Phonological Features and the IPA

Major Class Features

[syllabic]

All vowels are [+syllabic]. By default, consonants are [-syllabic]; [+syllabic] consonants are marked with the [] diacritic. Glides are always [-syllabic]; the [+syllabic] counterpart of a glide is a vowel.

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[vocalic]

Vowels and glides are [+vocalic]; all other segments are [-vocalic].

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[approximant]

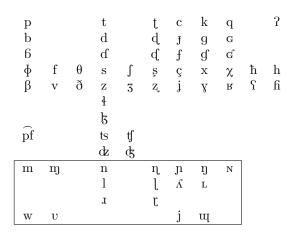
Segments that are [+approximant] have a very wide constriction in the oral tract; segments that are [-approximant] have a narrow constriction in the oral tract. Vowels, glides, and liquids are [+approximant]; stops, fricatives, affricates, and nasals are [-approximant].

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i		у			ш/i		u
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[sonorant]

The feature [sonorant] characterizes an acoustic property of segments: segments that are [+sonorant] have formant structure; segments that are [-sonorant] do not. Vowels, glides, liquids, and nasals are [+sonorant]; stops, fricatives, and affricates are [-sonorant].



i		у			ш/i		u
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[continuant]

The feature [continuant] refers to oral airflow: segments that are [+continuant] have continuous oral airflow; segments that are [-continuant] involve an interruption in oral airflow. Vowels, glides, liquids, and fricatives are [+continuant]; stops, affricates, and nasals are [-continuant].

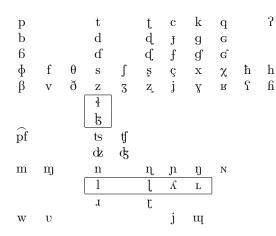
p			\mathbf{t}		t.	\mathbf{c}	k	q		?
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ф	f	θ	s	ſ	ş	ç	X	χ	ħ	h
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i		У			ш/i		u
	I		Y			υ	
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[lateral]

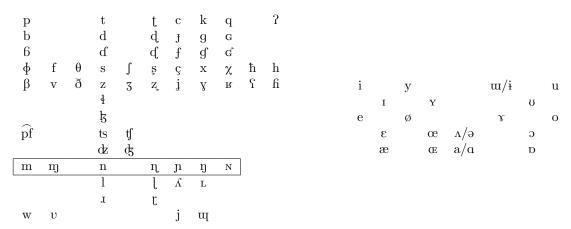
Lateral fricatives and approximants are [+lateral]; all other segments are [-lateral].

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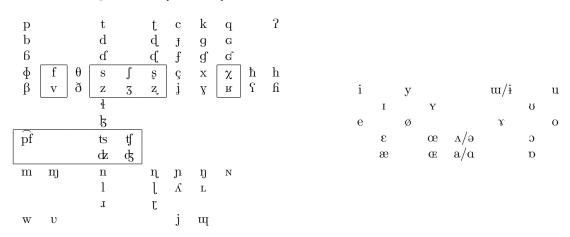
[nasal]

Nasal consonants are [+nasal]. All other segments are [-nasal] by default; nasal vowels and other nasalized segments are marked with the $[\tilde{}]$ diacritic.



[strident]

The feature [strident] refers to high-frequency aperiodic noise during a segment: segments that are [+strident] have this noise; segments that are [-strident] do not. All affricates are [+strident]; in addition, fricatives at certain places of articulation are [+strident]: labiodentals, alveolars, palato-alveolars, retroflexes, and uvulars. All other segments are [-strident].



Place Features

[labial]

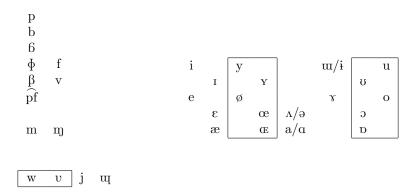
Among consonants, the feature [labial] distinguishes between labial and non-labial segments. Rounding in vowels and glides is specified with [round], which is a dependent feature of [labial]; therefore, all vowels and glides are [+labial]. Thus, bilabials, labiodentals, and all vowels and glides are [+labial]; all other segments are [-labial]. In addition, if a language has a pair of segments that contrast in rounding, both segments are [+labial] (see below).

b 6 φ β	f v	θ	d d s z 4 ts	∫ 3	d d s z	f ç j	9 у х	R	ħ S	h fi
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	æ		Œ	a/a		σ	

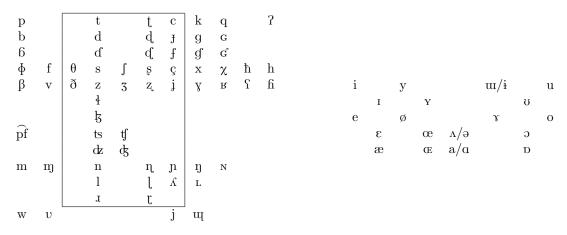
[round]

The feature [round] is dependent on the feature [labial]; it refers to rounding of the lips independent of labial place of articulation. Round vowels and glides are [+round]; unrounded vowels and glides and labial consonants are [-round]. Rounding on other segments is indicated with the [w] superscript; thus, adding [w] to a segment makes that segment [+round] (and [+labial] if it is not labial already). The non-rounded counterpart of that segment (if any) is [+labial, -round].



[coronal]

The feature [coronal] refers to the involvement of the front half of the tongue body in the articulation of the segment. Interdental, alveolar, palato-alveolar, retroflex, and palatal consonants (except glides) are [+coronal]; labial, velar, uvular, pharyngeal, and glottal consonants and all vowels are [-coronal]. The dependent features of [coronal] are [anterior] and [distributed].



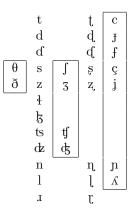
[anterior]

The feature [anterior] is dependent on the feature [coronal]; it refers to whether the primary constriction is in the frontmost part of the mouth (at or before the alveolar ridge). Interdentals and alveolars are [+anterior]; palato-alveolars, retroflexes, and palatals are [-anterior].



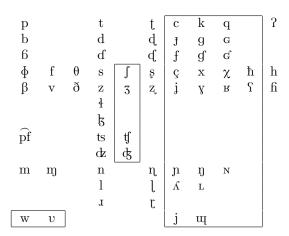
[distributed]

The feature [distributed] is a dependent feature of [coronal]; it refers to whether the primary constriction is made with the tip or the blade of the tongue. Segments that are [+distributed] are articulated with the blade of the tongue; segments that are [-distributed] are articulated with the tip. Interdentals, palato-alveolars, and palatals are [+distributed]; alveolars and retroflexes are [-distributed].



[dorsal]

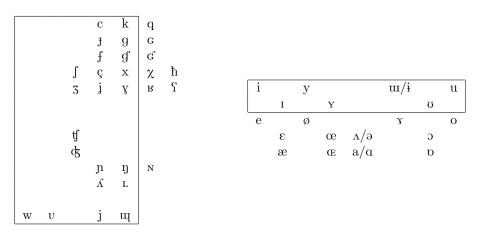
The feature [dorsal] refers to the involvement of the back half of the tongue body in the articulation of the segment. Palato-alveolar, palatal, velar, uvular, and pharyngeal consonants and all vowels and glides are [+dorsal]; labials, interdentals, alveolars, retroflexes, and glottals are [-dorsal]. The dependent features of [dorsal] are [high], [low], and [back].



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	æ		Œ	a/a		σ	

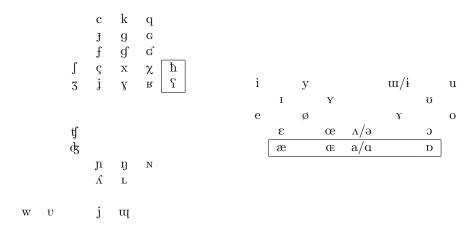
[high]

The feature [high] is dependent on the feature [dorsal]; it refers to the height of the tongue body. Alveopalatal, palatal, and velar consonants, all glides, and high vowels are [+high]; uvular and pharyngeal consonants and mid and low vowels are [-high].



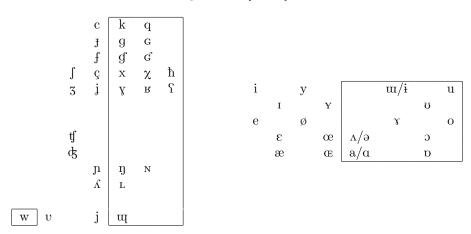
[low]

The feature [low] is dependent on the feature [dorsal]; it refers to the height of the tongue body. Pharyngeal consonants and low vowels are [+low]; palato-alveolar, palatal, velar, and uvular consonants, all glides, and high and mid vowels are [-low].



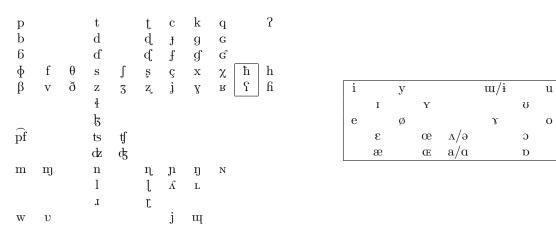
[back]

The feature [back] is dependent on the feature [dorsal]; it refers to the horizontal position of the tongue body. Velar, uvular, and pharyngeal consonants and central and back vowels and glides are [+back]; palato-alveolar and palatal consonants and front vowels and glides are [-back].



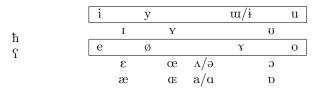
[pharyngeal]

Pharyngeal consonants and vowels in a language with a contrast between tense and lax vowels are [+pharyngeal]; all other segments are [-pharyngeal]. The dependent feature of [pharyngeal] is [ATR].



[ATR]

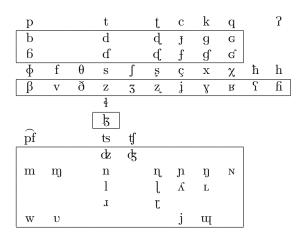
The feature [ATR] (short for 'advanced tongue root') corresponds to the distinction between tense and lax vowel. Tense vowels are [+ATR]; lax vowels and pharyngeal consonants are [-ATR].



Laryngeal Features

[voiced]

Voiced consonants and all vowels are [+voiced]; voiceless consonants are [-voice].



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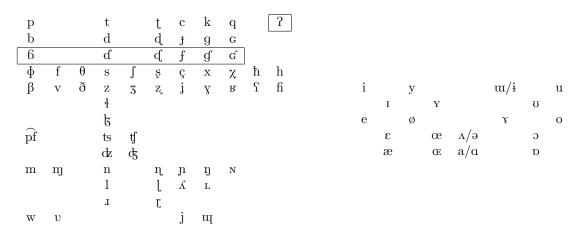
[aspirated]

Voiceless fricatives and [fi] are [+aspirated]; all other consonants and all vowels are [-aspirated] by default. The feature [+aspirated] is also applied to aspirated stops (marked with the [h] diacritic), voiceless sonorants (marked with the [h] diacritic), and vowels with breathy voice (marked with the [h] diacritic).

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ф	f	θ	s	ſ	ş	ç	х	χ	ħ	h
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[glottalized]

Implosive consonants and the glottal stop are [+glottalized]; all other consonants and all vowels are [-glottalized] by default. The feature [+glottalized] is also applied to ejectives (marked with the ['] diacritic) and vowels with creaky voice (marked with the [] diacritic).



Diacritics

Table 1: **IPA diacritics**

Diacritic	Example	Meaning	Feature
,	p'	ejective	[+glottalized]
0	ņ	voiceless	[-voiced, +aspirated]
v	$\overset{\$}{\operatorname{t^h}}$	voiced	[+voiced]
h	$\mathrm{t^h}$	aspirated	[+aspirated]
1	Ţ	syllabic	[+syllabic]
•	e	non-syllabic	[-syllabic]
	a.	breathy voiced	[+aspirated]
~	$\tilde{\mathbf{a}}$	creaky voiced	[+glottalized]
W	$\mathbf{t^w}$	labialized	[+labial, +round]
j	${ m t^j}$	palatalized	[+dorsal, +high, -back]
Y	\mathbf{t}^{γ}	velarized	[+dorsal, +high, +back]
?	$\mathbf{t}^{\mathbf{r}}$	pharyngealized	[+pharyngeal]
п	ţ	dental	[+coronal, +anterior, +distributed]
	ţ	apical	[+coronal, -distributed]
_	t ë	laminal	[+coronal, +distributed]
~	$ ilde{ ilde{ ext{e}}}$	nasalized	[+nasal]