

On the nature of labial velar shift

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Abstract Labial velar shift is a common diachronic occurrence in various languages which in recent works on phonology has been captured by the reintroduction of the Jakobsonian feature [grave]. The type of shift involved, the form and direction it takes is a matter which has received insufficient attention. The present study is an attempt to account for this shift by viewing manifestations of it in Romance, Celtic, Germanic, Slavic and Uralic. The essential difference between lenition and labial velar shift is emphasized and the notion of favouring conditions for the shift (the phonotactic environment of the segments involved) is introduced. In all cases the acoustic (and hence auditory) similarity of the segments which undergo shifting is seen to be the triggering factor.

It is by now commonplace to maintain that a phonological framework must take cognizance of, and provide notational means for describing, the interrelatedness of labial and velar segments. Evidence abounds in a variety of languages (see below) that labials and velars relate in a manner which say labials and dentals do not. In early distinctive feature theory (Jakobson and Halle, 1956, p. 43) this fact could be captured by the use of the feature [grave]. It was also quickly recognized by linguists after the publication of Chomsky and Halle (1968) that the abandoning of the feature [grave] constituted a loss in generalization (Ladefoged, 1972, p.44; Hyman, 1973; Lass and Anderson, 1975, p.187).

However, in those works where the necessity for the feature [grave] is insisted upon (Davidsen-Nielsen and Ørum, 1978, p.201; Sommerstein, 1977, p. 111) no attempt is made to attempt explaining the labial velar interrelation (with the exception of Ladefoged, 1972, p. 44). In fact most comments are of a rather cryptic nature (Schane, 1973, p. 30) merely recording the fact that there is a connection of some sort between labials and velars.

Before considering the nature of, and possible motivation for, labial velar shift let me first of all delimit it from other processes which may be confused with it.

A diachronic change which has elicited a great deal of comments from Romance scholars is the shift from Latin /f/ to /h/ in Spanish and Gascon (Pellegrini, 1980, p. 68f.; Malmberg, 1971a [1958]):

Spanish <i>harina</i> ‘flour’	< Latin <i>FARINA</i>	(1a)
Spanish <i>hecho</i> ‘complete’	< Latin <i>FACTU</i>	(1b)

This is not an example of a labial shift in the sense in which I understand it here. It is not the change of a velar (this I use for the issue at hand as a cover term for velar and glottal articulations) for a labial segment, but rather an example of lenition (this fact is correctly noted by Martinet, 1955, p. 304). In this case /f/ was weakened in its articulation to a glottal fricative. This is the normal result of leniting a voiceless fricative; this process should also not be confused with intervocalic voicing. In fact there is dialectal evidence in Spanish for the lenition of /s/ as well (in southern Spain and in large parts of Spanish America; Malmberg, 1962, p. 64) the result being /h/ as well. Equally /x/ lenites to /h/ in Germanic when it occurs initially, cf. Old High German *hūs*, Old English *hūs* < Germanic < $\chi\bar{u}s$.

The lenition of /f/ to /h/ is attested in other languages as well. In Irish the reflexive pronoun *féin* has the phonetic realization /he:n^j/ this having given rise to an equal amount of debate as in Spanish (see O’Rahilly (1932, p. 81) for a derivation of /h/ from /f/). In Irish /h/ appears as the result of synchronic lenition (a morphological process of fricativizing stops and weakening fricatives):

snámh /sna:v/ ‘swim’ (2a)

shnámh sé /hna:v s^je:/ ‘he swam’ (2b)

There is also a certain amount of alternation between /h/ and /x/, particularly after stressed vowels:

cluiche /klix,ə/ ~ /klihə/ ‘game’ (3a)

ó shin /o:hm,/ ~ /o: `xɪn,/ ‘since’ (3b)

The later loss of /h/ in certain Spanish dialects (a broad band from North to South (Jungemann, 1955, p. 458)) corresponds to the situation with synchronic lenition in present-day Irish where /f/ alternates with ø:

fiön /f_hi:n/ “wine” (4a)

a fhíön /ə i:n/ “his wine” (4b)

The change of /f/ to /h/ to ø is usually assumed to have been initiated by a bilabial articulation of /f/ as [ϕ] (Pellegrini, 1980, p. 69; Jungemann, 1955, p.412). Purczinsky sees /f/ as having become [ϕ] in order to become homorganic with /p/ given the correlation which developed in Spanish between stops and fricatives (Purczinsky, 1980, p. 79).

There is one aspect of the Spanish /f/ to /h/ shift which is interesting for the matter at hand. In two phonotactic positions original /f/ was maintained. One is before /r/. A natural phonic explanation can hardly be given for the preservative influence of /r/ on a preceding consonant but it is something which is attested from other languages as well. In Irish English the alveolar stops of English /t/ and /d/ were initially realized as dentals (/t̪/ and /d̪/) as in Irish but with the decline of the Irish in numbers and social status the alveolar articulation of English was adopted. This did not take place before /r/ so that words like *drink*, *train* are pronounced as [d̪rɪŋk], [t̪re:n] in varieties not influenced by Standard English.

The second position for the retention of /f/ is before /w/ (= /ʷ/) as in

fuego /fewʷo/ Latin *FOCU* ‘fire’ (5)

The retention can be regarded as due to /f/ being in a ‘strong’ position (Lass and Anderson, 1975, p. 159ff.). By this is meant that /f/ is unlikely to lenite (to /h/) if it precedes an element which is itself labial. As [w] is labiovelar it constitutes a phonologically strong environment for /f/ and so the latter does not lenite. Malmberg (1971b [1961]) sees /f/ surviving before /w/ in Castilian as due to the shift from an original /ϕ/, which he postulates to a labio-dental /f/ before a labio-velar /w/ (in order to maintain its acoustic prominence which it would have lost /ϕ/). I agree with this to the extent that the retention of /f/ is seen to be due to the labial element of the following segment.

Within the areas of Romance languages there is a diachronic change which I regard as being true labial velar shift as opposed to the Ibero-Romance lenition of /f/ to /h/. This is the shift which is obvious in a variety of Rumanian forms:

Latin	<i>coctum</i>	Rumanian	<i>copt</i>	‘cooked’	(6a)
Latin	<i>nox, noctis</i>	Rumanian	<i>neapte</i>	‘night’	(6b)
Latin	<i>acqua</i>	Rumanian	<i>apa</i>	‘water’	(6c)

The shift of /k/ to /p/ cannot be interpreted as lenition as both are stops and neither is phonologically weaker than the other. Note that when talking of this shift I term it labial velar. This is deliberately vague on the direction of the shift. It may be from a velar to a labial or from a labial to a velar position (as in the Irish examples below). Furthermore the segments involved may be fricatives or stops, voiceless or voiced.

The question which arises with such shifts is whether they are spontaneous or conditioned. The acoustic evidence would justify assuming the former. Labial and velar consonants have a certain amount of acoustic similarities. The fricatives /f/ and /x/ are more acoustically similar to each other than either is to /s/. Both have friction well below four thousand cycles per second which is the approximate starting point for the alveolar fricative (Stevens, 1976 [1969], p. 141 ff.). It is natural for acoustically similar sounds to interchange diachronically or diatopically. The interchange of /r/ and /l/ is so common as to be hardly worth comment; it can be seen clearly in the various assimilations and dissimilations which have occurred with liquids in the Romance languages (see Posner (1961, p. 101 ff.) and Tekavčić (1980, p. 145 f.) for a review). Furthermore evidence for the interchangeability of labial and velar articulations is available from language acquisition. The present writer has observed with a German child (aged 2.6 years) the following substitutions:

<i>auch</i>	/aux/	→	/auf/	‘also’	(7a)
<i>Buch</i>	/bu:x/	→	/bu:f/	‘book’	(7b)

Acoustic similarity accounts for other shifts such as that of /θ/ to /f/ (see Stevens (1976 [1960], p. 142) and (Fry, 1979, p. 122) for details of their acoustic patterns) which is found in Cockney English for example (Gimson, 1980, p. 184):

<i>three</i>	/θri:/	→	/fri:/	(8)
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Supporting the labial velar exchange interchange that there is also the articulatory similarity that both types of articulation are peripheral in that they do not involve the tip, blade or front of the tongue.

Bearing these facts in mind it might seem that the Rumanian shift is simply a case of spontaneous shift. But many authors try to maintain that it was conditioned. For example Leonard (1980, p. 24f.) sees the Rumanian /p/ as deriving from Latin /kw/; this would make it a conditioned shift: a labialized stop shifts its plosive stage to its labial release, yielding /p/. While this could be postulated for the form in (6c) it is difficult to see how it would have affected the shift in (6a) or (6b). But on the basis of unshifted /k/ as in

Latin	<i>cantare</i>	→	Rumanian	<i>cînta</i>	‘to sing’	(9)
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Leonard postulates that the Latin sequences *ct* consisted of /k^wt/ in view of such sequences to Rumanian /pt/.

The conditioned shift view is adhered to by scholars not only because no framework for a general label velar interchange has been worked out but also because in other Romance languages the sequence *ct* has developed in a conditional manner. French palatalized the /k/, subsequently shifted it to /j/, lost the following /t/ giving such forms as Modern French *nuit* /nuʝ/ ‘night’. Spanish palatalized and assimilated *te* /k/ giving /tʃ/ (cf. *noce*, /notʃe/). Italian assimilated the /k/ to the following /t/ giving a dental germinate stop (cf. *notte* /nɔtʃte/).

The Latin sequences *qua* and *gua* have both been shifted to /b/ (or *qua* intervocalically to /bb/, Blumenthal, 1972, p. 50) in Sardinian but Latin /g/ and /k/ have both been largely retained (Lausberg, 1967, p.9). Politzer sees this as confirmation for the ombinatory shift of /kw/ to /p/ in Rumanian and as confined to intervocalic position. The exception of

Latin *quattuor* → Rumanian *patru* ‘four’ (10)

is explained as being syntactic phonetic development (Blumenthal’s ‘satzphonetische Stellung’, 1972, p. 61 f.). Politzer adds additional evidence such as the retention of /b/ and the shift of /v/ to /b/ (Politzer, 1953, p. 488) as in

Latin *alba* Rumanian *alba* ‘dawn’ (11a)

Latin *servire* Rumanian *serbi* ‘serve’ (11b)

The development in (11b) would in fact account for a postulated Rumanian development of /u/ to /v/ to /b/ in *gua* and *qua* with loss of velar stop and devoicing of the labial with *qua*. Later nasal assimilation would account for Rumanian form in

Latin *lingua* → Rumanian *limbă* ‘language’ (12)

But there are various objections to this view. One is that the /v/ to /b/ shift in (11b) would seem to be an example of post-sonorant fortition (a dissimilation of a continuant segment to a non-continuant one) which is found in German, for example, which does not have a general /v/ to /b/ shift (Russ, 1978, p. 77f.)

Modern German *Farbe* < Middle High German *farwe* ‘colour’ (15)

In Rumanian /v/ is also retained in initial position (Nandris, 1963, p. 114).

The second objection is that even if one allows for arguments sake that the labio-velar glide /w/ fortified to a stop and also that *ct* sequences in Latin were, in fact, /k^wt/ there are still cases (admitted by Politzer, 1953, p. 488) of velar to labial shift with /k/ in the sequence *cs* where labialization of the original stop cannot be assumed:

Latin *coxa* → Rumanian *coapsa* ‘hip’ (14)

With this and similar cases various intermediate stages are postulated. Nandris (1963, p. 260), quoting other workers (Candrea-Hecht and Densușianu), gives a developmental sequence as follows,

/kt/ → /xt/ → /ft/ → /ps/ (15)

but rejects it as the reflexes of *ct* in the four main Rumanian dialects do not show these intermediate stages. Nonetheless the contention of Nandris that *cs* and *ct* clusters were somehow ‘strange’ (*insolites*) and threatened by assimilation and hence shifted the velar stop to a labial as a type of preventive differentiation (Nandris, 1963, pp. 260f., 263f.) is peculiar indeed.

Of the various discussions of Rumanian, that offered by Rankin (1974) provides the most food for thought. Basically his view of the Rumanian shift is as follows: the velar to labial shift (as in (6c)) is a conditioned change which results from a process of glide fortition; with /k^w/ the glide element fortifies to a stop and the velar plosive element is lost (Rankin, 1974, p. 18). Rankin links up this velar glide fortition to palatal glide fortition which is also found in Rumanian (Rankin, 1974, p. 17). According to his view the glides /w/ and /j/ can shift and fortify as follows:

$$\begin{array}{lcl} & \nearrow & /β/ \\ /w/ & \rightarrow & /p/ \end{array} \quad (16a)$$

$$\begin{array}{lcl} & \nearrow & /c/ \\ /j/ & \rightarrow & /tʃ/ \\ & \searrow & /ʃ/ \end{array} \quad (16b)$$

The above possibilities may furthermore be ordered as stages in some instances:

$$/w/ \rightarrow /β/ \rightarrow /p/, \quad /j/ \rightarrow /c/ \rightarrow /tʃ/ \rightarrow /ʃ/ \quad (17)$$

As Rankin shows by considering certain central and west Romance data:

$$\begin{array}{lcl} /j/ \rightarrow /c/ & & (18a) \\ \text{Latin: } sapiam & \text{Rhetic: } sap[c]a & \\ & (\text{Lausberg, 1965, p. 398ff.}), & \end{array}$$

$$\begin{array}{lcl} /j/ \rightarrow /tʃ/ & & \\ \text{Latin: } sapiam & \text{Old Provençal: } sap[tʃ]a & (18b) \\ & (\text{Lausberg, } loc. cit.), & \end{array}$$

$$\begin{array}{lcl} /j/ \rightarrow /ʃ/, & & \\ \text{Latin: } sapiam & \text{Modern French: } sa[ʃ] & (18c) \\ (\text{Toscan) Italian } pieno & \text{Bergamescan Italian: } p[ʃ]ena \text{ ‘full’}, & \\ & (\text{Tekavčić}^1, 1980, p. 196; Rohlfs, 1972, p. 308) & \end{array}$$

Fortition of /j/ is found, for example, among Polish dialects too (Edmund Gussmann, personal communication), *piwo* Standard /pivo/ dialect /pʃivo/ ‘beer’.

The sequence /w/ → /β/ → /p/ is what Rankin assumes to have developed between Latin and Rumanian and links this up with /j/ fortition seeing both as part of a single process (Rankin, 1974, p. 14). But two criticisms of Rankin’s treatment are necessary here. Firstly he claims that velar to labial shift only occurs before /a/, thus ignoring the cases of postvocalic velar to labial shift as with the examples in (6a) and (6b). Secondly he explicitly denies (Rankin, 1974, p. 15) the possibility of labial to velar shift only granting labial to palatal shift before yod as part of a place of articulation assimilation process. But as the Irish data below show (see (23a-c) labial to velar shift *without intermediary stages* is attested.

The issue of intermediary stages which has occupied linguists continually (see the discussion in Grau and Rosetti, 1935, p. 65 ff.) is in fact a red herring. What is important is to establish the labial velar interrelation through linguistic evidence. If this can be done then the shift can be assumed to have taken place in a single step, or in several as long as these are attested.

The relatedness of labial and velar articulations obtains support from the position in Albanian. Here Latin *ct* can have two reflexes, one /it/ the second /ft/. These are termed palatal and labial reflexes respectively (Solta, 1980, p. 144 ff.) and can be seen to have areal concentration, the former in the west of the East Romance area (Dalmatia) and the latter in the East proper, i.e. Rumania. Albanian, in its treatment of Latin loan words, offers an overlapping of these two developments.

In Albanian *ct* has the reflex /it/ before front vowels and some cases of /a/ (Grauer and Rosetti, 1935, p. 66):

Latin <i>directus</i>	Albanian <i>dreitë</i>	‘direct’	(19a)
Latin <i>tractare</i>	Albanian <i>traitoj</i>	‘prepare, cook’	(19b)

This would mean that front vowels caused natural assimilation to a palatal point of articulation for the original /k/ (to /kʲ/ to /j/ to /i/). With back vowels, *cs* has the reflex /fs/ giving

Latin <i>cosa</i>	Albanian <i>kofshë</i>	‘hip’	(20a)
Latin <i>laxa</i>	Albanian <i>lafshë</i>	‘battle’	(20b)

These forms would support an intermediate stage /x/ (/k/ to /x/ to /f/) because, as is remarked below, labial velar shift is only possible where the back articulation is really velar, it is here that acoustic similarity is maximal; if a velar segment is forwarded to a palatal articulation then its acoustic similarity with labials diminishes accordingly (see the respective descriptions for /f/, /ç/ and /x/ in Strevens, 1976 [1960], p. 142 f.) preventing shift but triggering co-articulatory assimilation to /i/ before front vowels.

Turning now to Old Irish one finds that labial velar shift operates in the opposite direction. It is a phenomenon which only affects loan words (Thurneysen, 1946, p. 565 ff.) from Latin. The reason for this is that Irish as the representative of Q-Celtic has eliminated all instances of inherited /p/ either by deletion,

<i>aithir</i>	cf. Latin <i>pater</i>	‘father’	(21)
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or by shift to /k/ in those words in which the following syllable also begins with /k^W/ (syllable onset assimilation) (Thurneysen, 1946, p. 138 ff.):

<i>cóic</i>	cf. Latin <i>quinque</i>	‘five’	(22)
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Pedersen (1909, p. 90) assumes that in those cases where /p/ disappears it does so via /ϕ/ and /h/.

Among old loan words in Old Irish Latin /p/ appears as /k/:

<i>cásc</i>	Latin <i>pascha</i>	‘Easter’	(23a)
<i>corcar</i>	Latin <i>purpura</i>	‘purple’	(23b)
<i>cland</i>	Latin <i>planta</i>	‘plant’	(23c)

Unlike the Rumanian examples there is no question here of postulating an intermediary stage. The labial articulation was spontaneously replaced by a velar one. It could equally well be imagined that the /p/ of these early loans be deleted. To account for the shift to a velar place of articulation not only the acoustic similarity with velar can be appealed to but also the fact that shifts of this kind had occurred before.

Starting with Insular Celtic one sees that Indo-European /k/ (subsuming /q/ and /k'/, Pedersen, 1909, p. 119 f.) was retained. Furthermore, in Irish, in the sequences /kt/, /k/ was fricativized to /xt/. This was due to a restriction which holds throughout the history of Irish into the present-day language that sequences of two stops are impermissible and that in such cases the first fricativizes. Now, when in pre-historic Irish /p/ was being deleted, certain instances of it were shifted. The lenition of /p/ involved /f/ and in the position before /t/ this led to the cluster /ft/ which then shifted to /xt/:

Old Irish *secht* /s^jaxt/ cf. Latin *septem* 'seven' (24)

The original cluster (/ft/) conformed to the phonotactics of Irish in terms of manner of articulation of its component segments but not in terms of place or articulation. In Old and Modern Irish fricative and stop clusters consist of homorganic segments or those where the fricative is posterior to the stop (i.e. /st/ and /xt/). Tokens of /xt/ already existed from original /kt/ so that these provided a basis for phonotactically preferred structures which triggered the shift of /ft/ to /xt/ rather than the deletion of /f/ as in other positions. The labial to velar shift of stops is thus another example of a preservative shift which provided an alternative to deletion of a segment, in this instance in loan words.

Later an independent /f/ arose in Irish through the fortition of /w/ to /v/ to /f/ (Thurneysen, 1946, p. 78). This internal development corresponded with the substitution of Latin /w/ by /f/ in later loans:

fin < Latin *uinum* 'wine' (25)

Also, /p/ developed from the coalescence of /b/ and /h/ (Thurneysen, 1946, p. 117) after which time it is then retained in Latin loan words:

popul < Latin *populus* 'people' (26a)

purgatóir < Latin *purgatorius* 'purgatory' (26b)

As of this stage there are no more instances of /p/ to /k/ shifts although in the modern language /h/ to /f/ is attested dialectally (de Bhaldraithe, 1945, p. 195; Mhac an Fhailigh, 1968, p. 157; de Búrca, 1958, p. 130):

toghta /tʌhə/ ~ /tʌfə/ 'excellent' (27a)

lútha-gháir /lu:ha:r/ ~ /lu:fa:r/ 'joy' (27b)

cruth /kruh/ ~ /kruf/ 'shape' (27c)

The instances of labial velar shift considered so far have mostly involved the interaction of stops. This is the more unusual kind of shift. If the basis for the shift being possible is acoustic then this can be explained. Fricatives have a continuant articulation while stops are only recognizable in terms of place of articulation by formant bending on their release (see Sanders, 1977, p. 36; Lieberman, 1977, p. 119 for annotated figures and comments) which is obviously briefer than the articulation of the corresponding fricatives. For this reason a shift which is largely based on the perceptual identification of segments and the coupling of them with another group of similar acoustic properties is

more likely with those segments which are most clearly identifiable in their place of articulation, viz. fricatives.

Not only is labial velar shift most likely with fricatives but it is also most likely with voiceless ones as with these the articulation is more fortis and the friction is more audibly that of a labial or velar articulation.

There are various languages in which labial velar shift is only found for voiceless fricatives. In West Germanic this is attested in abundance. From Old to Modern English a number of words with /x/ have this shifted to /f/ (Dobson, 1968, p. 946):

Old English *hlahhan* late Middle English *laugh* (>/la:f/) (28a)

Old English *rūh* late Middle English *rough* (>/rʌf/) (28b)

This shift is not something which was confined to a certain period as the differences between German and Dutch (Low Franconian) which involve this shift are of an earlier date than the internal English developments. This time the shift is in the reverse direction (Kluge-Mitzka, 1967, p.398):

Old High German *luft* Dutch *lucht* (ch = /x/) ‘air’ (29a)

Old High German *kraft* Dutch *kracht* (ch = /x/) ‘strength’ (29b)

A labial plosive is also found for Old Norse *lopti* in *ā lopti* (English *aloft*) nor is the fricative the same within the German areas as Low German has /x/ cf. Low German *achter* Old English *æft*, Old High German *after* (Kluge-Mitzka, 1967, p. 9).

In view of slighter acoustic (and hence auditory) prominence of voiced sounds interchange of /v/ and /ɣ/ is less common (Ladefoged, 1972, p. 44). There are instances however where the phonotactic environment strengthens the labial or velar quality of the fricative. In Russian (after the 15th century, Bräuer, 1961, p. 21) there is a shift from /g/ to /v/ in the (prominal) genitive ending *-ogo*. Here the /g/ almost certainly (going to the Ukrainian and White Russian evidence, Bräuer, 1961, p. 211 f.) became a fricative /ɣ/. The environment was central-back so that the velarity of the voiced fricative was supported by its phonotactic surroundings:

ego /jivo/ ‘his’ (30a)

russkogo /ruskəvə/ ‘Russian-GENITIVE’ (30b)

That the environment of a mid back vowel can act as a strengthening environment for a velar (and hence fulfil the pre-conditions of acoustical prominence for labial velar shift) can be seen from other developments with Slavic. In Prague Czech, for example, an epenthetic labial fricative /v/ has evolved before the mid back vowel /o/ so that one gets forms such as (de Bray, 1951, pp. 446, 451):

okno → *vokno* ‘window’ (31a)

otec → *votec* ‘father’ (31b)

on → *von* ‘he’ (31c)

Finally the labial velar shift can be used to explain apparent irregularities in the synchronic phonology of a language. In the system of consonant gradation in Finnish there is an alternation between geminates and simple consonants in open and closed syllables respectively (the latter arising due to agglutination for a particularly grammatical category). The gradation of simple consonants is irregular however. Notably with /k/ there is an alternation with \emptyset or /v/ (Karlsson, 1979, p. 36 ff.):

<i>pika</i>	‘fast-NOMINATIVE’	(32a)
<i>pian</i>	‘fast-GENITIVE’	(32b)
<i>puku</i>	‘dress-NOMINATIVE’	(32c)
<i>puvun</i>	‘dress-GENITIVE’	(32d)

But this can be explained by the labial velar shift. By assuming that gradation originally involved an alternation of simple voiceless stop and voiced fricative one obtains the reconstructed forms:

<i>pika</i>	~	<i>pi van</i>	(33a)
<i>puku</i>	~	<i>pu vun</i>	(33b)

As labial velar shift occurs preferentially in a strengthening environment (here: with flanking high back vowels, but also high front vowels (Fromm and Sadeniemi, 1956, p. 38) the shift of /ɣ/ to /v/ is assumed to have occurred with deletion of the non-shifted /ɣ/ giving the present-day alternation /k/ ~ ø; /k/ ~ /v/ / V [+high]/.

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