Labial-velar changes in the history of English and Netherlandic

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1. Introduction

The primary aim of this paper is to discuss and analyze labial-velar and velar-labial (historical) developments in two related languages: English and Dutch. However, in order to propose an explanation for such changes, first we need to address a problem of a somewhat unexpected phonological patterning of two articulatorily unrelated consonant classes and its high frequency. This research task presupposes the necessity to study the elemental make-up of velar and labial consonants in both languages. The assumption is that labials and velars must share a phonological element. This common-element solution explains their intimate relationship which is evident in the phonological activity of both classes. In short, simply because both classes interact phonologically, they are assumed to share an element. Additionally, the study aspires to provide a formal mechanism which is able to capture the changes in question and explain the context in which they occur.

The idea that labials and velars are represented by a common element (feature) is far from being new. For example, Jakobson and Halle (1956) propose the feature [grave] to capture the phonological relationship of both classes.[1] In the present study, however, we apply a more recent, Element Theory (ET) solution to the representation of labials and velars, that is, the one proposed in Backley and Nasukawa (2009) and Backley (2011). More specifically, we argue after Backley (2011) for the presence of the element |U| in the content of both velars and labials. This proposal deserves deeper thought as it stands in sharp contrast to a mainstream ET consensus which holds that velars are not

[1] For a cross-theoretical survey of the phonological representation of velars and labials see Kijak (in press).

specified for any resonance elements at all, for example, Harris and Lindsay (1995), Huber (2007). The choice of the model (apart from the author's personal preferences) is dictated predominantly by the fact that we analyze the historical data. Since ET is a theoretical model which holds that phonological behavior can say more about segmental structure than phonetic (articulatory) details, it makes the model a perfect choice for the analysis of the sound system of some earlier stages in the development of a language.

The reason why we have decided to take a closer look at Dutch[2] and English is that these languages represent two opposite patterns: labial > velar in Dutch, for example, MDu *after* > Du *achter* 'after' and velar > labial in English, for example, *laughen* > *laugh*, *laffe* 'laugh.' A preliminary observation is that in a rigidly specified context a labial fricative is potentially able to evolve into a velar one (Dutch), while a velar fricative can develop into a labial one (English), the choice of the direction being language-specific. What needs to be stressed at the outset is that we do not aspire to explain here the opposite pattern of the change in both languages, rather we are interested in providing an explanation of a close phonological relationship between labials and velars. This is a very broad topic, indeed. It covers various, apparently unrelated phenomena like, for example, OE breaking, ME diphthongization before the voiceless and voiced velar fricatives, for example, OE *dohtor* > ME *dohter* > *douhter*/*doughter* 'daughter' and OE *dragan*[3] > ME *dragen* > *drawen* 'draw,' respectively, OE gliding, for example, *furh* > *furuh*, 'furrow,' *burh* > *buruh* 'borough' or a historical vocalization which affected the velarized lateral and led to various qualitative and quantitative vocalic developments like, for example, the 15th-century diphthongization before [ɬ], for example, *balk* > *baulke* 'baulk/balk,' among many others. However, due to space limitations and because these phenomena have been analyzed elsewhere (cf. Kijak 2014, 2015), the following discussion is confined to the labial/velar developments in Dutch and English.

The general conclusion we draw shows that the relationship between labials and velars in both languages can be easily captured if we agree on the presence of the element |U| not only in the content of labials, the labial-velar glide [w] and the labial vowels [u o] but, first and foremost, in velars. What differentiates the two categories is the function played by this element, that is, in labials it functions as the head |U|, while in velars it is a dependent |U|.

[2] In this study Dutch stands for Standard Dutch and its dialects like, for example, West Flemish. In general, these are Low Franconian languages, hence they are grouped under the Netherlandic label in the title.

[3] The letter <g> in the intervocalic position was realized phonetically as the voiced velar fricative [ɣ].

2. Selected labial-velar developments in Dutch and English

2.1 Velar > labial shift in English

In the history of English velar spirants underwent various modifications. They were vocalized, they triggered diphthongization or gliding. All of these developments affecting velar spirants led to their annihilation in Modern English. More importantly for us here, the voiceless velar spirant was also labialized and this is depicted in (1).

(1) ME labialization [x] > [f]/[ʊ ɔ] (Fisiak 1968: 69; Jordan 1974: 249; Wełna 1978: 203; Bonebrake 1979: 20)

a. the regular pattern

ME dwergh	> [dwɔ:f]	*dwarf*	ME choughe	> [tʃʌf]	*chough*
ME coughen	> [kɒf]	*cough*	ME laughen	> [lɑ:f]	*laugh*
ME trough	> [trɒf]	*trough*	ME rough	> [rʌf]	*rough*
ME enogh	> [ɪnʌf]	*enough*	ME tough	> [tʌf]	*tough*

b. two different developments
ME slugh > [slʌf] *slough* (the skin of snake)
but
ME slogh > [slaʊ] *slough* (swamp)

c. exceptions and unstable pronunciation
OE bōg/ME bogh > [baʊ] *bough*
OE plōh/ME plough > [plaʊ] *plough*
OE clōh/ME clough > [klʌf]/[klaʊ] *clough*

d. before [t]
ME aughten > [ɔ:t] *ought*
ME doghter > [dɔ:tə] *daughter*
ME boht (part.) > [bɔ:t] *bought*
ME troute > [traʊt] *trout*
ME drougth > [draʊt] *drought*
ME draught > [drɑ:ft] *draught*

e. unstressed syllables
ME boru/borewes (pl.) > [ˈbʌrə] *borough*
ME thurgh > [ˈθʌrə] *thorough*
ME thou/thow > [ðəʊ] *though (conj.)*

In (1a–b) the voiceless velar fricative [x] evolves into a voiceless labiodental fricative [f] word-finally in Modern Standard English. The velar fricative is also responsible for the development of diphthongs (1c) or back rounded vowels in stressed syllables before [t] (1d). It can also be lost without a trace (1e). Interestingly, the forms in (1e) preserved a diphthongal pronunciation in General American, that is, [bɚ:oʊ] and [θɚ:oʊ]. Finally, note that [ç], the palatal counterpart of [x], suffered a similar fate. Thus [ç] merged completely into the preceding diphthong and disappeared, for example, *light*, *high*, *right*, etc. Since, however, this is a palatal fricative, the development leads to quite a different result, that is, the diphthong [aɪ].

2.2 Labial > velar shift in Netherlandic

A similar development took place in Dutch. What differentiates it from the case of English, however, is the direction of the change. Thus, while in English it is the velar spirant that is labialized, in Dutch we can observe a reverse pattern, that is, the labial [f] changes into a velar and in the majority of cases it winds up as [x]. Consider some examples in (2), which have been adopted from Bonebrake (1979: 66).

(2) MDu [f] > [x] shift

a. labial > velar changes

OLF a**ft**er	> MDu a**cht**er	*after*
OLF ha**ft**a	> MDu ha**cht**e	*capture/captivity*
OLF cra**ft**	> MDu cra**cht**	*power*
OLF gesti**ft**oda	> MDu ste**cht**en	*found*
OLF seni**ft**e	> MDu za**cht**e	*soft*

b. dialectal variation

OLF heli**ft**ron > MDu hal**ft**er *halter*
hal**cht**er (Limburg)
hal**t**er (South Limburg)
hal**s**er (Southwest Limburg)
hal**d**er (Zeeland)
hal**ft**er > hal**t**er > ha**ut**er (West Flemish)

c. place names

Al**ft**re	–	Ale**cht**re	*Alfter* (*Cologne*)
Su**ft**ele	–	Su**cht**ele	*Süchteln* (*Düsseldorf*)
Cru**ft**e	–	Cro**cht**	*Kruft* (*Cologne*)
Ui**ft**a	–	Ue**cht**a	*Vichte* (*Kortrijk*)

It must be mentioned here that manifold reasons, which are discussed in Bonebrake (1979: 65), caused Dutch evidence to be far more scanty than that of English. Be that as it may, it does not influence the general conclusion that in Dutch we find the opposite direction of the change to that found in English. This becomes evident when we look at the examples under (2a–c). Additionally, (2b) illustrates some modifications found in various dialects. Interestingly, the general pattern is sometimes reversed or violated as in the labial > spirant [s] change in some dialects of Dutch (West Flemish), for example, MDu *nooddurft* > WFl *nooddorst* 'indigence.'

Before we propose an explanation of the facts depicted in (1) and (2), however, we should first briefly outline the main assumptions concerning the internal structure of the consonants in question. This is done in the immediately following section.

3. Theoretical assumptions

3.1 Element Theory

In Element Theory phonological segments are built out of privative cognitive units called elements. Elements differ from the traditional features in that they are linked to the acoustic signal rather than to articulation. At the same time, however, they function as "abstract units of phonological structure which carry linguistic information about segments" (Backley 2011: 7). Another characteristic feature of elements is the autonomous interpretability which means that they are large enough to be phonetically interpretable when they occur alone in a segment. For example, a single element |I| linked to a vocalic slot is realized as the vowel [i]. The same element attached to the consonantal position is pronounced as the palatal glide [j]. Crucially, elements may combine with one another and appear together in a single segment forming complex expressions. For example, the two mid vowels [e] and [o] are combinations of |A I| and |A U| respectively. Moreover, in richer vocalic systems which maintain the opposition between the front mid closed vowel [e] and the front open vowel [æ], the head/dependent function is applied to mark the contrast. Simply put, the complex expressions like [e] and [æ], in, for example, English, are represented by identical elements, that is, |A I| which, however, are ascribed different functions. The vowel [e] is a compound |A I| where |I| is the head. The melodic make-up of [æ] is identical, that is, |I A|, but here the element |A| plays the

role of the head. Finally, the same elements which are used to describe vocalic systems are active in consonants. Thus, the three resonance elements |I|, |A|, |U| which define vocalic segments are active place definers in consonantal systems. However, in order to describe consonants some additional primes are required like, for example, |L|, |H|, and |ʔ|.[4]

The internal structure of segments may be affected by the position they occupy in the syllable structure.[5] The elemental make-up of a segment may be altered by adding a locally present element or by reducing the internal composition of a segment. Thus, spreading or composition consists in the addition of elements, while the result of delinking or decomposition is the deduction of elements. Both operations must have a local trigger or source and can be observed in vocalic as well as in consonantal systems. This can be illustrated by spirantization, a process often resulting in elision and involving the lenition of a stop to a glottal fricative, usually through a fricative stage, for example, [t] > [s] > [h] > [ø] = |H A ʔ| > |H A ʔ| > |H A ʔ| > |H A ʔ|. Similarly, in vowel reduction the elemental material is stripped away or the element status is reduced from head to dependent, for example, [o] > [u] = |A U| > |A U| and [i] > [ɪ] = |I̲| > |I| respectively.

Summing up, the vocalic as well as consonantal segments are composed of the same elements. Segments may undergo decomposition or composition, they suffer deletion or they may simply spread to neighboring positions. The behavior of segments depends on the context in which they occur (a strong or a weak site). A typical lenition site is associated with the position before the empty vocalic slot.[6]

3.2 Internal structure of labials and velars

From among many recent attempts to explain the relationship between labials and velars, it is Backley and Nasukawa's (2009) solution which deserves special

[4] It does not mean, however, that the latter cannot occur in a vocalic expression. Quite the contrary, in certain systems they are present in vowels as well.

[5] The analysis in this study is couched in the Strict CV framework. To make a long story short, this model recognizes a universally flat syllable structure which boils down to CV sequences. Any theory which assumes a universal CV syllable structure must be prepared to accept the presence of empty syllabic slots whose proliferation is curbed by various mechanisms (Scheer 2004 and Cyran 2010). The pre-empty position is generally recognized as the lenition site (Ségéral and Scheer 2001; Ziková and Scheer 2010).

[6] For more information concerning Strict CV and Element Theory, see Harris and Lindsey (1995), Charette and Göksel (1996), van der Torre (2003), Scheer (2004), Botma (2004), Bloch-Rozmej (2008), Cyran (2010), and Backley (2011) among others.

credit. Building on the idea introduced in Broadbent (1996), they argue for the presence of |U| in the internal structure of both labials and velars. What differentiates the two categories is the status played by the resonance element, that is, it is headed in labials |U|, but non-headed in velars |U|. In order to further support their proposal, Backley and Nasukawa (2009: 7) provide spectrograms revealing the presence of a falling spectral pattern identifying both labial and velar resonance. In short, labials and velars share the acoustic property of "dark" resonance. Labials, in opposition to velars, have "darker" acoustic properties and so they are represented by the headed element |U|. Velars, on the other hand, are represented by headless |U|.

Cross-linguistic findings unquestionably point to the fact that velars interact more readily with labials than coronals. Without going into details, this relationship is evident in some diachronic alternations between velars and labials in Germanic languages (Bonebrake 1979; Kijak 2014), Irish and Romanian (Hickey 1984, 1985), some varieties of spoken Spanish (Brown 2006), or dialectal variation in Swedish (Backley and Nasukawa 2009) among many others. Moreover, the examples of the relationship can also be found in some more exotic languages. For example, Ohala and Lorentz (1977) bring to light some data from Melanesian languages, for example, Ulawa, Common Melanesian, Fiji, and Uto-Aztecan and some dialects of Yoruba.[7]

Interestingly, the ET mainstream solution concerning the representation of labials and velars stands in sharp opposition to the one proposed by Backley and Nasukawa (2009). Thus, it is generally believed that labials and velars are represented by different primes (Kaye et al. 1985, 1990; Harris and Lindsey 1995). More exactly, labials, together with the high back vowel [u], contain the element |U|. Velars, on the other hand, are proposed either to be represented by a neutral element (Harris and Lindsey 1995: 29) or they are simply empty-headed, that is, they do not contain any resonance element at all (Huber 2007; Cyran 2010). Note that if we accepted the latter solution there would be no logical link that would favor velars and labials over velars and coronals. Moreover, the intimate phonological relationship of labials and velars would have to be treated as a pure coincidence. It means that the explanation could not lie in the absence of place element in velars as in this situation they could in principle interact with any other consonant or vowel including coronals which is actually a very rare case, indeed.[8] Therefore in what follows we agree with Huber (2007) that velars do not contain any headed resonance elements; however, this does not preclude the presence of resonance elements functioning as dependents. In short, velars do contain the resonance element |U| which defines velarity. Moreover, what links labials and velars is the very element |U| which plays a different

[7] For more cross-linguistic evidence, a thorough discussion and analysis see Kijak (in press).

[8] Velars may interact with coronals in various palatalization processes (see Kijak (in press)).

function in the two categories, that is, it is the head in labials but a dependent in velars (Backley and Nasukawa 2009; Backley 2011). Additionally, this representation may explain a particularly active phonological role of velars. They are susceptible to weakening and easily affected by neighboring segments, for example, labialization, palatalization, etc. Moreover, the solution advocated here can also account for their common alternations with labials. If we agree that the empty-headedness contributes to a general weakness of a segment, all the above mentioned phenomena are explained straightforwardly. Thus, velars, being empty-headed, are weak and hence in prosodically weak positions they undergo lenition and/or deletion more readily; the empty-headedness also means they are easily affected by assimilation processes like palatalization; and finally they contain the dependent |U| which can be promoted to the head position resulting in labials. Note that this representation can also explain the bidirectional shift, that is, velar > labial and labial > velar, which is simply the result of the presence of |U| in both classes. In velars |U| is a dependent which can be promoted to the head position in certain contexts. Moreover, it can explain the phonological patterning of labials/velars with the labial vowels and the glide [w]. All these segments are represented under (3).

(3) Elemental make-up of labials, [u], [w], and velars

a. high rounded vowel *u*

b. the semivowel *w*

c. labials

d. velars

The element |U| linked to a vocalic slot is interpreted as the vowel [u] (3a), the same element associated with the consonantal slot stands for the glide [w] (3b). Now, in (3c) and (3d) the same element occurs in the internal make-up of labials and velars. Note that in a labial it plays the function of the head while

in a velar it is a dependent. Note also that labials and velars contain some additional elements indicated in (3c) and (3d) by the dots. They are ignored here as not relevant for the present discussion.

4. Analysis of the labial-velar changes

4.1 Verification of the research assumptions

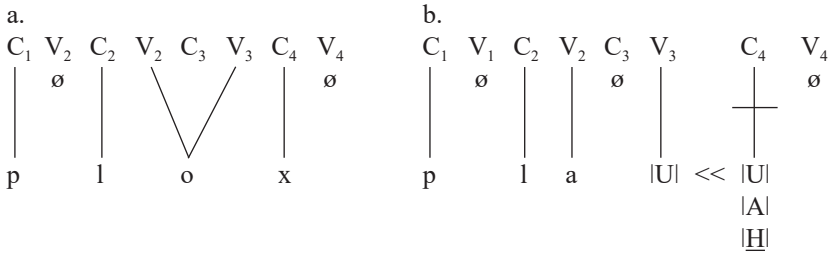
Having cleared the theoretical ground a bit, we are ready to look at the labial-velar changes in English and Dutch from the perspective of the assumptions made above. Recall that in the regular pattern (1a), English voiceless velar fricative [x] alternates with the voiceless labiodental fricative [f] in the word-final position. We propose to explain this change as a reorganization of the melodic content of the velar spirant, that is, |H A U| > |H A U|.[9] To put it differently, the non-headed |U| of the velar spirant is promoted to the head position |U| which gives [f]. Since Backley (2011: 98) argues for the complex resonance representation of the labiodentals, that is, |A U|, we need to find a source segment for |A| in the near vicinity. Note that the donor of |A| could be the velar fricative itself as represented above.[10] Finally, note that it would be difficult to account for this change by means of the traditional, SPE-like binary features as the two fricatives do not have much in common articulatorily. In ET, however, elements are directly associated with the speech signal and since acoustically both velars and labials are characterized by a similar spectral pattern, they are represented by the same melodic prime, that is, the element |U|. It is the presence of this element in both the velar and the labiodental fricative that is responsible for the alternation in (1a) above. Moreover, this solution can easily account for the rest, less regular developments in (1). Note that the velar spirant can also disappear altogether. However, before it disappears, it often triggers a development of a diphthong with the labial second element, for example, OE *plōh*/ME *plough* > [plaʊ] 'plough' or a long vowel, ME *aughten* [ɔ:t] 'ought.' Crucially, such developments always lead to a round vowel/diphthong. This situation is

[9] In Backley's (2011) version of Element Theory some segments may contain two headed elements, for example, English /p/ is represented as |U ʔ H| where |U| stands for labiality and |H| occurs in all voiceless aspirated stops.

[10] Kijak (2015) proposes, based on independent evidence, to include the prime |A| in the elemental make-up of the velar spirant. It is claimed that this element is responsible for the uvularized realization of the spirant.

explained here as the spreading of the element |U| from the velar fricative to the preceding vocalic position and merging with the original vowel. Consider the development of the diphthong [aʊ] in (4).

(4) OE plōh/ME plough > [plaʊ] *plough*



In (4b) the final velar spirant C_4 gets delinked while part of its content, that is, the element |U|, spreads to the left and docks onto the vocalic slot V_3. The original vowel is reduced to [a] and together with the incoming |U| it results in the diphthong [aʊ], hence [plaʊ]. This development represents a more general pattern which is also found in (1b–d). It starts with the lenition of the spirant which leads to a glide/vowel formation (vocalization), that is, [x] > [u] = |H A U| > |H A U| and later the resultative [u] contributes to the appearance of a diphthong or a long monophthong while the fricative gets annihilated. To translate it into the structural terms, the development consists in evacuation of the element |U| to a neighboring position and the deletion of the fricative. Now, even though it is possible for some similar forms to develop differently (1b),[11] the result is always either the labial consonant or a round vowel (see also 1c–d). Finally, the resultative schwa in forms under (1e) is explained as a consequence of a typical vowel reduction process observed in unstressed syllables. However, even in the latter scenario it is perfectly possible, at least theoretically, to assume the whole developmental path for the velar fricative, that is, vocalization > diphthongization > velar deletion > vowel reduction.

Another observation which deserves a comment is the context in which the changes occur. Note that in the developments discussed above the velar spirant occurs in the pre-consonantal or final position. Now, in the Strict CV model these two positions are reduced to a single context, that is, before the empty vocalic slot and this, according to Ziková and Scheer (2010), is a common lenition site (see also fn. 4). Summing up, in a weak position the velar

[11] Bonebrake (1979: 28) points out that one of the reasons why these forms have developed differently may be a fundamental need to avoid homonymy.

spirant undergoes lenition which is a typical reaction of a segment to suffer in positional plight.[12]

Similarly to the switch in headedness exemplified by the [x] > [f] change in English (1), the consonants in Dutch also undergo the same change but in the opposite direction (2). Thus, the MDu [f] > [x] shift is the development in which the headed |U| is reduced to a mere dependent, hence, |H A U| > |H A U|, for example, OLF *craft* > MDu *cracht* 'power.' This pattern applies to the change from OLF to MDu (2a), and is further confirmed by dialectal developments (2b) and by place names (2c). Furthermore, the labial-velar change in Dutch occurs predominantly in the pre-consonantal position. As pointed out above, this is a typical lenition site and the head > dependent switch represents a lenition mechanism. Finally, the dialectal variation under (2b) illustrates the whole range of possibilities available to velars and/or labials. Thus, apart from the regular head > dependent switch, for example, OLF *heliftron*/MDu *halfter* > *halchter* (Limburg), we can observe the deletion of the labial, for example, *halter* (South Limburg), and labial vocalization + diphthongization, for example, *hauter* (West Flemish).[13] Interestingly, there are some examples of labial > spirant [s] changes, for example, MDu *noodd-durft* > WFl *nooddorst* 'indigence' (West Flemish). The latter change can be explained as the loss of |U| in front of the alveolar [t], hence [f] > [s] |H A U| > |H A| (lenition). Identical explanation applies to *halser* (Southwest Limburg) < *halchter* (Limburg), with the difference that after the change [x] > [s] |H A U| > |H A|, the alveolar stop gets deleted.[14]

Finally, it must be stressed here that the solution discussed in this section can be applied to various apparently unrelated cross-linguistic phenomena some of which are briefly mentioned in the following section.

[12] What is left unanswered here is the question concerning the dependent > head switch and whether it is still a lenition process. Since it occurs in a typical weak context, we are forced to admit that it is a form of lenition rather than fortition.

[13] The development *halfter* > *halter* > *hauter* in West Flemish can be given an alternative explanation, namely, the labial [f] is deleted and the pre-consonantal [l], which with a high degree of certainty was velarized in this position, is vocalized to [u] resulting in [hauter]. For similar developments of the 'dark' *l* in English but to a far more massive scale see Kijak (2014) and the discussion in Section 4.1.

[14] Still a different scenario is possible here. Note that in such cases it may be the disappearing coronal which is the supplier of the phonological material. In consequence, we obtain the coronal fricative [s].

4.2 General applicability of the solution

The representation of labials and velars advocated in this study can be applied to diverse phenomena (both historical and contemporary) in various languages. For instance, it can explain the vocalic developments in the process known as Old English breaking. The traditional interpretation (cf. Campbell 1959: 54) boils down to the epenthesis of a protective back glide vowel between the preceding front vowel [æ], [e] or [i] and certain consonants or consonant clusters: /x/, /l/+C, /r/+C, and /x/+C. What is problematic here is the group of consonants triggering the back glide vowel formation – they simply cannot be captured as one single class. However, building on the idea that the pre-consonantal liquids were velarized in OE, it is possible to unify the group of consonants which trigger breaking by means of the element |U| (cf. Kijak 2015).

Furthermore, this solution may prove useful in the explanation and understanding of many other historical phenomena, for example, ME liquid vocalization which results in a diphthong or a long monophthong formation, for example, ME [a] + l(C) > [au] + l(C) > ENE [ɒu] > [ɔ:] as in *altar*, *malt*, *talk*, *walk* or ME [o/u] + l(C) > [ɔu] + l(C) > MoE [əʊ] in *colt*, *boll*, *shoulder*, *folk*. It can also be applied to ME diphthongizations before the voiced/voiceless velar fricative or the vocalization of [x], for example, OE *lahter* > ME *laughter* 'laughter' and OE *dragan* > ME *drawen* 'draw,' respectively. Moreover, it can explain various contemporary processes like vocalic developments before [ɬ] or liquids intrusion, among many others.

5. Conclusion

The solution advocated here offers a logical explanation for some historical developments and contributes to the understanding of the phonological proximity of two articulatorily distant classes, that is, labials and velars. It has been pointed out that, first, the missing element responsible for the close phonological relationship between labials and velars is |U|. Both labials (including the glide [w] and the round vowel [u]) and velars contain the element |U| in their melodic make-up. The element plays a different function in both classes. Second, the element |U| may be promoted to the head position (velar > labial shift) or demoted to a dependent (labial > velar shift). Third, the element |U| is responsible for various vocalic developments like diphthongization or the qualitative changes of the preceding vowels. Fourth, there is a direct link between the context and the process. The affected labial/velar undergoes weakening in a lenition site

which is a position before the empty vocalic slot (Ségéral and Scheer 2001; Ziková and Scheer 2010). And fifth, this solution can be successfully applied to various historical and contemporary processes.

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