.

Figure 4. Sands (fc: 32, incl. fn 18)
IPA and IPA-derived letters

**Modifier reversed barred glottal stop, ⎷ (⟨⟨⟩⟩)**

Epiglottalization. Used in Khoisan and in Arabic dialectology. An additional source to those below is Miller-Ockhuizen (2003) *The Phonetics and Phonology of Gutturals: A Case Study from Ju|’hoansi*, p. 72 ff., and Esling informs me that he’s made extensive use of this character in his 2019 book *Voice Quality*, which I don’t have access to.

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Figure 5. Tooker (2012: 100)

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Figure 6. Ladefoged & Maddieson (1996: 365)
**Ejective stop.** As was noted above, there is one ejective stop in Njūu (recently discovered in one word, \( c^\text{'ä}é \) ‘be in pieces’), namely the voiceless prepalatal ejective stop /c'/ (3.9).

\[
(3.9) \quad c^\text{'ä}é \quad \text{be in pieces}'
\]

As for the VOT of aspirated plosives, no quantitative study has yet been conducted on the glottal lag (the duration between the release of the oral closure and the release of the glottal closure, i.e., the onset of voicing) of ejective stops in Njūu. From qualitative inspection of the tokens that are found in my data, an order of magnitude for the glottal lag of around 50 ms (similar to the estimate given for the VOT above) seems reasonable, though. Figure 3.7 shows spectrograms of typical realizations of căà ‘lie (recline)’ and c\( ^{\prime} \)áé ‘be in pieces’. Both /c/ and /c'/ show the slight affrication typical of prepalatal stops.

![Figure 7. Exter (2008: 25)](image)

**Epiglottalized vowels.** The epiglottalized vowel system consists of the segments \( /e^\text{e}/, /a^\text{a}/, /o^\text{o}/ \) and \( /u^\text{u}/ \) (3.25).

\[
(3.25) \quad zé^\text{e} \quad \text{fly (verb)}'
\]

\( ̣\text{ä}ù \) ‘kick’

\( kô^\text{o} \) ‘swell’

\( ̣\text{ù}ù \) ‘arrow poison’

![Figure 3.30 Schematic diagrams of the ‘plain’ (left) and nasalized (right) epiglottalized vowel inventories of Njūu. The dotted circle indicates a presumed accidental gap.](image)

![Figure 8. Exter (2008: 51)](image)
Table 1: Nuu vowels

Overall, there are fewer contrasts among the nasalized and epiglottalized vowels than their modal counterparts. Our lexicon contains examples of epiglottalization on all vowels except [i], but [e'] and [u'] are much less common than [a'] and [o'] and [u'] is most likely an allophone of [o']. Just three roots with [e'] have been elicited: [ze'e'] 'fly (v)', [je'be] 'have arms crossed' and [j¹+h'e'be] 'close your skirt'. To the best of our

Table 9. Some terms referring to the cheek

<table>
<thead>
<tr>
<th>Language</th>
<th>“cheek”</th>
<th>“cheekbone”</th>
</tr>
</thead>
<tbody>
<tr>
<td>†Amkoe</td>
<td>[ŋ̪Ω̄bi]</td>
<td>[n̪Ω̄bi (si) j̃aⁿf]</td>
</tr>
<tr>
<td>Ju’hoan</td>
<td>lomm</td>
<td>l’úbíkxáí</td>
</tr>
</tbody>
</table>

Modifier small-cap Ḣ (庳)

Voiceless epiglottalized release. (U+1D34 Ḣ is a full capital, U+1D78 Ḧ is Cyrillic ṅ.)

The clicks transcribed [ǃkxʼ] and [ɡǃkxʼ] in Ju’hoansi are transcribed by Miller-Ockhuizen (2003) and Miller (2007) as having epiglottalized releases, [ǃ³] and [ǃ⁵]. Nakagawa (2006) transcribes the voiceless consonant of the pair as a cluster con-

last row of the table, each click may have several secondary accompaniments, such as in the series [ǃ | ʰ | ŋ | ɡ | ǐ | ǂ | ³] (Miller, 2007; Miller et al., 2009), but only the basic primary values are represented here. This qualification can be seen

Figure 12. Esling (2010: 700). The Ḣ has x height.
in narrow phonetic transcriptions, I have sometimes debated whether a syllable such as [la] with an epiglottalized vowel might not be better considered as containing a click with an epiglottalized accompaniment [ɓa]. Accompaniments are important because the number of click consonants (or click clusters) in the inventory of a language may correlate with the number of syllables in the language.

Figure 14. Sands (fc: 23). The " clearly has x height.

vary even when the clicks described are the same. For instance, Miller (2007) has described jil‘oan as having voiced and voiceless epiglottalized clicks /ɓ, ɡ/ where others have transcribed them as ejected velar affricated clicks /lx, qlx/ (e.g. Snyman

Figure 15. Sands (fc: 34).

The orthographic q represents a voiceless dorso-uvular stop, accompanied by epiglottal components depending upon the word position. The peculiar thing about this stop is that it might be called a voiceless epiglottalized uvular stop [qʰ] (often with faucalization), because it is accompanied by an epiglottal stop. Finally, in careful, overly correct speech it represents a voiceless dorso-uvular stop with a schwa offglide [q]. In more normal conversational style it will be an epiglottalized dorso-uvular stop that can be released as an ejective. Examples are: qod ['qɒdʰ] ‘to dig’, maqal ['mɒqalʰ] ‘to hear’ aqal ['ʔa qalʰ] ‘a house’, liq ['liqʰ] ‘to swallow’.

Figure 16. Edmondson, Esling & Harris (2008: ms p. 6)

**Modifier h-bar, h (ʰ)** [redesign in font]

Esling, a co-author of the article in the figure, also says “it would also be logical to use h as a superscript, since voiceless frication or trilling are common phonetic effects,” and that a superscript ʰ would be useful for transcribing the very light final [h] often produced in the acquisition of Arabic by infants at around 12 months.

Note also extIPA request that all fricatives be supported as modifier letters for fricated release.

‘other’, and are distinct from /ʔ/, which is implemented as [ʔ] initially and medially, and as [ɬʰ] finally, e.g. in ‘icep [ɬsəpʰ] ‘betel nut’, po‘ot [poʔotʰ] ‘small knife’, and loma’ [rumgʰ] ‘house’.

Figure 17. Edmondson et al (2005: 384)

**Figure 5: The epiglotto-pharyngeal stop in Amis riri’ [ririʔʰ] ‘grasshopper’**

Figure 18. Edmondson et al (2005: fig. 5, p. 389).

**Modifier small-cap b and p (ʰ ʰ)**

Found for voiced and voiceless bilabial trilled release, such as [bʰ] alongside [d'] for an alveolar trilled release. Attested from Avava (Vanuatu). Crowley & Lynch use superscript small-capital p (ʰ) for a voiceless bilabial trilled release, equivalent to Americanist superscript p-with-tilde ⟨p⟩ in [tʰ] in
Everett & Kern (1997) *Wari*. Brendon Yoder (p.c.) says a superscript ʙ would be useful for transcribing trilled release of Nias mb.

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**Figure 19.** Crowley & Lynch (2006: 31). Red is the voiced trilled release, orange its voiceless allophone (also visible, alveolar d'). On p. 30 the consonant is described as a “prenasalized voiced bilabial stop with a bilabial trilled release, which typically involves some rounding – or at least thrusting forward – of the lips.” The tilde in this transcription indicates that rounding rather than nasalization.

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**Figure 20.** Crowley & Lynch (2006: 28). Modifier 琇 for a voiceless trilled release.

### Modifier fish-hook 琇 and retroflex ɽ (ɽ)

Used in Penhallurick and similar dialect atlases for weak allophones of English /r/. The first two are also found in descriptions of Iwaidjan languages, where superscript ⟨шей⟩ and ⟨шей⟩ function as diacritics modifying the articulations of l and l. The resulting phonemic segments /lʃ/ and /ɭʃ/ are distinct from sequences /lʐ/ and /ɭʐ/. So far I have only been able to access papers with /ɭʃ/, though the languages that have that also have /lʃ/ (e.g. Robern Mailhammer (p.c.) said that “the symbol [I] used has been an l with either a tap or a retroflex tap superscript.”)
| place name: Cape Don | Jamarldin,gi | Jami[lôi]gi | | | |
| place name: Eastern Side of Popham Creek | Wumarij | wuma[ji] | | | |
| place name: Western Side of Popham Creek | Wagali | waga[lî] | | | |
| proper name (Cunningham) | Ngurlldun | njul[un] | | | |

Figure 21. \(\langle l\rangle\) in Evans (1996: 2)

Figure 22. Upton, Parry & Widdowson (1994: 26). Contrast between \(\langle t\rangle\) and \(\langle r\rangle\).

Figure 23. Penhallurick (1991: xviii). Modifier IPA diacritics used for weak articulation. The letters are \(\text{r}^\text{f} \tilde{\text{r}} \text{r}_\text{f} \text{r}_\text{b}\). The superscript rhotics \(\text{r} \text{r} \text{r}_\text{b}\) and \(\text{r}_\text{b}\)-bar are not supported by Unicode.

Figure 24. Penhallurick (1991: 66). Modifier fishhook \(\text{r}\) (red) is handwritten, as opposed to typewritten superscript \(\text{r}\) (yellow).

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Modifier turned small cap ș ([add to font])

Figure 25. McDavid & O’Cain (1980: 126). Modifier uperscript U+1D1A ș in the word Virginia. Contrasts with combining ș (see proposal for combining letters).

Modifier retroflex ʈ (t)

Used for pre-stopped retroflex nasals and laterals, for example in the Arandic languages.

<table>
<thead>
<tr>
<th>bilabial</th>
<th>dental</th>
<th>alveolar</th>
<th>retroflex</th>
<th>palatal</th>
</tr>
</thead>
<tbody>
<tr>
<td>ʰm</td>
<td>ʰn</td>
<td>ʰn</td>
<td>ʰŋ</td>
<td>ʰʃ</td>
</tr>
<tr>
<td>p</td>
<td>t</td>
<td>t</td>
<td>c</td>
<td>k</td>
</tr>
<tr>
<td>m</td>
<td>n</td>
<td>n</td>
<td>ʰn</td>
<td>ʰɲ</td>
</tr>
<tr>
<td>ʰm</td>
<td>ʰn</td>
<td>ʰn</td>
<td>ʰŋ</td>
<td>ʰʃ</td>
</tr>
<tr>
<td>ʰp</td>
<td>ʰt</td>
<td>ʰt</td>
<td>ʰc</td>
<td>ʰk</td>
</tr>
<tr>
<td>ʰm</td>
<td>ʰn</td>
<td>ʰn</td>
<td>ʰŋ</td>
<td>ʰʃ</td>
</tr>
<tr>
<td>t</td>
<td>ʰt</td>
<td>ʰt</td>
<td>ʰc</td>
<td>ʰk</td>
</tr>
<tr>
<td>n</td>
<td>n</td>
<td>n</td>
<td>ʰn</td>
<td>ʰɲ</td>
</tr>
<tr>
<td>ʰn</td>
<td>ʰn</td>
<td>ʰn</td>
<td>ʰŋ</td>
<td>ʰʃ</td>
</tr>
<tr>
<td>ʰn</td>
<td>ʰn</td>
<td>ʰn</td>
<td>ʰŋ</td>
<td>ʰʃ</td>
</tr>
<tr>
<td>ʰn</td>
<td>ʰn</td>
<td>ʰn</td>
<td>ʰŋ</td>
<td>ʰʃ</td>
</tr>
</tbody>
</table>

Table 1: Kaytetye consonantal inventory.

Figure 26. Riehl & Cohn (2011: 555)

relevant subset of the recorded data are considered. The target words contained the coronal nasals /n, ŋ, ɲ, ȵ/, pre-stopped nasals /natural/*n, ŋ, ɲ, ȵ/, and laterals /l, ɾ, ɬ, ɭ/ all in a /#V_V/ context. The target coronal segments were preceded by word-initial /a/

Figure 27. Harvey et al. (2013)

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Australia, an alveolar [d̪] and a dental [d̪]. Martuthunira, a now extinct language of Western Australia, also prestopped its four laterals syllable-finally: [l̪], [l̪], [l̪], [l̪] (Dench 1995: 27).

Figure 28. Harvey et al. (2013)

Figure 29. François (2010: 426)
**Modifier small-cap g (铈)**

Used for pre-stopped uvular nasals and prevoicing of other uvular consonants. (A superscript is commonly used for prevoicing, e.g. in Laver 1994: 370.) For those who use superscripts for partial voicing, a /ɢ/ with final devoicing would be written ⟨ɢ^⟩. In addition, ⟨q^⟩ is an old IPA convention for unaspirated [q] to be used when ⟨q⟩ transcribes aspirated [qʰ].

---

**Modifier small turned y, ʎ (ʎ)**

Modifier ʎ is used for a palatal lateral affricate, often with voiceless or raising diacritics. Even with the potential availability of a dedicated character from the extIPA, such usage could continue under adherence to the regular IPA.
Figure 34. Kehrein (2002: 18) A palatal lateral affricate [c\textsuperscript{ʃ}].

<table>
<thead>
<tr>
<th>vl. lat. aff. click</th>
<th>( \text{\textsuperscript{ʃ}} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>vl. asp. lat. aff. c.</td>
<td>( \text{\textsuperscript{ʃ}} )</td>
</tr>
<tr>
<td>gl. vl. lat. aff. cl.</td>
<td>( \text{\textsuperscript{ʃ}} )</td>
</tr>
<tr>
<td>vd. lat. affr. click</td>
<td>( \text{\textsuperscript{ʃ}} )</td>
</tr>
<tr>
<td>gl. vd. lat. aff. cl.</td>
<td>( \text{\textsuperscript{ʃ}} )</td>
</tr>
<tr>
<td>breathy vd. lateral affricated click</td>
<td>( \text{\textsuperscript{ʃ}} )</td>
</tr>
</tbody>
</table>

Figure 35. Lateral affricated palatal clicks in the UPSID, p. 170.

**Modifier hook-top heng, \( \text{ʃ} (\text{ǝ}) \)**

Used for theoretical allophones in Swedish. Note also extIPA request that all fricatives be supported as modifier letters for fricated release.

- Figure 36. Riad (2013: 61, fn 11–12). \( \langle \text{ʃ} \rangle \) and \( \langle \text{ǝ} \rangle \).

**Modifier turned r-leg, \( \text{ɺ} (\text{ɺ}) \)**

Used for lateral-flap coloration of Japanese /r/.

| before a vowel or approximant, or before /h/ or /s/, as e.g. /žɛnɛl/ [\textipa{d\textsuperscript{ɺ}z\textsuperscript{ɺ}g}] ‘goodwill’, /hoŋjaku/ [hoiŋjaku] ‘translation’, /zenhan/ [\textipa{d\textsuperscript{ɺ}z\textsuperscript{ɺ}g\textsuperscript{ɺ}an}] ‘first half’. Before other consonants, it is homorganic with the following consonant, as e.g. /sɪnpo/ [cɪmpo] ‘progress’, /sɪnɛi/ [cɪmpɛi] ‘truly’, /sɪnɛi/ [cɪmpɛi] ‘truth’. /s/ and /z/ are [c] and [z] before /i/. /s/ and /z/ tend to be [d\textsuperscript{ɺ}z] initially (\[d\textsuperscript{ɺ}z\] before /i/) and after /h/. /h/ tends towards [c] and [ʃ] before /i/ and /u/ respectively. /hh/ is realized as [c\textsuperscript{ɺ}c], [x\textsuperscript{ɺ}x] or [Φ\textsuperscript{ɺ}] depending on the (normally identical) surrounding vowels. /ʃ/ affects the preceding consonant as /i/ does, and is itself absorbed, thus: /mjak\textsuperscript{ɺ}u/ [m\textsuperscript{ɺ}jak\textsuperscript{ɺ}u] ‘pulse’, /h\textsuperscript{ɺ}ja/ [t\textsuperscript{ɺ}ja] ‘tea’, /s\textsuperscript{ɺ}jo/ [c\textsuperscript{ɺ}jo] ‘prize’, /kanju/ [ka\textsuperscript{ɺ}nu] ‘joining’.

Figure 37. Okada (1999: 118). The superscript has the height of superscript \(\text{ɺ}\) in the first two lines of the text, rather than the x-height of a superscript turned-r.

I’ve also seen superscript \(\text{ɺ}\) in a poster presentation at a phonetic conference but can’t track it down.

[a similar poster Thomas Magnuson ‘A Pharyngeal Component in Kansai Japanese /r/ Variants?’ at https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.596.175&rep=rep1&type=pdf, but that doesn’t have the superscripts]
**Modifier ram’s horns, ɤ (⁺)***

Most instances of ⁺ I’ve found are typos for ɤ (gamma). The following use ⁺ for its intended value.

Similarly, Lanham and Macdonald (1979:40–1) identify fronted and glide-weakened MOUTH as a CE¹⁵ variable and thus a defining feature of BrSAE. The most advanced values are [ɤ] for the onset, with a weak (unrounded) glide to [ɔ]. The vowel is corrected to a [øː]-like quality or even hypercorrected “towards backed [æʊ] or glide-weakened [œː]” with hypercorrections most prominent among females in the Cape generally” (Lanham and Macdonald 1979:40). Importantly, and according to these

Figure 38. Bekker (2003: 165) The Vowels of South African English, PhD thesis. The source mistakenly used gamma (ɤ), which is why I refer to Bekker for its interpretation as ⟨⁺⟩. P. 43 of Lanham & Macdonald (1979) supports Bekker, as the source used gamma for the full vowel letter ⟨⁺⟩ as well, a not uncommon substitution in typewritten publications of the time. Regardless of whether the gamma was an intentional substitution in 1979, Bekker felt a need for superscript ram’s horns in 2003.

Figure 39. Wetzels (2009: 244) “Nasal harmony and the representation of nasality in Maxacali”, in Calabrese & Wetzels (eds.) Loan Phonology. [ɤ] is a ‘prevowel’ derived from a coda /p/ or /m/ (p. 245).

also the ‘baby gamma’ in Dogopolskij? Contrasts w normal Latin gamma.

**Modifier closed omega, ɷ (ⁿ)***

Used in English dialectology.

The long monophthongal forms [oː, ɔː, ʊː], [ŋː] may be due to sound-substitution of Welsh /oː/ for RP /æ, əo/. The influence of this Welsh phoneme may also give rise to the diphthongal forms above with lengthened first elements - [ɔː] - or weakened second elements - [ŋː]. This Welsh influence is less likely to obtain at Cl 3, 6.

Figure 41. Penhallurick (1991: 55), explaining the use of superscript o in diphthongs.

Figure 42. Penhallurick (1991: 258). Excrecent superscript ḁ. The circumflex indicates pharyngealization.

Figure 43. Anderson (1987: 102) A Structural Atlas of the English Dialects. The superscript is a bit faint, due to the thinness of the bottom curves, but is clearer in Note 8 on p. 119; the segments are /œu: ~ œü:/, /ɛœ:/, /œœ:/, /œo:/.

**Modifier small-cap ɣ (ɤ)**

Used when measuring the formants leading into a consonant adjacent to [ɣ] (here an allophone /i/ preceding /u/). Also for diphthongs like [ɵɤ] in Swedish and [ɛɤ] in some English dialects.
Figure 44. Edward Flemming (2002: 103) *Auditory Representations in Phonology*. Routledge Outstanding Dissertations in Linguistics.

![Table](image)

<table>
<thead>
<tr>
<th></th>
<th>American English: MINDIST = trans F2:3 &gt;&gt; MAX CONTRASTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>bųu-dųu-djųu</td>
</tr>
<tr>
<td>b</td>
<td>bųu-dųu-djųu</td>
</tr>
<tr>
<td>c</td>
<td>bųu-dųu</td>
</tr>
<tr>
<td>d</td>
<td>bųu-djųu</td>
</tr>
<tr>
<td>e</td>
<td>bųu-dųu</td>
</tr>
</tbody>
</table>

while others are rising; some are closing, while others are centering: /eː/ > [eː], /ɛː/ > [ɛː], /uː/ > [ʊu], /ɔː/ > [ɔː], /oː/ > [oː] ([iː], /yː/ and /aː/ are monophthongs) (Elert, 2000, 42).

Figure 45. (Flemming 2002: 123)


**Modifier æ ligature (æ)**

Appears in diphthongal offglides and ms abbreviations.

Figure 47. Akademisk Forlag. (Denmark, 1974: 199) *Dialektstudier*, vol. 3. Contrast between [ɛˑæ] and [ɛˑæ].

Figure 48. Andersen (1958: 138) *Fonemsystemet i østfynsk: på grundlag af dialekten i revninge sogn*.

Figure 49. Andersen (1958: 139). Contrast between [æ] (red) and [æ] (yellow).
Figure 50. Homan (1975: 151), explaining * in Icelandic mss. (The italics are a convention for the abbreviations spelled out in full.)

**Modifier o-slash, ø (♦)**

Appears in diphthongs in Scanian.

Figure 51. Martin Persson (forthcoming thesis on Scanian dialectology).

**Modifier reversed e, ø (♦)**

Appears in diphthongal offglides.


**Modifier reversed fish-hook, ɿ (♦) & with tail, ɿ (♦)**

Used for transitional vowels under erhua in Chinese phonology.

Figure 53. Lee & Zee (2014: 384) “Chinese Phonetics”, in Huang et al. (eds.) The Handbook of Chinese Linguistics, Blackwell. Though the vowels have unexpected
ascenders in this font, they are clearly γ and υ, as demonstrated by context and by the Unicode encoding of the electronic version of the book.

(TIPA has separate encodings for these short and long allographs, recognizing the two typographic styles, though of course that would not be needed for Unicode.)

**Modifier curly-tail n, n专业人士 (*)&

A common Sinological convention for alveolo-palatal consonants.

One striking feature of Maonan is that pre-nasalized stops and pre-glottalized stops are found to be in complementary distribution in the tonal system, with pre-nasalized stops \( mb-, mbj-, nd-, ndj-, nd- \) and \( nw- \) only occurring in high tones, while glottalized stops \( b-, bhj-, d- \) and \( dj- \) only occurring in low tones, as shown in Figure 54.

I have only found \( n \) as a superscript, but superscript \( t \), \( d \), \( l \) might be expected as well. Some Sichuanese and Yunnanese dialects, for example, have post-stopped [n̥d] (Chan 1987 “Post-stopped nasals in Chinese”, *UCLA Working Papers in Phonetics* 68, p. 97).

**Modifier t-esh, d-ezh ligatures, ʧʤ (ʧʤ)

Figure 55. Perry (2000: 90). The top line, \( ⟨⁶ɪəʧəʳ⟩ \), is the recorded utterance; below it is the target phrase *kitchen chair*.

Figure 56. Perry (2000: 91). \( ⟨ðəbæ̃ːdʌmd⟩ \); the target phrase is *the badger jumped*.

---


Figure 57. Perry (2000: 90, 91), specifying the contrast of [ʃ ʤ] and [ʧ ʤ].

**Modifier length signs, : and · (ˑ ·)**

Used for narrow transcription of voice-onset time (length of aspiration).

---

**Modifier el-slash, ł (ł), and el-bar, ł (ł)**

Used for weak sounds or fricated release. These are allographs in APN, but the base letters have separate Unicode points.
Modifier \( b \)-bar, \( b \) *(add to font)*

Figure 62. Bromley (1961: 29) *The Phonology of Lower Grand Valley Dani.*

Modifier alpha (\( a \))

In Sapir, for Ute and Shoshone.

Figure 63. Sapir (1929/1992: 883) *Northern Ute ethnographic field notes, 1909* in Bright (ed.) *The Collected Works of Edward Sapir X*. In italic typeface, used throughout this volume, the alpha remains distinct from \( a \) without requiring special font accommodation as the IPA does.

Modifier small-capital \( a \) (\( A \)), \( e \) (\( E \)), \( o \) (\( O \))

Small-cap \( \langle a \rangle \) has, besides its voiceless value, an obscure value “as in English *but*”. More generally, \( \langle A E O \rangle \) are used for obscure vowels with \( [a e o] \) coloring and may be superscribed for fleeting obscure vowels. (Same for \( \langle i u \rangle \), but they’re already supported by Unicode.) Modifier \( A \) and \( E \) are also found in Chinese extension to the IPA.

Modifier \( \langle a \rangle \) and \( \langle e \rangle \) vary in size between texts and between tokens within a text. Often they are not reduced in size at all and look like superscript capitals, which are not defined in the phonetic keys provided. For example, in Frachtenberg’s 1922 chapter on Siuslaw, superscript \( \langle e \rangle \) is consistently a small capital, apart from small-print in a table where all superscripts are misaligned or oversized. However, in his chapter on Coos in the same volume, \( \langle e \rangle \) is raised above the baseline with little to no reduction in size; only in a few cases (e.g. p. 317, 340 – illustrated, 344, 359) is in formatted correctly. Semantically, though, these are clearly small caps as defined by the pronunciation key in the volume. Obscure \( \langle o \rangle \) is also superscripted occasionally. Though visually
it is difficult to tell it’s a small cap, a problem shared with ⟨w⟩ (see next entry) and ⟨z⟩, the semantics indicates that it is.

Figure 64. Frachtenberg (1922: 458) “Siuslawan (Lower Umpqua)”, in Boas (ed.) *Handbook of American Indian Languages*, part 2. ⟨w⟩ (red) is the same size as lower-case ⟨w⟩ (yellow). Its sharp angles distinguish it from the ⟨’⟩ used for glottal stop.

Figure 65. Frachtenberg (1922: 340) “Coos”, in Boas (ed.) *Handbook of American Indian Languages*, part 2. ⟨’⟩ (red) vs. ⟨e⟩ and a lower-case superscript (yellow).

Figure 66. Sapir (1994: 4 [384]) “Noun Reduplication in Comox”, in Golla (ed., 1994) *The Collected Works of Edward Sapir VI: American Indian Languages* 2. Although the size is inconsistent between the letter in isolation and in a word, the intent is clearly a small-cap: brief/fleeting vowels are superscribed, and the corresponding full vowel in Comox (yellow) can be seen to be a small-cap ⟨A⟩.

Figure 67. Frachtenberg (1922: 447) “Siuslawan (Lower Umpqua)”, in Boas (ed.) *Handbook of American Indian Languages*, part 2. Plain o does not occur in these Siuslaw texts, but obscure (small-cap) ⟨o⟩ occurs in loans. Modifier small-cap ⟨’⟩ has a heavier typeface than superscript ŋ in the same line.

**Modifier small-capital w (’)**

Voiceless labialization in Sapir; equivalent to ⟨w⟩ in IPA.
Figure 68. Sapir (1929/1992: 59) *Southern Paiute, a Shoshonean Language*, in Bright (ed.) *The Collected Works of Edward Sapir X*. The superscript voiceless w is small-cap, as can be seen not just by comparing it to the l.c. ⟨ʷ⟩ in the line above it, but to the semantically parallel small-cap voiceless ⟨w⟩ below (yellow; a few intervening lines have been removed). Small-cap glossing elsewhere has the same letter size.

Figure 69. Sapir (1929/1992: 63). Unaspirated [pʷ] contrasts with aspirated [pʰ]. The difference is not very apparent in roman type face, even in Sapir, but this is true for other small-cap letters in the Americanist tradition such as z. The difference from IPA is that they are plain small caps rather than petit caps. This has not, however, been differentiated in Unicode, where БГИЛНРЫ apparently cover both IPA petit-cap and Americanist small-cap notation.

**Modifier small-capital phi ( alumno)**

Small-capital phi and its superscript are used in the Americanist/IPA transcription of LAMSAS (U Georgia) for lowercase IPA /ϕ/, parallel to the use of small-capital gamma ⟨ᵣ⟩ for lowercase IPA /ɣ/. These distinctions are similar to Americanist small-capital ⟨u⟩ for IPA ⟨o⟩, which already have superscript support in Unicode (⟨ᵢ⟩ and ⟨ᵣ⟩).
Figure 70. Kretzschmar (1993: 124). The letter is clearly a small capital, with x-height. [Two intervening paragraphs on voiced fricatives have been removed from the image.]

Figure 71. Kretzschmar (1993: 122). The letter is clearly a small capital Φ in the last line (red), and a small capital superscript * in the first (orange), with the height of superscript s rather than of superscript f.

**Modifier eszett (◊)** [dubious – bad typography. Ask LAMSAS? see if repeated in other docs. Better to find 2 docs.]

⟨ß⟩ is used in place of IPA [β] in LAMSAS (Kretzschmar et al. 1994), perhaps as a stylized small capital similar to ⟨ɹ⟩ for [ɣ] and ⟨Φ⟩ for [ɸ], which are also conventions at LAMSAS. It appears superscribed in the labial affricate (second figure below).

Figure 72. Kretzschmar et al. (1994: 135), explaining that the superscribing is semantically distinctive, and that its loss would be equivalent to the loss of a tie bar.

Figure 73. Kretzschmar et al. (1994: 122)
**Modifier small capital o-u ligature, Ȣ (♂)**

This is used in Americanist notation for U+1D15 small-capital Ȣ as an offglide. The existing U+1D3D Ȣ is a full capital Ȣ. (The UPA submission to Unicode was for a small-cap Ȣ, but it was adopted as full-cap like the other UPA modifiers. Americanist notation is instead a small cap.)

![Image](image.png)

Figure 74. Kretzschmar et al. (1994: 117). Small capital (x-height) U+1D15 Ȣ (red) and superscript small capital Ȣ (orange).

**Capital letters**

**Modifier capital C (♀) [why not T for tone?]**

Most common among unsupported letters isNC or ♀N for a post- or pre-stopped nasal.

![Image](image.png)

Figure 75. Ratliff (2015: 39). The semantic distinction between ⟨NC⟩, ⟨ⁿC⟩ and ⟨N♀⟩.

![Image](image.png)

Figure 76. Miotti (2015: 382)

![Image](image.png)

Figure 77. Riehl & Cohn (2011: 572)
Modifier capital F (F)

Figure 9.9 De fem toner i thai

9.5.3 Notation
Der er flere forskellige måder at notere toner på i litteraturen. En ser således ud: ʰpa – hoj, ʰ⁴pa – midt, ʰ¹pa – lav, ʰ⁵pa – faldende, ʰ⁶pa – stigende (‘rising’). Meget almindeligt

Modifier capital Q (Q)

Occasionally used for sokuon (phonemic gemination) in Japanese.

[If this should be a superscript small-cap Q, that is also unsupported by Unicode.]

Figure 80. Fujimura & Williams (1999: 473)

Other Greek letters

Modifier mu (μ)

μ is a wild card for ‘mora’, whereas superscript μ marks a moraic boundary. The distinction is analogous to σ for ‘syllable’ vs $ for a syllable boundary[dbl check usage], and I’ve always seen the moraic boundary symbol as a superscript. If the formatting were lost, the mu would suggest an additional unspecified mora within the string of segments.
*[ha:.t]* is ruled out for its monomoraic full-voweled syllable. With a (potentially) bimoraic stem as in (19b) /vɛβ+nt/, the suffix is forced into a syllable of its own to avoid a trimoraic syllable *[vɛβ+nt]* while still having a mora itself [vɛβ+nt] (the underdot marks the syllable boundary that the [β] straddles). That a diphthong does not break apart, as with (20a) /pɔ́mu+nt/, follows from

**Figure 81.** Hiller (2003: 204)

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**VOWELS**

(19) The high short allophone of /o/
norr /norH `north’
Norrtälje /norH+tɛlj-e2/ [no2[ɛlje] or [no2[ɛlje]]
Norrtull /norH+tulH/ [no[øl] or [no[øl]]

**Figure 82.** Riad (2014: 32)

Nearly all consonants occur as both a long and a short phoneme. We assume that contrastive quantity resides with the consonants, whereas length in vowels is purely allophonic, and driven by Stress-to-Weight, an undominated constraint in Swedish (see chapter 8). We represent the phonemic length here with a raised mora (e.g. /katH/ [kat] ‘cat’). Phonetically this always comes out as increased duration relative to the non-moraic variant. This is worth emphasizing, since Swedish (and Norwegian) differ from most other varieties of Germanic by having a direct quantitative correlate to a moraic consonant. The two consonants /h/ and /ç/ are

**Figure 83.** Riad (2014: 45)

(28) Main articulations of the Central Swedish consonants

<table>
<thead>
<tr>
<th></th>
<th>labial, labiodental</th>
<th>dental, alveolar, palatal</th>
<th>velar</th>
</tr>
</thead>
<tbody>
<tr>
<td>oral stop s.g.</td>
<td>p</td>
<td>t</td>
<td>k</td>
</tr>
<tr>
<td>voice</td>
<td>b</td>
<td>d</td>
<td>g</td>
</tr>
<tr>
<td>fricative s.g.</td>
<td>f</td>
<td>s</td>
<td>ç</td>
</tr>
<tr>
<td>fric./retroflex</td>
<td>s</td>
<td>ş</td>
<td></td>
</tr>
<tr>
<td>fric./approx. voice</td>
<td>v</td>
<td>j</td>
<td></td>
</tr>
<tr>
<td>nasal stop</td>
<td>m</td>
<td>n</td>
<td>ñ</td>
</tr>
<tr>
<td>lateral</td>
<td>l</td>
<td></td>
<td></td>
</tr>
<tr>
<td>apical trill</td>
<td>r</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 84.** Riad (2014: 45). ⟨lH⟩ is a moraic [l]; baseline ⟨lμ⟩ would instead be non-moraic [l] followed by some mora. ⟨lH⟩ is thus similar to ⟨l⟩, but moraic rather than syllabic.

**Modifier kappa, omicron, pi, tau (& iota) (... ι)**

Used in scribal abbreviations. See also combining alpha (separate request).
Additional superscript letters for review

Modifier small-cap r (r) and turned R (ɋ) [waiting on ILL]

(good to have on record for future proposals)

Used in Penhallurick and similar dialect atlases for weak allophones of English /r/. r is used, along with a modifying superscript variant, for fricative [ɹ] in Penhallurick (1991). I have not found superscript ɋ or R in that volume, apart from the list of superscript letters below, but they are used in the data it was drawn from, which is published in volume 3 of D.R. Parry (director, U. of Swansea) & Penhallurick (ed.) Survey of Anglo-Welsh Dialects. [I do not have access.] * might be found in Bright, if that is not a full capital (small cap R for uvular trill vs full cap R for voicelessness).

The following superscript IPA letters indicate weak articulation:

The following superscript IPA letters in

Figure 86. Penhallurick (1991: xviii). Modifier IPA diacritics used for weak articulation. The letters are r ɋ.
Modifier ɖ (ɖ)

Linguists differ on whether they transcribe the Australian stop series as voiceless ⟨p t t c k⟩ or voiced ⟨b d d r g⟩. Thus both ʈ r and superscript ɖ r are needed. For example, Nukunu /ʈn/ and /ʈr/ have been transcribed phonetically as [ʈʰ] and [ʈ r] (Hercus 1992 A Nukunu Dictionary, cited in Butcher 1999 “what speakers of Australian Aboriginal languages do with their velums and why”, Proceedings of the XIVth International Congress of Phonetic Science), though that particular language does not have a retroflex. Similarly, Acehnese has voiced post-stopped (orally released) nasals transcribed ⟨m b n d̪ ɲ ᵇ̄⟩ in Long & Maddieson (1993: 142) “Consonantal evidence against Quantal Theory”, UCLA Working Papers in Phonetics 83, but lacks a retroflex series. Chan (1987) comments that such notation is quite common, and uses it herself (“Post-stopped nasals in Chinese”, UCLA Working Papers in Phonetics 68). Lack of attested ⟨ɖ r⟩ is thus an accidental gap.

Modifier barred glottal stop, ʡ (ʡ)

I have yet to find ⟨ʡ⟩ in print. John Esling (p.c.) says “One of the only reasons epiglottal stop (ʡ) in general may not yet appear widely in the literature is because we only identified it phonetically (as a pharyngeal stop, a.k.a. aryepiglottic closure) 20 years ago.” Indeed, he has used the transcriptions ⟨ʕ ʡ⟩ and ⟨ʜ̄ ʡ⟩ for Amis, with a tie bar that he notes in print is not accurate, and says he could imagine using modifier letters (ʡ and ῱) instead.

Modifier capital X (χ)

(good to have on record for future proposals)

Figure 88. MUFI (2015: 121).

Modifier Latin chi (χ)

Baseline Greek χ and Latin χ are both encoded, due to casing in both (Latin χχ). It may be that the superscript can be handled by the font. check proposal 12270 for justification. Add contrasting texts with superscript Greek chi and beta.
Modifier Latin beta (\(\beta\))

A proper IPA superscript beta is used in Laver. Modifier Greek beta is at U+1D5D \(\beta\), and Greek beta \(\beta\) is more commonly used in IPA transcriptions than the dedicated IPA Latin beta, but since the latter has been added to Unicode (at U+A7B5) it would be consistent to have a superscript Latin \(\beta\) as well. Latin \(\beta\) is attested both in affricates and diphthongs. Another use is a restored (‘missing’) \(\beta\) in transcriptions of Avestan and Old Persian manuscripts (Skjærvø 2007 Avestan and Old Persian Morphology, in Kaye (ed.) Morphologies of Asia and Africa, p. 859).

Baseline Greek \(\beta\) and Latin \(\beta\) are both encoded, due to casing in both (Latin \(\beta\)). It may be that the superscript can be handled by the font. check proposal 12270 for justification.
Table 19.2e Numbers of languages exploiting differences of place of articulation, aspectual and co-ordination categories on single post-affricated voiced oral stops in 317 languages

<table>
<thead>
<tr>
<th></th>
<th>Labial</th>
<th>Lab-dnt</th>
<th>Dental</th>
<th>Dent/Al</th>
<th>Alveol</th>
<th>Post-al</th>
<th>R'flex</th>
<th>Palatal</th>
<th>Velar</th>
<th>Uvular</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>[b\beta]</td>
<td>b\beta</td>
<td>\check{d}</td>
<td>\check{d}</td>
<td>\check{d}</td>
<td>d\check{2}</td>
<td>d\check{3}</td>
<td>j\check{Y}</td>
<td>g\check{Y}</td>
<td>e\check{\epsilon}</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 92. Laver (1994: Table 19.2e and p. 245). The latter shows that Laver uses Latin \( \beta \) and \( \phi \), with their serifs, rather than Greek \( \beta \) and \( \phi \).

\[ i:\quad y:\quad \check{u}_\beta:\quad \check{u}_\beta: \]

tilsører det forhold at fonetisk er der tale om fire høje vokaler, \([i:\quad y:\quad \check{u}_\beta:\quad \check{u}_\beta:]\) (=/u:/), og det indrundede \([u\beta:]\) (=/o:/); \([o:]\) = /o:/

jeg [round] til fremrundede vokaler. Men måske kunne de svenske indrundede vokaler, 
[/u:/([u\beta:]) og /o:/([u\beta:])), karakteriseres som [+round, +lab].

Figure 93. Grønnum (2005: 362, 396). Both the baseline and superscript betas have the bottom serif expected of Latin script.
Properties

.....;MODIFIER LETTER SMALL AE;Lm;0;L;<super> 00E6;N;.....
.....;MODIFIER LETTER SMALL REVERSED E;Lm;0;L;<super> 0258;N;.....
.....;MODIFIER LETTER SMALL RAMS HORN;Lm;0;L;<super> 0264;N;.....
.....;MODIFIER LETTER SMALL O WITH STROKE;Lm;0;L;<super> 00F8;N;.....
.....;MODIFIER LETTER SMALL CAPITAL Y;Lm;0;L;<super> 028F;N;.....
.....;MODIFIER LETTER SMALL CAPITAL B;Lm;0;L;<super> 0299;N;.....
.....;MODIFIER LETTER SMALL CAPITAL G;Lm;0;L;<super> 0262;N;.....
.....;MODIFIER LETTER SMALL H WITH STROKE;Lm;0;L;<super> 0127;N;.....
.....;MODIFIER LETTER SMALL HENG WITH HOOK;Lm;0;L;<super> 0267;N;.....
.....;MODIFIER LETTER SMALL CAPITAL H;Lm;0;L;<super> 029C;N;.....
.....;MODIFIER LETTER SMALL Q;Lm;0;L;<super> 0071;N;.....
.....;MODIFIER LETTER SMALL R WITH FISHHOOK;Lm;0;L;<super> 027E;N;.....
.....;MODIFIER LETTER SMALL R WITH TAIL;Lm;0;L;<super> 027D;N;.....
.....;MODIFIER LETTER SMALL TURNED R WITH LONG LEG;Lm;0;L;<super> 027A;N;.....
.....;MODIFIER LETTER SMALL CAPITAL R;Lm;0;L;<super> 0280;N;.....
.....;MODIFIER LETTER SMALL T WITH RETROFLEX HOOK;Lm;0;L;<super> 0288;N;.....
.....;MODIFIER LETTER SMALL TURNED Y;Lm;0;L;<super> 028E;N;.....
.....;MODIFIER LETTER REVERSED GLOTTAL STOP WITH STROKE;Lm;0;L;<super> 02A2;N;.....
.....;MODIFIER LETTER SUPERSCRIPT TRIANGULAR COLON;Lm;0;L;<super> 02D0;N;.....
.....;MODIFIER LETTER SUPERSCRIPT HALF TRIANGULAR COLON;Lm;0;L;<super> 02D1;N;.....
.....;MODIFIER LETTER SMALL REVERSED R WITH FISHHOOK;Lm;0;L;<super> 02D7;N;.....
.....;MODIFIER LETTER SMALL SQUAT REVERSED ESH;Lm;0;L;<super> 0285;N;.....
.....;MODIFIER LETTER SMALL N WITH CURL;Lm;0;L;<super> 0235;N;.....
.....;MODIFIER LETTER SMALL CAPITAL P;Lm;0;L;<super> 1D18;N;.....
.....;MODIFIER LETTER SMALL CAPITAL TURNED R;Lm;0;L;<super> 1D1A;N;.....
.....;MODIFIER LETTER SMALL CLOSED OMEGA;Lm;0;L;<super> 0277;N;.....
.....;MODIFIER LETTER SMALL DEZH DIGRAPH;Lm;0;L;<super> 02A4;N;.....
.....;MODIFIER LETTER SMALL TESH DIGRAPH;Lm;0;L;<super> 02A7;N;.....
.....;MODIFIER LETTER CAPITAL C;Lm;0;L;<super> 0043;N;.....
.....;MODIFIER LETTER CAPITAL F;Lm;0;L;<super> 0046;N;.....
.....;MODIFIER LETTER CAPITAL Q;Lm;0;L;<super> 0051;N;.....
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