Title

Consonant Prevocalization

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1. Consonant Prevocalization

The term Consonant Prevocalization (CP) refers to the phonological process by which a consonant develops a subsegmental vocalic prearticulation, or prevowel. The European Portuguese forms in (1), from Barbosa (1965: 64), provide an illustration. In these examples, the palatal consonants have developed the vocalic prearticulation, or prevowel, [ʲ].

(1)	a. /maʃa/	[maʲʃa]	'mesh'
	b. /uɲa/	[uʲɲa]	'(finger)nail'
	c. /lɔʒə/	[lɔʲʒə]	'boutique'
	d. /kaʃə/	[kaʲɕə]	'box'

Depending on the language, prevowels may have a variety of surface realizations, ranging from vowel-like to glide-like. Unlike segmental vowels and glides, from which they differ both phonetically and phonologically, prevowels often fail to be registered by the linguistic consciousness of the speakers. They are also distinct from diphthongal offglides in that their source is the consonant rather than the preceding vowel. These differences help to crystallize the distinctiveness of CP, and to highlight its distinctness from vowel diphthongization, which is essential in postvocalic environments such as the one in (1).

The only monographic treatment of CP to date is Operstein (2010); see Purnell (2012) and Nevins (2015) for in-depth reviews of the monograph. In Operstein (2010), I survey previous work on CP, compile a substantial collection of intra- and cross-linguistic examples of this process, highlight its theoretical significance and interfaces with related phonological processes, and outline a model of segment structure consistent with the findings. The monograph also devotes considerable attention to the internal diversity of this process, which comprises two sets of phenomena sharing the underlying mechanism but differing in their respective targets and outcomes.

The first type of CP affects secondarily modified consonants. These include palatalized, velarized, labialized, and pharyngealized consonants. Secondary articulations are usually associated with vowel-like positions of the body of the tongue superimposed on the primary articulation of the consonant; thus, secondary palatalization is associated with a [i]-like, secondary velarization with a [ɯ]-like, secondary labialization with a [u]-like, and secondary pharyngealization with a [ɑ]-like tongue body position. If the execution of the primary and the secondary articulation gestures is less than perfectly

[1] This is a draft.

synchronous, a vocalic pre- or post-articulation to or from the consonant may result. Prevocalization of secondarily modified consonants occurs when the secondary articulation gesture precedes the primary constriction gesture. This type of CP usually affects every consonant with the relevant secondary articulation, regardless of its position within the syllable, and does not affect the consonant's primary constriction. Its main synchronic function is as an articulatory and perceptual enhancement of the secondary articulation. For example, various observers have commented on the fact that the palatalization feature of the coronals /t^j, s^j, l^j, n^j/ in Standard Estonian is signaled primarily by a prominent [i]-quality prevowel (Lehiste 1965; Eek 1973). Functionally, this type of CP appears to be motivated by the twin tendency of the secondary articulation gesture to move into the preceding vocalic space and that of the preceding vowel to assimilate to it. Due to the role of the vocalic transitions, the degree of articulatory and acoustic distance between the secondary articulation and the preceding vowel is essential for this type of CP; the prosodic position of the consonant, on the other hand, is less relevant. Diachronically, CP-generated prevowels are often reanalyzed as part of the preceding nuclei, resulting in the loss of the secondary articulation on the consonant and phonemicization of the nucleus arising from what originally was a vowel-prevowel sequence. Both these processes may be illustrated with the Gallo-Roman French forms seen in (2). In these, the palatalized consonants *k^j and *t^j were first prepalatalized, producing *$^j k^j$ and *$^j t^j$, respectively. Subsequently, the consonants lost the palatalization feature (*k^j > z, *t^j > s) while the prevowel was reanalyzed as a diphthongal offglide (*u^j > oi, *a^j > ai).

(2) Latin *nuce* > Old French *noiz* 'nut' (*Vk^j > *V$^j k^j$ > Vjz)
Latin *palatiu* > *palais* 'palace' (*Vt^j > *V$^j t^j$ > Vjs)

The second type of CP affects plain consonants. Although it shares its basic mechanism with the first type of CP, a number of differences also exist. The major difference is that, unlike prevocalization of secondarily modified consonants, prevocalization of plain consonants is a type of consonant lenition and, as such, is comparatively independent from the preceding vowel. Its main targets are inherently weak consonants, such as sonorants and fricatives, and weak prosodic positions. As detailed in Foley (1977), Hock (1991), Lavoie (2001) and related literature, inherent consonant strength is primarily correlated with the tightness of stricture, rising incrementally from glides (weakest) to stops (strongest); while positional strength is prosodically based, rising from syllable-final (weakest) to intervocalic (intermediate) to initial (strongest). Plain CP most commonly acts on consonants located in coda, and one of its major outcomes is diminished duration of the consonant's primary stricture. E.g., in Albano (1999) the spectrogram illustrating prevocalization of /s/ in Brazilian Portuguese shows a significant temporal reduction in the closure phase of the sibilant. Shortening of consonantal stricture under plain CP is perhaps easiest to observe in the case of geminates, where it is interpreted as degemination. The Gaelic examples in (3), from Ó Dochartaigh (1981: 225), illustrate this by contrasting the geminate sonorants [ll, nn, mm] in dialect area 1 with their prevocalized/degeminated counterparts [wl, wn, wm] in dialect area 2.

(3)		Dialect area 1	Dialect area 2
	dall	[dall]	[dawl]
	ceann	[kʲenn]	[kʲewn]
	cam	[kamm]	[kawm]

Shortening of stricture may be accompanied by other forms of lenition, including diminished tightness, lack of release, devoicing, debuccalization, and complete deletion. For example, lenition of utterance-final stops in the Brazilian language Maxakalí is effected through a combination of CP and implosion, frication, and/or voicing of the constriction gesture (Gudschinsky et al. 1970). Debuccalization of the oral constriction may be illustrated with the Kedah Malay examples in (4). Here, word-final /s/ is realized as a sequence of the prevowel [j] followed by [h], the outcome of debuccalization of the primary constriction gesture of /s/.

(4)	Standard Malay	Kedah Malay	
	balas	*balajh*	'finish'
	bagos	*bagojh*	'good'

Trigo (1988) has argued convincingly that an equivalent to debuccalization in nasals is velarization. Velarization can act together with CP in certain cases of lenition; for example, the two processes work together to effect the change from [ɲ] to [jŋ] in Gascon and some other Romance varieties (Recasens et al. 1995: 270).

Prevocalization of palatal stops and lateral is particularly interesting as it sometimes involves alveolarization of the palatal constriction gesture. The French development in (5) may be cited as an example.

(5)		
	balneum > *bain* 'bath'	(by way of *baɲ, or *ɲ > jn)
	consilium > *conseil* 'advice'	(by way of *conseʎ, or *ʎ > jl)

Alveolarization of palatals is one of the less common forms of lenition. It reduces the surface area of primary contact between the tongue and the palate as well as the duration of the contact: alveolars, articulated with the more mobile tongue tip, are inherently shorter than the corresponding palatals, which are articulated with the tongue blade. Alveolarization of palatals also entails a lowering of their F2 value, which is a form of lenition due to the weakening (centralization) of the palatal gesture. Palatal stops and lateral may undergo other, more common forms of lenition, such as fricativization or gliding, cf. dialectal Polish /koɲ/ → [koʲj̃] 'horse'.

To summarize, this section has introduced the phonological phenomenon of CP, outlined its major divisions, and provided some initial examples of this process. The next section will look at a range of languages to show how different classes of consonants behave under CP. The presentation is organized around the quality of the prevowels, namely, [i]-like, [ɯ]-like, [u]-like, and [ɑ]-like.

2. Prevowels

2.1 [i]-LIKE PREVOWELS

The type of CP that leads to [i]-quality prevowels is termed prepalatalization; consonants triggering such prevowels may be palatalized, palatal, or alveolar. The relevant articulatory feature shared by these consonant types is fronted position of the body of the tongue; in CP-triggering environments, anticipatory execution of the vocalic gesture with respect to that of the primary constriction results in the percept of a front-quality prevowel. In the primary sources, front prevowels are commonly notated as [i] or [j]; however, the accompanying descriptions reveal substantial variation in the height, duration, tenseness, and the degree of frontness of the prevowel. This section first discusses prevocalization of palatalized consonants (2.1.1), then that of palatals (2.1.2), and finally that of alveolars (2.1.3).

2.1.1 PALATALIZED CONSONANTS

Secondary palatalization is defined as a supplementary [i]-like tongue gesture superimposed upon a labial, dental, alveolar, or postalveolar consonantal constriction. This definition is traditionally used to distinguish secondary from primary palatalization, which refers to processes whereby noncoronal consonants become coronal, and nonpalatal coronals palatal. It is also commonly used to distinguish secondarily palatalized consonants from palatals, for which the hard palate serves as the primary place of articulation. It is well known, however, that this definition is also not entirely satisfactory because it fails to include secondary palatalizations that entail a change in the location of the consonant's primary constriction, such as the palatalized version of the Slavic retroflex fricative /ʂ/, which is articulatorily alveolopalatal (Hamann 2004: 64). In such cases, the analysis of palatalization as a primary or secondary feature is based more on its functioning in the phonemic system than its articulatory implementation. For instance, in Polish the alveolopalatals /ɕ, ʑ, tɕ, dʑ, ɲ/ are analyzed as secondarily palatalized based on their functioning as the palatalized counterparts of /s, z, ts, dz, n/.

Prepalatalization is often observed in languages with contrastive (phonemic) palatalization in which the majority of consonants have a palatalized counterpart. Language groups with this feature include Finno-Ugric, Celtic, and Slavic. In a number of Finno-Ugric languages, palatalization is concentrated in the [i]-like onglide to the consonant and the initial portion of the consonant itself, while the rest of the consonant is nonpalatalized and subject to coarticulation from the following vowel (Eek 1973: 31). Standard Estonian has palatalized coronals /t^{j}, s^{j}, l^{j}, n^{j}/ derived from the positional allophones of /t, s, l, n/ before a following [i] or [j]. A prominent [i]-quality prevowel is an important perceptual correlate of palatalization in that language (Harms 1962, Lehiste 1965: 136, Hint and Paunonen 1984: 283). Forms cited in Harms (1962: 18, 28ff) indicate that the prevowel is especially prominent after the back vowels /u, o, õ, a/. Lehiste (1965) has shown experimentally that vowel-prevowel combinations in Estonian differ from the corresponding phonemic diphthongs in terms of length. This aspect of the study provides instrumental support for the widely noted phonetic and phonological differences between vowel-prevowel sequences and the (nearly) homophonous phonemic diphthongs.

Prepalatalization is also observed in languages in which palatalization is contextual, or allophonic. It is reported most frequently for consonants followed by the palatal glide, which is the strongest trigger of palatalization cross-linguistically (Straka 1965: 131). For instance, according to Pernot (1894, 1907), in Tsakonian Greek prepalatalization is triggered by consonants palatalized by the following [i] or [j]. The examples in (6) illustrate the speech of Tyro.

(6) Μαʲρία [maʲria]
τη φυλακή [taʲfilaki]
καὶ hένα τρία [tsenaʲtria]
παραδίγματα [paraʲgʲdʲimata]

Pernot's (1894) observations on the social dynamics of prepalatalization help to contextualize the phenomenon. The heaviest users of prepalatalized forms in his sample are the oldest women in the community; this fact allows him to correlate the peak of popularity of this pronunciation type with the generation born around 1833. In spite of this, the overall popularity of prepalatalized pronunciations at the time of Pernot's fieldwork was such that he predicted that prepalatalization would eventually become automatic: "Dans un bref délai s'établira la règle phonétique suivante: *tout ι ou ɻ, précédé d'une consonne prépalatale ou d'un groupe de consonnes prépalatales, se répercute sous forme d'ι dans la syllabe précédente* [In a short while the following phonetic rule will be established: *any ι or ɻ preceded by a prepalatal consonant or consonant group will be echoed in the form of a i in the preceding syllable*]" (1894: 83f; emphasis original).

2.1.2 PALATALS

The term palatal comprises three articulations: palatals in the narrow sense [ç, ʝ], palatoalveolars [tʃ, dʒ, ʃ, ʒ], and alveolopalatals [c, ɟ, ɲ, ʎ, tɕ, dʑ, ɕ, ʑ]. Although palatals are produced by a single articulator at a single place of articulation (Recasens et al. 1993), in the literature they are sometimes treated as inherently palatalized based on their phonological patterning (Recasens et el. 1995; Keating and Lahiri 1993). The arguments in favor of this interpretation include the fact that palatals often serve as synchronic or diachronic outcomes of palatalization of nonpalatals. This is true, e.g., of the Polish alveopalatals /tɕ, dʑ, ɕ, ʑ, ɲ/, which function as the palatalized counterparts of /ts, dz, s, z, n/. A related argument is that palatalized alveolopalatals and palatalized palatals (in the narrow sense) are disallowed, while palatalized palatoalveolars [tʃʲ, dʒʲ, ʃʲ, ʒʲ] are articulatorily indistinguishable from alveolopalatals [tɕ, dʑ, ɕ, ʑ]. Additionally, no language is known to contrast palatals (in the narrow sense) with palatalized velars, or alveolopalatals with palatalized palatoalveolars. These and related facts have led, e.g., Hall (1997: 50ff) to interpret alveolopalatals as palatalized (palato)alveolars, and palatals as palatalized velars.

Although palatals of all manners of articulation may prepalatalize, the tendency is especially pronounced in palatal stops and the lateral. These are described as articulatorily tense and long, and they seem to represent the least stable manner of articulation in the palatal area, possibly due to the difficulty inherent in forming a complete closure at the hard palate (Straka 1949: 20 fn. 1, 1965: 121ff). In environments

that favor lenition, reduction in palatal contact is achieved through the combined action of CP, which brings about a shortening in the closure phase; and either alveolarization, gliding, or debuccalization of the palatal's consonantal gesture. An example of palatal CP may be cited from Majorcan Catalan, where underlying /ɲ, ʃ, tʃ/ as well as [ɲ] derived by assimilation to a following /c/ prevocalize in preconsonantal positions. As illustrated in (7), the consonantal gesture of the nasal is assimilated to the following consonant's place of articulation (Mascaró 1985). Crucially, the vowel-prevowel sequences resulting from this CP process behave differently from the homophonous underlying diphthongs; for example, while underlying *VjCs* sequences are simplified to *Vjs*, the corresponding derived sequences fail to do so, compare *vújséns* (< *vújtséns*, from *vújt* 'eight' and *séns* 'hundreds') with *ájns* [aʲns] 'years' (Mascaró 1985: 140f).

(7) /tronc/ [troŋc] 'log' → [troʲns] 'logs'
[trojm pətit] 'small log'
/aɲ/ [aɲ] 'year' → [aʲns] 'years'
[ajm bɔ] 'good year'

2.1.3 ALVEOLARS

The most frequent alveolar triggers of CP are clear liquids, /s/, and /n/. According to Delattre (1965: 102), the tongue body position of clear /l/s "is in the region of front vowels, perhaps nearest an [ɛ]". Prevowels triggered by clear /l/s are often notated in the literature as [i] or [j]. For example, syllable-final /l/ in Sardinian may be pre- or fully vocalized; the lenition process has reached the most advanced stage before labials, but is less advanced before velars and /tʃ/ (Contini 1987: 370ff). Full vocalization of /l/ may be accompanied by gemination of the following obstruent and deletion of the prevowel. The different stages of /l/-(pre)vocalization are illustrated in Table 1, which displays the varying dialectal shapes of /kulpa/ 'fault', /alva/ 'beard', and /maltʃu/ 'male'. (Pre)vocalization of /l/ is also attested across word boundaries, as in [sɔʲl ˈbɔɛzɛ] ~ [sɔj ˈbɔɛzɛ] 'the cows' (Contini 1986: 548 fn. 56).

Table 1. Prevocalization of /l/ in Sardinian

Underlying shape	Prevocalization	Deletion of the liquid's consonantal gesture	Deletion of the prevowel
/kulpa/ 'fault'	[kuʲlpa]	[kujppa]	[kuppa]
/alva/ 'beard'	[aʲlva]	[aj(v)va]	[avva]
/maltʃu/ 'male'	[maʲltʃu]	[majʃu]	[maʃu]

Prepalatalization of /s/ may be illustrated with data from Brazilian Portuguese. In that language, /s/ is realized as a voiced or voiceless alveolar fricative [s] ~ [z] or palatoalveolar fricative [ʃ] ~ [ʒ]. Regardless of its phonetic realization, /s/ is prevocalized in some dialects in the absolute coda of a stressed syllable (see 8).

(8) *arroz* [aˈxoʲs] ~ [aˈxoʲʃ] 'rice'
luz [ˈluʲs] ~ [ˈluʲʃ] 'light'

In Rio de Janeiro, /s/-prevocalization occurs most frequently in stressed monosyllables, especially when the lexical stress coincides with the sentence stress. In all prevocalizing dialects, high-frequency vocabulary is particularly liable to be affected, and prevocalized pronunciation is reported as being almost categorical in such everyday words as *mas* 'but', *três* 'three', *faz* 's/he does', *mês* 'month', *rapaz* 'boy, fellow', and *mesmo* 'even, really' (Câmara 1977; Albano 1999, 2001). /s/-prevocalization may be sensitive to morphological conditioning; for example, in São Paulo Portuguese word-final /s/ representing the plural marker fails to prevocalize (Wetzels and Sluyters 1995: 140 fn. 2).

/n/ often prepalatalizes as well, especially when followed by /s/. For example, in Lesbian Greek it prepalatalized both in the primary word-final sequence /ns/ an in /ns/ of secondary origin, cf. the verb endings **-a-nti*, **-e-nti*, **-o-nti* > Lesbian *-ajsi*, *-ejsi*, *-ojsi* (Grammont 1948; Schwyzer 1963; Pellegrini 1961; Lejeune 1972; Foley 1975, 1977; Wetzels 1985). Grammont (1948: 150) attributes this development to the palatalizing effect of /s/ on the preceding nasal: "En lesbien la nasale perd sa nasalité devant *-s*, et ses vibrations, palatalisées par l'*-s*, qui était vraisemblablement articulé avec la pointe de la langue levée vers la partie antérieure du palais, subsistent après la voyelle sous forme d'*i* deuxième élemént du diphtongue [In Lesbian, the nasal loses its nasality before *-s* and its vibrations, palatalized by *-s*, which was probably articulated with the tip of the tongue raised towards the anterior part of the palate, remain after the vowel in the form of an *i*, the second element of a diphthong]".

This completes this brief survey of consonant types triggering front prevowels. The next two sections will look at the types of consonants that prevocalize with retracted prevowels.

2.2 [ɯ]-LIKE AND [w]-LIKE PREVOWELS

Dentals, labials, velars, and velarized consonants prevocalize with prevowels of a central ([ə]-like) to back ([ɯ]-like) quality, while prevowels triggered by labialized consonants typically have a [w]-like quality. The comparatively retracted quality of the prevowels in all these cases is determined by the relatively retracted position of the body of the tongue during the production of these consonants.

Dental and interdental consonants prevocalize with prevowels of a central to back quality. According to Lowman (1932: 287), in Albanian final /ð/ may (pre)vocalize with a "dark glide which gives a distinct impression of [ɫ]". In West Muskerry Irish, dentals have a [ə]-like prevowel after long front vowels and diphthongs ending in a palatal offglide, cf. *slaodán* [slə̯iˠdɑn] (Ó Cuív 1975). In Ring Irish, dentals prevocalize after front vowels /i, i:, e, e:/ with a central to back prevowel (Breatnach 1947). Schwa-like prevowels are developed by dentals in Erris Irish (Mhac An Fhailigh 1980) and Cois Fhairrge Irish (De Bhaldraithe 1945). In the latter, the degree of darkness of the dentals varies positionally, from a central [ə]-like resonance to a back [u]-like resonance; these fluctuations in the resonance quality of the dentals are reflected in the quality of the prevowels.

Another dental that tends to prevocalize with a central- to back-quality prevowel is dark /ɬ/ (Kolovrat 1923; Straka 1942). Sproat and Fujimura (1993) and Browman and Goldstein (1995) report on an important generalization regarding the prevocalization of dark /ɬ/. Both studies focus on differences between the production of American English /l/

in syllable-initial and syllable-final positions. The production of /l/ comprises two gestures, one involving the tongue tip and providing the tighter of the two constrictions (the consonantal gesture) and the other involving the tongue dorsum and supplying the wider constriction (the vocalic gesture). The generalization reported in these studies is that the component gestures of /l/ are inherently asynchronous, with the wider vocalic gesture occurring closer to the nucleus. When the lateral is in the syllable-final position, the anticipatory execution of the vocalic gesture leads to the percept of a prevowel. The tendency toward /l/-prevocalization is known from earlier historical stages of English as well; for example, during the fifteenth century, it began to prevocalize in final and preconsonantal codas after a /a/ or /o/. The sequence of changes /al/ > [awl] (prevocalization) > /ɔl/ (vowel-prevowel merger) > /ɔ/ (loss of the lateral's tongue-tip gesture) accounts for the modern pronunciation of words like *chalk*. This process took centuries to complete, and even as late as the early nineteenth century a "lingering pronunciation of /l/" could still be heard, as witnessed by the following remark made by Carlyle with reference to Coleridge: "I never hear him *tawlk* without feeling ready to worship him" (Jespersen 1922: 292).

Prevocalization of dark /ɬ/ is often reflected in earlier spellings, helping to reconstruct the phonetic details of past phonological processes and better understand the relationship between CP and related phenomena, such as consonant vocalization. An example of this is gradual vocalization of preconsonantal [ɬ] after /a, o, ɔ, e, ɛ/ in Medieval French (Bourciez 1967: 187). This process first affected words in which /ɬ/ preceded a prepausal consonant (as in **ałt* 'high (masculine singular)'), and only later those in which it preceded syllable onsets (as in **ałte* 'high (feminine singular)') (Fouché 1961: 858). Contemporary spellings such as *chevaulx* 'horses' and *royaulme* 'kingdom' argue that the underlying mechanism was CP rather than straight vocalization of the lateral (Kolovrat 1923: 89ff). Such spellings have led Fouché to suggest that vocalization of the lateral occurred in two stages, "vocalisation partielle [partial vocalization]" and deletion of the lateral (1961: 856ff). Fouché's "vocalisation partielle" corresponds to the stage at which /ɬ/ was prevocalized, and his deletion of the lateral, to the stage at which the lateral's tongue-tip gesture became suppressed. In Fouché's own words, "Il est d'ailleurs probable qu'il ne s'agit pas ici, à proprement parler, de vocalization. Pris entre l'u̯, résultant de la vocalisation partielle et la consonne implosive finale, *ɬ* a dû disparaître purement et simplement [Moreover, it is probable that we are not dealing here, strictly speaking, with vocalization. Caught between the u̯, which had resulted from its partial vocalization, and the final coda consonant, the *ɬ* simply disappeared]" (Fouché 1961: 858).

An example of CP involving velars is supplied by Maxakalí, where /ŋ/ is prevocalized to [ʊ̯̃ŋ] and /k/ to [ʊ̯k] (Gudschinsky et al. 1970). Velars may also prevocalize with rounded prevowels, which may be the outcome of a routine enhancement of velarity by simultaneous rounding (Lindau 1978: 547ff; Stevens et al. 1986). Many examples are supplied by Rhaeto-Romance, cf. Latin *manum* > *maun* 'hand' (Gartner 1910; Ritter 1981).

Prevocalization of velarized consonants may be exemplified with data from Irish and Scottish Gaelic. The phonemic palatalization contrast in these languages is usually enhanced by velarization of the broad, or plain, series, often signaled by velar-quality vocalic pre- and postarticulations. For example, in Erris Irish both velar and velarized

consonants develop a schwa-quality prevowel after /i:/ and /e:/, cf. [driːˠxdə] *draoidheacht*, [bʲiːˠf] *bíodh* (Mhac An Fhailigh 1980: 45ff).

An example of prevocalization of plain labials is supplied by Maxakalí, where /p/ prevocalizes to [ɤp] and /m/ to [ɤ̃m] (Gudschinsky et al. 1970). Another example is supplied by the historical development in French, where [w], the outcome of vocalization of preconsonantal /l/, developed a schwa-quality prevowel after [ɛ]. The triphthong that resulted from this development was spelled <eau>, phonetically something like [ɛ́əw]; subsequent accent shift from [ɛ́əw] to [ɛə́w] has led to the standard [o] as well as dialectal [jaw], [jo], and [ja]. *Oiseau* 'bird', from Vulgar Latin *aucellu*, and *heaume* 'helmet', from Old High German *helm*, illustrate this development.

Prevocalization of labialized consonants may be exemplified with data from Seri, a language isolate from north-western Mexico. Seri has four vowels /i/, /e/, /o/, /a/, and three labialized consonants /kʷ/, /xʷ/, /χʷ/. When a labialized consonant follows an unrounded vowel, there develops a back rounded prevowel agreeing with the preceding vowel in height (Marlett 1981: 7; Moser and Marlett 2005: 830f). Marlett et al. (2005) describe the prevowel as "a very short round transitional vowel" (see 9).

(9)	/iˈtakʷ/	[iˈtɑᵒkʷ]	'did s/he kill him/her/it?'
	/taˈʔexʷk/	[taˈʔɛᵒxʷkʷ]	'Tiburon Island'
	/ˈkikʷ/	[ˈkiᵘkʷ]	'the one who killed him/her/it'

2.3 [ɑ]-LIKE PREVOWELS

[ɑ]-like prevowels are triggered by pharyngeal and pharyngealized consonants, whose production involves a [ɑ]-like vocalic gesture associated with a primary or secondary articulation in the pharynx. The latter category also incorporates uvulars, analyzed as simultaneously pharyngeal and dorsal (Elorrieta 1991; McCarthy 1994). Although the prevowels triggered by pharyngeal and pharyngealized consonants sometimes have the expected [ɑ]-quality, more often than not they surface as a low central [a] or mid central [ə]. The main reason for this is the raising and/or fronting influence from the adjacent nucleus; as noted by Pulleyblank (1986: 241), "The shwa-like offglide that is the typical realization of [H] [i.e. [ɑ], N.O.] after other vowels can be compared to the glides in the diphthongs [aj] and [aw], which often do not reach their ideal target but are more accurately represented as [ae] and [ao]".

An example of a pharyngeal prevowel that fully reaches the pharyngeal constriction is the surface realization of word-final /ʁ/ in German. German /ʁ/, which is produced midway between Arabic /ʁ/ and /ʕ/ (Delattre 1971, 1981), is usually described as vocalized in syllable-final positions; the relevant allophone is variably transcribed as [ɐ], [ə], or [ʌ] (Krämer 1979; Hall 1993). Delattre's (1971) instrumental study, however, has clearly shown that /ʁ/ is prevocalized rather than fully vocalized. Delattre describes the production of both the intervocalic (fully articulated) and word-final (prevocalized) allophones of /ʁ/ as involving a "circling motion" which consists of a retraction of the tongue toward mid-pharynx and its raising along the pharyngeal wall until it comes into contact with the uvula (Delattre 1971: 140). The main difference between the prevocalized and fully articulated allophones of /ʁ/ consists in the relative duration and

magnitude of the two gestures. In the prevocalized allophone, the retraction gesture is much longer than in the fully articulated one; it is also articulatorily close to, and gives a distinct auditory impression of, an [ɑ]. The uvular contact gesture of the prevocalized allophone is much shorter and lighter than in the intervocalic allophone: while in the latter it produces "some loud trills", in the former it results in "a very light friction sound" (Delattre 1971: 140f). When recordings of /ʁ/-final words were played in reverse to speakers of American English, they heard an [ɑ] followed by a light constriction ranging from uvular to velar. Thus, *Flur* /flur/ was given in reverse transcription as [ʁɑul] ~ [xɑul] and *wir* /vir/ as [ʁɑiv] ~ [xɑiv] (Delattre 1971: 142).

After nonlow vowels, the pharyngeal prevowel is often schwa-like. For example, Allen's (1950) observations on Modern Eastern Armenian indicate that /ɦ/, realized phonetically as [ʁ] or [ɣ], prevocalizes with a schwa-like prevowel after /e/ and /i/, cf. *pʰiɫ* [pʰiˀɣ], *teɫ* [teˀʁ]. Armstrong (1964) notes that there is "a very noticeable central glide" between /i/ or /i:/ and the following /q/ or /ħ/ in Somali. Bliese (1981) comments on a schwa-quality onglide to pharyngeal fricatives /ħ/ and /ʕ/ after the high vowels /i:/ and /u:/ in Afar. A nonsyllabic schwa-quality onglide to /r/ is also noted in many varieties of Mandarin Chinese, cf. /pʰir/ → [pʰiˀr] 'skin' (Lin 1990); Gick and Wilson (2006) describe Mandarin /r/ as a pharyngealized retroflex. An [a]-quality pharyngeal prevowel is recorded in Kedah Malay, where word-final /ʁ/ is prevocalized after /i/. In that language, prevocalization of the pharyngeal forms part of the more general process of word-final consonant lenition, selectively summarized in Table 2.

Table 2. Prevocalization in Kedah Malay (after Teoh 1988: 214ff)

	Underlying	Surface	Gloss
/s/ > *[js] > [jh]	/malas/	[mãlajh]	'lazy'
/l/ > *[jl] > [j]	/pukul/	[pukoj]	'to hit'
/ʁ/ > *[a̯ʁ] > [a̯ʕ]	/pasiʁ/	[pasia̯ʕ]	'sand'

3. Summary

This paper has outlined the phonological process of Consonant Prevocalization, focusing on its division into two major types: prevocalization of plain consonants, and that of secondarily modified consonants. While sharing the underlying mechanism, each subtype of CP has individual characteristics, which include but are not limited to the conditioning environment, synchronic function, and diachronic outcomes. The paper has also outlined the typology of prevowels and noted interactions between CP and selected other processes. For further discussion of CP, including its synchronic functioning, its theoretical significance, and/or its place among related phenomena, see Andersen (1972), Reighard (1972), Gussenhoven and Weijer (1990), Clements (1991), Wetzels (1993), Wetzels and Sluyters (1995), Albano (1999, 2001), Operstein (2010), Silva and Nevins (2014), Nevins (2015), and Silva (2016, 2020).

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