

Rhotic representation: problems and proposals

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Starting with an **r** that was already ambiguous, the IPA added new symbols and diacritics without arriving at a comprehensive treatment of rhotics. The results have been *ad hoc* solutions and potential confusion for languages such as Spanish, in which these need to be distinguished. A few modifications of the IPA diacritic system would suffice in order to capture the different types.

1 Introduction

For most of its history, the Association has designated the simple symbol **r** for the apical trill found in Spanish *perro* ‘dog’ or *corro* ‘I run’. The almost universal practice in linguistics, on the other hand, has been to use **r** for whatever *r*-sound happens to be at hand in the language being described, or for the main or unmarked one when there are two or more. To Anglophone linguists and students, then, “[r]” means an alveolar or retroflex approximant unless otherwise indicated.

The latter practice has been true of the IPA also. Thus, in *Principles* (IPA 1912 (1949: 11)) the Association defined **r** as ‘rolled *r*’ (i.e., the apical trill) but then added that it is ‘also used whenever possible to denote flapped **r** (*r̥*), fricative **r** (*r̥*), lingual frictionless continuant **r** (*r̥*), uvular rolled **r** (*r̥*), uvular fricative **r** (*r̥*), or the uvular frictionless continuant (*r̥*)’. It then gave sample transcriptions (‘The North Wind and the Sun’) of a variety of languages, and in well over half of the passages that contained the symbol **r**, transcribers felt obliged to explain what it meant in the language even when it had the official value of ‘rolled *r*’; contrarily, for quite a few specimens **r** was left WITHOUT any such specification even when it clearly referred to some other kind of rhotic, not an apical trill (Whitley forthcoming).

2 Problems

The general understanding, then, is that ‘[r]’ means any rhotic but may be defined by reference to a narrower transcription such as [ɾ] or [r̥]. But the IPA provides no way to do this in the case of an apical trill. An example of the potential ambiguity can be found in Wells (1982: 342), who stated that ‘/r/ is retroflex, [ɻ]’, but then (p. 379) intended ‘[r]’ to be understood as a trill. Even for an attentive reader, his slashes vs. brackets did not eliminate the ambiguity since ‘[r]’ can mean ‘any rhotic’ in either phonemic or phonetic representation.

Table 1 IPA rhotics.

[r̥]	apicoalveolar trill, or any <i>r</i> -sound.
[ɾ]	apicoalveolar flap (or tap)
[ɹ]	apicoalveolar approximant (frictionless continuant)
[ɻ]	apicopostalveolar (retroflex) approximant
[ɽ]	apicopostalveolar (retroflex) flap
[ɺ]	apicoalveolar lateral flap
[ʀ]	uvular trill
[ʁ]	uvular fricative

Otherwise, he carefully labeled rhotics, but the awkwardness is still apparent:

Elsewhere in this chapter I have used [r̥] to stand for various possible /r/ realizations indifferently. In this discussion of /[r̥]/, I shall use [r̥] to stand only for a voiced alveolar roll (trill), with other types of /r/ represented as [r], [ɹ], etc. (Wells 1982: 410)

Likewise, Penny (1991) followed the almost universal practice in Hispanic linguistics (Navarro 1967) of using **r** for the unmarked Spanish rhotic, the flap [ɾ]; but following IPA norms, he also had to use **r** for the trill, thereby confusing the distinct historical rules (72–73) that the two phonemes underwent. As a way out of the problem, the earlier IPA (1949: 13) had suggested doubled [rr] for specifying an apical trill (and [RR] for a uvular one), but this proposal proved unworkable for languages such as Spanish, in which trills are not geminates. In Hispanic linguistics, the general way to indicate the apical trill has been **r** with a macron, [r̄], a tradition taken for granted by Navarro (1967: 121) and dating back at least to Boas et al. (1916: 13). Alternatively, some Americans (at least since Pike 1947) have substituted a tilde, [r̃], but this can wrongly suggest nasality, which is quite possible with a trill.

The apical trill is not the only problem in rhotic transcription. The IPA began with simple **r** for any *r*-sound (Albright 1958: 49–52), adding **ʀ** for a ‘back **r**’ in particular, and then a few more symbols as other types came up. Our currently recognized inventory of voiced rhotics is shown in table 1.

Certain variants are adequately transcribed by the addition of diacritics for voicelessness, laryngealization, palatalization, advanced/retracted, etc.; the laminal subscript, for example, has been adopted (Pullum & Ladusaw 1996: 235) to signal the non-apical ‘bunched’ /ɹ/ of some American English speakers, [ɹ̥]. Yet there was apparently little anticipation of the other types that result from the parameters of three places (alveolar, postalveolar, uvular) and four manners (trill, flap or tap,¹ fricative, approximant) that were already recognized in the classification in table 1. These combinations do exist, as illustrated below, and pose a special challenge for Hispanic linguistics (my own field) since Spanish has several of these phones as allophones or dialect variants of its flap and trill phonemes.

Postalveolar (retroflex) trill: phonemic in five languages cited in Maddieson 1984; also Malayalam (Ladefoged et al. 1977: 50). Ladefoged & Maddieson (1996: 223, 237) interpreted the two Malayalam trills as advanced/retracted alveolar and used a subscript plus and minus to distinguish them, [ɹ̥₊]; but for the undeniably retroflex trill of Toda they borrowed the flap symbol [ɽ] since the IPA does not provide for it.

¹ Following the IPA’s traditional classification, we make no distinction here between *flap* and *tap* as described by Ladefoged & Maddieson (1996: 231); perhaps that is another transcriptional deficiency that needs to be remedied.

Apicoalveolar fricative trill: one language cited in Maddieson 1984, but his corpus did not include the best-known language with this sound, Czech (as in *Dvořák*). The fricative trill is also a widespread pronunciation of the trill phoneme in Spanish (Alonso 1967: 123–158), where it is known as the *vibrante múltiple asibilada* ('assibilated trill'), although it is not a true sibilant since it lacks tongue grooving. For several decades, the IPA showed the fricative trill with 'long-legged r', [r̄], but this symbol was seldom used and was dropped in 1989. In its place, the Association advised adding the diacritic for 'raised' to r, [r̥] (IPA 1989: 71), although Ladefoged & Maddieson (1996: 228) reinterpreted the sound as a laminal trill, [r̥]. At least for Spanish, I know of no evidence that the fricative trill is either laminal or more raised, and neither diacritic captures its striking acoustic effect. Alonso added a háček to a turned trill symbol, [r̥̂], but the general solution in both Hispanic and Slavic linguistics has been a háček on plain r, i.e. the Czech letter ř, which was also the IPA's original symbol (1912, 1926), as well as Maddieson's (1984).

Apicoalveolar fricative: phonemic in four languages in Maddieson 1984, plus a fifth with a 'fricative flap', and a sixth, in which the sound forms an affricate with /t/; but it is also widespread as an allophone of the flap in other languages, such as Spanish, Turkish, and Bolivian Quechua (Bills et al. 1969: xix). Unlike the various types of /s/ or /z/, this fricative is nonsibilant (ungrooved), despite the Spanish term for it, *vibrante simple asibilada* ('assibilated flap'), and it commonly results from the weakening of an alveolar flap, as in Spanish and also Irish English (Wells 1982: 429). Wells transcribed it as [t̪] (using the Polish hook for a more 'open' articulation than full stop closure), whereas Wolfram & Johnson (1982) showed it as [s̪] (barred s) in order to discuss it as a speech defect for /s/ or /z/. Trager (1964: 22) opted for eth with a subscript dot, [ð̣], to suggest a retracted dental (hence nonsibilant) type of fricative; by the similar argument in Bernhardt & Ball (1993: 37), this would be [ð̣̣] (with a new double underscore diacritic for 'alveolar'). Following new IPA norms (1989), Ladefoged & Maddieson (1996: 236) interpreted the phone as a raised [ɹ̥], [ɹ̥̂]. In Hispanic linguistics, though, it has been transcribed as turned r with a háček, [r̥̂] (Navarro 1967: 120), which was also Maddieson's (1984) choice. The devoiced version, common in Spanish for a weakened flap in phrase-final position (as in *ir /ir/* 'go'), is shown as [ɹ̥̥̂].

Postalveolar (retroflex) fricative: five languages in Maddieson 1984. In addition to its occurrence as a phoneme in those languages, it is a well-known allophone of /r/ (i.e., /r/) in Chilean Spanish in the cluster /tr/, so that *otro* 'another' reminds other Spanish speakers of their affricate /tʃ/ in *ocho* 'eight' (Zamora-Munné & Guitart 1982: 100). Once again, however, this rhotic differs from sibilants such as [ʃ ʒ] and [ʂ ʐ] in lacking the higher frequency hiss resulting from a grooved tongue. Wells (1982: 616) also reported this nonsibilant fricative as a common /r/ in South African English, and singled it out as [ɹ̠] (turned r with the subscript dot meaning 'close'). On the other hand, Maddieson 1984 used a háček and subscript dot, [r̥̣̂], while Ladefoged (1971: 49) used a circumflex, [ṛ̂].

Uvular flap: a phone that did not appear as a phoneme in Maddieson's survey, although it is attested: Jacob (1968: 4) cited it for Cambodian /r/ in Battambang, as opposed to the approximant [ɹ] used in Phnom Penh and the apical trill used in the rest of the country. This rhotic can be handled by the Association's recommendation (1989: 70) to add a breve to a symbol to show a flapped version: [r̆].

Uvular fricative trill: Lindau (1985: 159) showed this to be a common articulation of French /r/ intermediate between uvular trill and fricative, and she confirmed spectrographically the presence of 'fricative noise' in 'trill-type closures and openings'. For it, she added a háček to the uvular trill symbol, [r̄̂], by analogy to the widespread (but unofficial) symbol for the alveolar counterpart [r̄̂].

Uvular approximant or frictionless continuant: phonemic in one language in Maddieson's (1984) survey, but also common for Danish /r/ (Grønnum 1998) and for German postvocalic /r/ (Kohler in IPA 1999: 71). It has variously been shown as [ɹ̥] (with the Polish hook for 'more open, without frication'), or as a low- or back-vowel glide [ɹ̥], [ɹ̥̣]; Maddieson added a nonsyllabicity mark to the fricative counterpart, [ɹ̥̣̣], then later (in Ladefoged &

Table 2 Fuller set of rhotics.

	alveolar	retroflex	uvular
trill	[̄r]	[̄ɽ]	[̄R]
flap (tap) and lateral flap	[r], [ɽ]	[ɽ]	[̄R]
fricative trill	[̄r̥]	[̄ɽ̥]	[̄R̥]
nonsibilant fricative	[̄x]	[̄χ]	[̄χ]
approximant (frictionless continuant)	[ɹ]	[ɻ]	[ʁ]

Maddieson 1996: 234) switched to the diacritic for ‘lowered’, [̄ɽ], which Grønnum also used.

As illustrated above, transcribers have dealt with these rhotics by resorting to non-IPA symbols or by pressing other symbols into service for them, increasing possible confusion. Thus, Quilis & Fernández (1990) used ‘[ɽ]’ for the Spanish fricative allophone of the flap, and then also for the English approximant (frictionless) /r/, sounds they were actually trying to get the reader to CONTRAST in order to eliminate English interference from Spanish pronunciation.

3 Proposals

Given the problems in representing certain rhotics, and trills in particular, I urge the Association to expand or redefine more carefully its symbols and diacritics in order to permit clearer distinctions of /r/ types. The most practical solution would be three minor modifications in the diacritic system:

1. Adopt the macron for specifying a trill, leaving plain r entirely free for its widely understood value of ‘any rhotic’.
2. Return to the Polish hook for showing decreased turbulence.
3. Recognize the háček for showing a fricative effect or greater stridency – a value it clearly has for many transcribers already.

The various rhotics could then be distinguished as in table 2 whenever a narrower transcription than plain [r] is needed.

The chief advantage of this system is that it handles all the rhotics described above in a way that matches existing practices. The Polish hook was standard² until just over a decade ago for ‘more open’ (not necessarily ‘raised’) and therefore ‘less constricted, less turbulent’, and it has continued in use for that value anyway (cf. Clark & Yallop 1995: 423). The macron traditionally signifies length and the trill is indeed longer than a flap, although it can be lengthened further ([̄r̄, r̄:]), which is why the length mark is needed separately. Note, too, that the macron’s traditional companion for showing shortness, the breve, remains official in the IPA, with the parallel function of earmarking a flap. The háček, too, already has a precedent in the IPA, since ř was once official and remains widespread.

² Pullum & Ladusaw (1996: 253) identified this previous diacritic for ‘more open’ or ‘less fricative’ as the subscript left half-ring now used for ‘underrounded’, and did not acknowledge the Polish hook as IPA usage. But although this subscript did resemble a half-ring in the font used in *Principles* 1949 (16), numerous other publications (e.g., *Principles* 1912: 18, *Le Maître Phonétique* 1967 no. 128: 26, Wells 1982: 42, 208) make it clear that the intended diacritic was the long-used Polish hook hanging down from the primary character and then sweeping to the right. Note its explicit definition in one IPA article (*Le Maître Phonétique* 1968 no. 130: 2) as indicating a ‘voɪst frɪkʃənələs kəntɪnjuənt ɔ:r əprɒksɪmənt’, e.g. [β̥] and [ð̥].

On several grounds, this system is preferable to the 1989 Kiel Convention's switch to 'tiny T's' for indicating more vs. less air stream turbulence. Raised/lowered 'is not a particularly intuitive way' to bring out these effects (Ladusaw & Pullum 1996: 162), and it is dubious for both the bilabial approximant '[β]' (traditionally [β]) and the fricative trill '[r̥]' (traditionally [r̥]), when stridency actually depends more on air flow, articulator tension, and degree of constriction than on articulator height (Dankovičová in IPA 1999: 71). In fact, in Ladefoged & Maddieson's midsagittal diagrams of the two Czech trills (1996: 233), the tongue is actually HIGHER for the plain trill than for the fricative one. There is also a practical advantage to these proposals: the macron and háček do not take up space under a character (indeed, the SOLE overstrike space there in many phonetic fonts) as tiny T's do, and they therefore do not interfere with the diacritics needed for showing voicelessness, dentality, or laryngealization.

Two objections might be: (1) the apparent inconsistency of a macron for [r̄] and [r̄] but not for [R] and [B], and (2) the current use of the macron and háček for mid and rising tone, respectively. But since the latter values appear mainly on vowel symbols, the risk of confusion would be minimal, and the inconsistency would be no more disturbing than the use of hooktops for both implosives and breathy-voiced [h̥], or of the breve for the uvular flap [ɾ̥] but not for the alveolar or retroflex ones.

Alternatively, distinct symbols could be introduced, as was done (at last) in the case of frictionless [j] vs. fricative [j̥]. This would require a distinction in the Association's consonant chart between a row for sibilant fricatives like [z̥ z̥] and a row for nonsibilant ones like [ɹ̥ ɹ̥] – an adjustment that at any rate seems overdue.

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