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A STRUCTURAL APPROACH TO SHORT DIPHTHONGS

This study presents a potential solution to a long-standing question of the phonological representation of short diphthongs. Their mere existence in Old English, the West-Saxon dialect, in particular, has been a matter of great controversy among historical phonologists and beyond. Some attention has been paid to short diphthongs attested in Icelandic by structuralists and phoneticians. Additionally, glide emergence, where a short vowel is expected, seems to take place in the present-day Sursilvan dialect of the Romansh language. What these languages have in common is that diphthongs occur in specific contexts, namely, they are allowed before consonants that are marked by what might be defined as secondary articulation. In this paper, in order to account for the occurrence of short diphthongs in these contexts, I adopt a structural model of phonological representations whereby glide emergence is the result of the interplay between a weak, empty-headed onset and the preceding nucleus.

Keywords: short diphthongs, phonological representation, West-Saxon, Sursilvan, Icelandic, Government Phonology 2.0

1. Introduction

This paper delves into West Saxon (**WS**), Sursilvan and Icelandic short diphthongs. These entities have been considered oddities in vocalic inventories and somewhat avoided in phonological analyses, if not completely rejected. Not accounted for by phonological theory, short diphthongs can baffle, but indeed they seem to have occurred in West Saxon, they are attested in Icelandic and the Sursilvan dialect of the Romansh language is marked by the occurrence of diphthongs where a short vowel is expected. In this work, I will first present the framework that can account for those diphthongs – the structural approach to phonological representations, i.e. Government Phonology 2.0 (**GP 2.0**). Then, I will concentrate on the West Saxon short diphthongs resulting from breaking and short diphthongs in closed syllables in Sursilvan. Additionally, I will focus on the falling diphthong [au] in both these dialects due to the particular influence of the velar nasal on the preceding vowel [a]. This discussion is a revision and an elaboration on some of the aspects addressed in Drabikowska (2019). Finally, I will briefly discuss some potential implications for short diphthongs in Icelandic.

2. Government Phonology and its structural offshoot

Standard Government Phonology (standard **GP**), developed by Kaye, Lowenstamm and Vergnaud (1985, 1990), Charette (1989, 1990, 1991), Kaye (1990a,b) and Harris (1994), among others, arose from the autosegmental tradition that constitutes a reaction to the arbitrariness of generative phonology. It assumes that phonology is governed by a set of universal principles and language-specific parameters for constrained formal representations of sounds and their patterns. It also rejects the derivational procedure that produces surface forms from the underspecified underlying level by means of phonological rules. The model, however, is not linear, but hierarchical in that three levels are distinguished: syllabic, skeletal and melodic. The representational units are bound by the relations of licensing and government, which determine their realisations. Licensing permits the existence of phonological positions in the structure. Government is a restrictive device as it imposes constraints on the combinability of segments that are strictly adjacent to each other. To represent sounds, GP utilises privative phonological primes, defined shortly by Kaye, Lowenstamm and Vergnaud (1985: 306) as "primary unit[s] of segment constitution," which are phonetically realised as sounds on the condition that they are attached to skeletal slots. The inventory of elements used in standard GP comprises 8 items: A, I, U, h, ʔ, N, H and L. They are characterised by having their unique acoustic signatures, but the exact realisations are language-specific.

One of the recent offshoots within the GP tradition, i.e. GP 2.0, proposed and developed by Pöchtrager (2006, 2015a,b, 2016a,b, 2018, 2021), Pöchtrager and Kaye (2010, 2013) and Živanović and Pöchtrager (2010), displays a series of similarities to standard GP.[1] The newer framework, however, adopts syntax-like structures inspired by the Minimalist Program (Chomsky 1995). The primes retained in the framework are I, U and L. They are considered position properties

[1] In this paper, I assume the reader's basic understanding of GP 2.0, which can be developed based on the above mentioned sources. Nevertheless, I will briefly describe the most crucial aspects of the model to recapitulate its main points and highlight any important details that may not be explicitly expressed in the cited literature.

in that they can be annotated to positions. The simplest consonantal representations are glides and lax vowels in English as below:

(1) a. [w] xO{U} b. [j] xO{I} c. [ʊ] xN{U} d. [ɪ] xN{I}

As shown above, the representation is constructed of 3 components:

position x
categorial annotation, which defines the position as consonantal (O) or vocalic (N)
melodic annotation in curly brackets {U}/{I}.

While glides are represented by non-projecting onset heads annotated with a resonance prime, fricatives and plosives are built by means of two or more terminal notes that merge and project, as in (2):

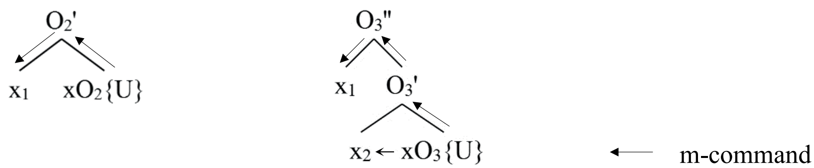
(2) a.[v] b. [b]

In (2a), the onset head xO_2 takes the position x_1 (its structural sister) as a complement and projects to O'. This single-layered projection is what encodes friction (the element h in standard GP). In (2b), an additional projection (O") is involved to encode occlusion (ʔ in standard GP). (2a–b) represent the neutral fricative [v] and the neutral plosive [b] in English. As structures in GP 2.0 are inspired by syntactic trees, where two words forming a phrase merge to form a projection, positions (x) also form units in phonological representations. Consequently, in (2b), for example, the non-terminal nodes O' and O" dominate their daughter terminal nodes – the head xO_3 and the complements x_1 and x_2.[2] The numbers that accompany the positions are merely a notational device – the terminal nodes – both heads and complements – are numbered continuously, while the projections take on the number that is assigned to their heads. These numbers allow us to refer to specific positions with sufficient precision. They are not used to indicate consecutive segments.

As GP 2.0 aspires to limit the number of primes, Pöchtrager (2006) proposes that voicelessness or aspiration (H in standard GP) should also be expressed structurally, specifically by a licensing relationship between the head and its complement, the so-called m-command (melodic command), as below:

[2] The relationship between xO_3 and x_2 expressed with an arrow will be explained shortly.

(3) a. [f] b. [p]

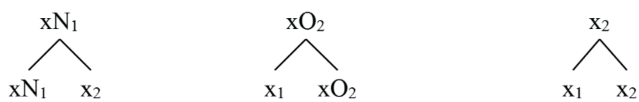


What distinguishes the voiceless consonant from the voiced one is m-command that holds between the head xO and its complement x_1.

As shown above, among the eliminated elements are h, H and ʔ. But GP 2.0 also abandons the element A. As noted by Pöchtrager (2006), A is somewhat omnipresent in the phonological systems and compared to other primes, it rarely spreads to other positions. Thus, it is replaced by structures inspired by minimalist syntax – the so-called adjunction – where the position (a head as in 4a-b or a complement as in 4c below) splits into two and takes an extra unannotated position. Unlike in syntax, however, adjunction does not signify the process of adjoining phrases, but it is an expanded constituent that contains an extra position, as below:

(4) Adjunction

a. b. c.

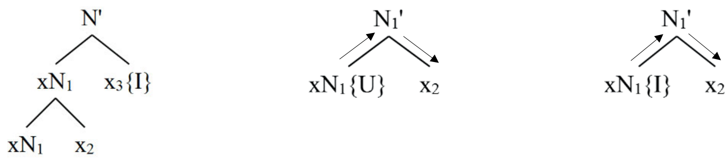


What is interesting about the above structures is that they are not projections – there is no N' or O' marking a higher projection – the head and its complement are dominated by the head type node. They are terminal nodes (heads or complements) that are split into two additional positions in the structure. Adjunction gives us extra room for representational possibilities. In the remainder of this paper, I will occasionally use {A} as a convenient abbreviation for adjunction.

Just as consonantal representations shown above, tense vowels, long vowels and diphthongs are also structured in this manner. Namely, they consist of two positions that constitute terminal nodes that merge and project, as below.

In (5a), the tenseness of the vowel [e] is expressed by projection. The structure also shows that the element I can be lodged in the complement position x_3 (see Pöchtrager (2016b). In (5b-c), not only does the head xN_1 take the position x_2 as a complement but also sanctions it via m-command. This time the

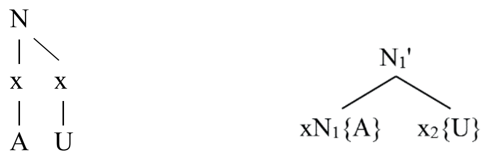
(5) a. Catalonian [e] b. English [u:] c. English [i:]



relationship has a different function from that in the representations of consonants. It does not contribute to the voicelessness but it makes the unannotated complement position receive the same phonetic interpretation as the head and contributes to the length of the monophthong.[3]

A projection can also represent diphthongs. In parallel to standard GP, the difference between long vowels and diphthongs is expressed in the configuration of elements annotated to the relevant terminal nodes. Consider the following representations:

(6) a. standard GP [aʊ] b. GP 2.0 [aʊ]

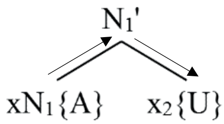


The diphthong [aʊ] in standard GP is represented by a sequence of two x-slots with two different elements, A and U, associated to them. Essentially, the two elements form two segments by being associated to two x-slots separately in (6a). In (6b), position x_2 is annotated with the element U but, in contrast to structures in (5b-c), the head does not m-command its complement, which results in the separation of the two vocalic portions. The structures presented in (5a) and (6b) are similar, but never appear in the same language to encode short tense vowels and diphthongs. The stipulation is that if the language possesses tense vowels, represented by at least one projection, diphthongs are represented by a larger number of projections, whereby the complement annotated with the melody encoding the second vocalic portion is located further away from the head. The representations of monophthongs and diphthongs are, therefore, language specific.

Moreover, a situation where both positions are annotated with melody and the head m-commands the complement is possible, as below:

[3] The rationale behind this use of m-command is presented in Pöchtrager's (2006) discussion of New York City English lengthening before voiced consonants.

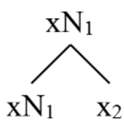
(7) [ɔʊ]



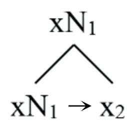
The diphthong in (7) differs from the one in (6b) in that the first part of the diphthong is represented by the head coloured by the element U lodged in the complement. The transfer of melody from x_2 to xN_1 is effected by m-command. Consequently, the element U is realised in both positions. What prevents the transfer of melody from the head to the complement, and renders (7) different from (5) in terms of phonetic realisation, is melodic annotation to the complement.

What remains unexplained in the above structures is the role of the horizontal arrow between the onset head xO_3 and its closest complement x_2, as in (2b) and (3b). It stands for control, that is, a type of licensing that holds between the head and its closest complement. Therefore, in its nature, control is a form of licensing that is heavily restricted with respect to its scope, since the head can only control its own sister node. Also, it has a small range of phonetic outcomes. Namely, it is used to encode stopness (as in 2b and 3b, see Pöchtrager 2006: 77; 2021: 11; Živanovič 2018) and in nuclear projections to distinguish between vowels, as in Putonghua between [ə] and [a] (see Živanovič and Pöchtrager 2010, Živanovič 2018):

(8) a. [ə]



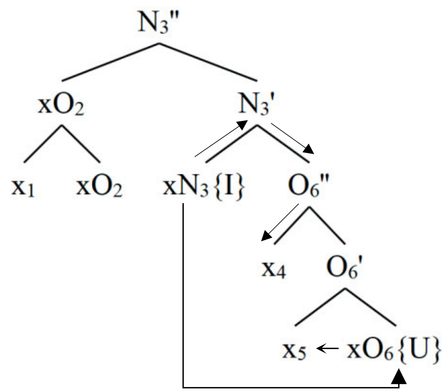
b. [a]



In the above structures, control has a specific phonological consequence – (8a) and (8b) represent two different vowels. What is also worth noticing is that control, as opposed to m-command, does not contribute to length – both vowels are short.

Before I proceed to the analyses in the ensuing sections, one more important issue has to be addressed, namely, how representations of the entire phonological domains are formed. As in the standard model, the head of the entire domain is the nucleus. The subordinate role of all other positions in the structure is expressed by the fact that they are complements of the head. Therefore, onsets are complements of nuclear projections. This can be illustrated with the example of the English word *rib*, as below.

(9) *rib* [rɪb]



As can be seen in (9), the nuclear head xN_3 and the onset projection O_6", which stand for [ib], form a structure dominated by the non-terminal node N_3'. What it means is that the nucleus xN_3 is the head of this projection and the onset projection O_6" is its complement. Additionally, according to Pöchtrager (2006: 97), the merge operation of two nodes is what licenses positions with categorial annotation (N or O). This is formally expressed as follows (Pöchtrager 2006: 96):

(10) In a configuration where a node α merges with a node β and projects to α', the head of β, Hβ, counts as licensed.

In line with the above, onset and nuclear heads (H) do not require any further licensing once they merge with other heads or their projections. In (9) above, the onset head xO_6 is licensed by virtue of being the head of the projection that merges with the nuclear head. In other words, the onset head xO_6 is licensed by the nuclear head xN_3. Notice that the maximal projection is marked with N, which means that the nuclear head is the head of the domain. Similarly, the initial onset xO_2 is also sanctioned by the same nuclear head. In this model, this relationship could be graphically presented as an arrow that runs along the tree branches, but it is usually avoided in order not to obscure the already complex tree representations. However, in the remainder of the paper, for the sake of clarity, I will adopt an alternative convention and use an arrow below the tree, as in (9), to indicate this relationship if, and only if, it is relevant for the discussion.

The final aspect to be noticed in (9) is that m-command does not have to be encompassed within a single nuclear or onset projection. M-command can also reach out for a position outside the maximal projection of the head. Pöchtrager (2006: 149) calls this phenomenon a transgression. It is a relationship between the projection head and a non-head position that reaches across the lowest non-terminal node marked as a nuclear projection (N', N'' or N''') dominating the onset projection. In other words, if the nuclear head reaches outside the maximal onset projection to m-command an unannotated position in the onset, it transgresses. In (9), the nuclear head xN_3 reaches over the projection N_3' to the onset projection and m-commands the position x_4. As a result, the vowel is longer. It is also proposed that if an onset head is a source of transgression, the consonant is long (a geminate).

To summarise, the structural approach departs from the segmental approach and advances representations that reflect the continuous character of the acoustic signal. In effect, the discrete units are not segments but constituents, whose positions might contribute to the phonetic realisation of other constituents. Also, the facts that onsets are complements of nuclear projections and that onset heads are licensed via such merge operations indicate the supremacy of nuclei as heads of phonological domains.

3. Short diphthongs in West Saxon

West Saxon digraphs *eo* and *ea*, as argued by Stockwell (1996, 2002), initially put forward by Daunt (1939) and Stockwell and Barritt (1951), represented short diphthongs [eu] and [æu] respectively.[4] They stand for both long and short vowels followed by a glide, since Old English scribes did not use any diacritics to mark vowel length. In order to determine if the vowel was short or long, we need to examine their historical developments. The short diphthongs were monophthongised to short vowels in the so-called West Saxon smoothing. The long diphthongs, in turn, were monophthongised to long vowels, which is evidenced by a later phenomenon known as the Great Vowel Shift. What needs to be stressed is that the shortness of a diphthong is understood here as its phonological length relevant to the syllable structure which might be expressed in terms of the number of morae (see Lass 1983a: 53-58, who considers short diphthongs monomoraic) or in standard Government Phonology, as being associated to one skeletal slot. My assumption is that, if the acoustic signal could be measured, their actual phonetic realisation might be longer than that of short monophthongs in a given language.

There are two processes that are believed to produce short diphthongs in WS, that is, breaking and back mutation.[5] Chronologically, breaking was an earlier

[4] See Drabikowska (2015) for a discussion of competing approaches, including Mossé (1945), Kuhn and Quirk (1953, 1955), Reszkiewicz (1953, 1971), Kuhn (1961), Stockwell and Barritt (1955, 1961), Hockett (1959), Antonsen (1961), Brunner (1965) and White (2004, 2015, 2016), and the arguments for the diphthongal approach.
[5] The digraphs also occurred in such forms as *geat* ‘gate,’ *sceaft* ‘staff,’ *ceafl* ‘jaw.’ It is probable that the first element e is a diacritic indicating the palatal value of the preceding consonant – see

process – it was complete before the restoration of *a* and I-mutation – while, as Hogg (1992: 115) claims, back mutation is estimated as being operative around 700. In this paper, I will focus solely on the process of the West Saxon breaking and will not delve into back mutation for the sake of space. Suffice it to say that, within the structural approach, phonological relationships between the structural positions resulting from back mutation are of the same nature and might be driven by phonetic analogy to breaking (see Schuchardt 1972 [1885], Vennemann 1972, 1978, Kiparsky 2003 [1995] and Benware 1996, for the nature of phonetic analogy).

Before I focus on the explanatory potential of the structural interpretation of these short diphthongs, let us now look into the contexts in which breaking occurred. In early West Saxon, short vowels [e] and [æ][6] were diphthongised before [l] or [r] followed by a consonant and before the voiceless velar fricative [x], as in the table below:

(11) The West Saxon breaking of short vowels (selected examples come from *The Vercelli Book* and Campbell 1959)

	[e] → [eu]	[æ] → [æu]
a.	followed by [l] plus a consonant	
	geold 'yield', *heolfor* 'blood', *heolstre* 'hiding place', *seolfe* 'self', *seolfren* 'silvern', *sweolgan* 'swallow', *eolh* 'elk'	*beald* 'brave', *bedealf* 'dig around', *ealgian* 'defend', *fealh* 'fallow', *gealgtreowe* 'gallows-tree'
b.	followed by [r] plus a consonant	
	beorht 'bright', *beorg* 'hill', *beorn* 'warrior', *deorc* 'dark', *eorl* 'warrior'	*bearn* 'child', *earc* 'ark', *eard* 'native place', *earfeðe* 'hardship', *earm* 'arm'
c.	followed by the voiceless velar fricative [x] only or with a following consonant	
	feoh 'cattle', *feohtan* 'fight', *geohðu* 'anxiety', *hreoh* 'rough', *weox* 'wax.past', *cneohtas* 'boy.pl', *eoh* 'horse'	*eaxl* 'shoulder', *meaht* 'might', *tear* (←*teahor*) 'tear', *weax* 'wax', *eahta* 'eight', *seah* 'saw', *seax* 'knife'

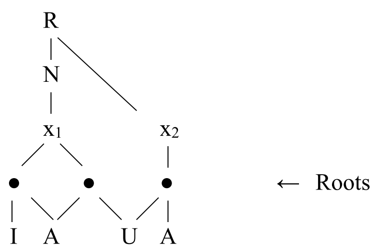
Dieter (1898), Daunt (1939), Stockwell and Barritt (1951), Lass and Anderson (1975) and Colman (1985). In some works, a different historical development of these forms is explained by means of a stress shift (see, for example, Wełna 1978: 47). Other opposing views, i.e. that the digraph represents a diphthong, include Bülbring (1900), Luick (1914–40), Kuhn and Quirk (1953), Campbell (1959), Brunner (1965), Hogg (1979, 2011). Although I find the diacritic interpretation more convincing, the issue has no direct bearing on the forthcoming discussion.

[6] The vowel [i] was also diphthongised, but it was merged with *eo* very early, as in *lioht*, *leoht* 'light', *lifen*, *leofen* 'life' of *fiorm*, *feorme* 'food'. As we will see, the [i]–[e] merger in this context might provide further evidence for our representations below.

The presentation of the views on digraphs above leads to the question of how the development of short diphthongs can be captured by phonological theory. Using Element Theory and standard Government Phonology, short diphthongs can be represented by three resonance elements I, A and U. If the vowels had been monophthongs, the difference between them could be expressed by means of headedness, but based on the counterarguments against monophthongs, we need to resort to other theoretical devices. As far as the following consonants are concerned, they are velar or velarised. In particular, the WS digraphs *eo* and *ea* were followed by [l] or [r] plus a consonant or the voiceless velar fricative [x] with an optional following consonant. Thus, two assumptions have to be made. Firstly, both [r] and [l] followed by a consonant were dark. Secondly, they must have contained the same element as the velar [x]. The explanation of this phenomenon is possible when the view of Backley and Nasukawa (2009) and Backley (2011) is adopted. They put forward that the representations of velars contain the element U, thus velarisation of [r] and [l] has to be expressed by the same means (for further evidence of the velarity of [r], see Lass 1983b).

As far as the phonological representation is concerned, within standard GP, the diphthong might be the result of the split root of the vocalic segment. A similar proposal was previously put forward by Huber (2007). In his view, the short diphthongs are contour structures, but he does not pinpoint the source of the element U in the structures. My claim is that the following consonant is such a source and it contributes to the representation of these diphthongs,[7] as below:

(12) [eor]



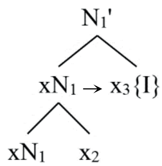
In (12), the elements are attached to consecutive roots, which should ensure the delayed pronunciation of some of the acoustic portions, but this solution seems theoretically dubious as, once attached to an x-slot, the primes should be immediately pronounced. As Harris (1994: 131) contends, a split root constitutes an exception whereby elements can be pronounced with a delay. However, it needs to be noted that, while the order occlusion-release in affricates seems

[7] For a summary of other approaches to Old English breaking and his treatment of the process couched within CVCV phonology, see Kijak (2017), who also proposes that the source of U is the following consonant, but offers no structure for short diphthongs.

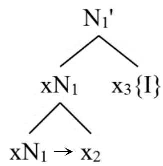
universal and cannot produce, e.g. an [st] sequence, for vowels, the sequencing is not readily apparent and in this case there seems to be no clear motivation for root fission. Therefore, the question is whether a representation of short diphthongs without resorting to a problematic split root is viable. This can be achieved by applying a structure that inherently introduces an order of melodic expressions, that is, the one proposed by the advocates of GP 2.0.

First, consider the following representations of front vowels in (13). The distinction between [e] and [æ] is encoded in control of the head over the complement in [e] and within adjunction in [æ],[8] as below:

(13) a. [e]

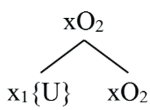


b. [æ]

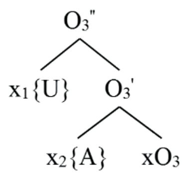


The placement of I annotated to complements x_3 for both [e] and [æ] explains their identical behaviour with respect to palatalisation of velars in Old English (see Drabikowska 2019: 173-195). The consonants which followed the vowels and caused their diphthongisation were velar or velarised. The presence of U in the fricative [x] is inherent, while in [r] and [l], it is contextual, as it is dependent on the presence of the following consonant. Despite this fact, in all of these consonants, it has the operator status, which translates into annotation to the complement. Their representations are as follows:

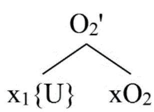
(14) a. velarised [r]



b. velarised [l]



c. [x]



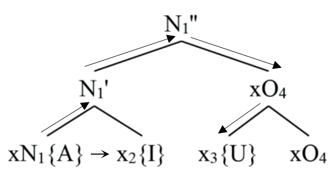
[8] These representations differ from diphthongs in Old English in that diphthongs require at least one more projectional layer, i.e. one more nuclear complement annotated with a melody.

What the projections in (14a–c) have in common is that the heads are unannotated while the complements x_1 are annotated for U. As a result, the projections with annotated complements disintegrate from their empty onset heads.[9] In this instance, distance between the head and the complement becomes phonologically relevant. In other words, the projection is no longer perceived as a unit where all positions contribute to the phonetic realisation of the constituent, but they become a sequence of acoustic portions. I propose that such disintegrated positions must receive additional licensing. Of course, such disintegration occurs under limited circumstances, namely, when an unannotated head is required to license its own complement that is itself annotated. The ability to license such a complement may be language specific, but, universally, the more distant the complement the less able the empty head is to license it. Moreover, provided that the position does not indeed receive some sort of licensing, disintegration may lead to phonological restructuring in a tree representation. Its result would be node truncation, which is equivalent to the erasure of an association line in standard GP.

With the disintegrated position in the representation, that is, a terminal node that requires further licensing, we have two theoretical possibilities. Either the preceding nucleus that forms an inter-head relation with the onset head indirectly sanctions such a position or the head of the preceding nucleus m-commands it. I will explore the latter possibility first.

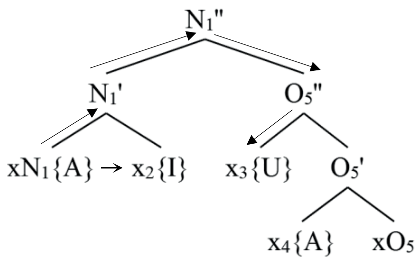
As we have seen so far, m-command is a licensing relation between the head and the complement that in English consonants determines their voicelessness. In vowels, when the complement is empty, the head takes over its length. If the complement is annotated with an element, it contributes to the phonetic interpretation of the head (cf. Živanovič and Pöchtrager 2010). In light of this, let us see the possible structures of the WS diphthongs followed by the relevant consonants:

(15) a. *beorn* ‘child’ (relevant part: [eor])

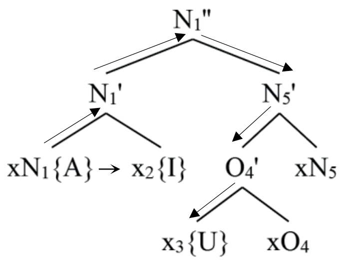


[9] Such a proposal can imply that breaking should also occur before velar [ɣ], but I postulate that annotation of I to the head in its representation prevents disintegration and breaking before this fricative. For evidence in favour of such a treatment, see Minkova (1996, 2003), Wójcik (2001) and Hogg (2011).

b. *heolfor* ‘blood’ (relevant part: [eol])



c. *feoh* ‘cattle’ (relevant part: [eox])[10]



These structures demonstrate that the nuclear head m-commands the complement of the onset projection, which is annotated with melody. Consequently, in line with the GP 2.0 postulates, we should expect that the resulting sounds are mid front rounded vowels. A possible solution that would allow us to obtain a diphthong would be to impose a language-specific condition stating that transgression in WS does not involve a transfer of an element to the preceding nuclear head. The resulting structure is a front vowel with a glide, which is exactly what was argued by Stockwell (1996, 2002). What is crucial is the fact that, in this manner, the delayed pronunciation of the second element is accounted for and its structural separation is depicted as it belongs to the following onset. We are also able to account for the close relation that holds between the preceding nucleus and the following onset complement because of the m-command between them. However, the language-specific restriction on the transfer of melody seems arbitrary. Moreover, the representation in (15c) is highly unusual, since the position x_3 is annotated, controlled and m-commanded.

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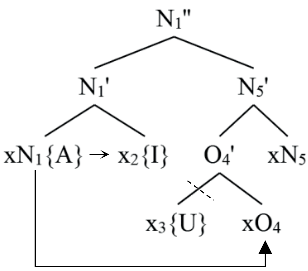
[10] A brief comment on position xN_5 is in order. Position xN_5 is a word final nucleus, as in this paper, I assume the stance that there are no word-final consonants. For the arguments in favour of this view, see Kaye (1990a), Kaye, Lowenstamm and Vergnaud (1990), Charette (1991), Harris (1994) and Harris and Gussmann (2002).

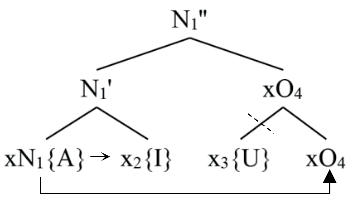
However, another inherent relationship between heads exists – onset heads are licensed by virtue of being merged with the nuclear projection. Let us, therefore, test the possibility of an inter-head relation between the nucleus and the following onset, which provides a different perspective. Consider the following structures:

(16) a. *feoh* 'cattle' (relevant part: [eox])

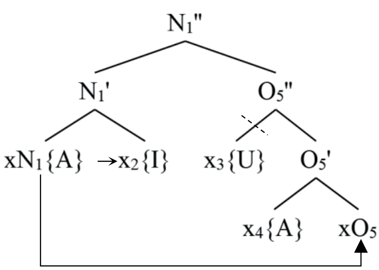


disintegration

b. *beorn* ‘child’ (relevant part: [eor])



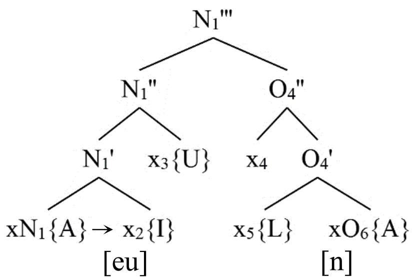
c. *heolfor* ‘blood’ (relevant part: [eol])



What I put forward here is that the licensing relation between the nuclear head and the following onset renders all annotated positions licensed, including x_3. What we receive is a possible representation whereby the vowel is not affected by the melody in the following onset but the annotated position is interpreted as a part of the vocalic expression. The phonetic interpretation of U annotated to x_3 might be the glide reflected in the digraph.

An argument in favour of this interpretation is a later development of compensatory lengthening. In particular, the consonant [x] was lost and the vowel became longer, as in **seohan* → *sēon* ‘see’ or **fleaxm* → *flēam* ‘flight’ (Hogg 2011: 271). The voiceless fricative is an unstable structure. As a constituent with an empty head, which is in a licensing relation with the preceding vowel, in the course of history, it might have been restructured into a long diphthong [eu]. Due to the inclusion of the complement into the nuclear projection, it might have lost the position with the categorial annotation (O), as below:

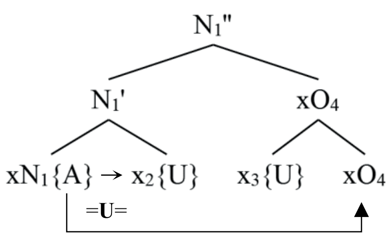
(17) *sēon* (←*seohan*) ‘see’ (relevant part: [eun])



In (17), I present the outcome of the restructuring, where the long (bimoraic in traditional terms) diphthong is composed of two layers of projections. The complement of the original [x] is incorporated in the nuclear projection and the second nucleus is eliminated to avoid a hiatus.

In the structures proposed above, the glide emerges due to the requirement of licensing of the annotated complement under the maximal projection by the preceding nucleus, since the unannotated onset head is incapable of performing this function. Therefore, the question is why the glide does not emerge after [o] or, in other words, why [o] does not break into [o^{w}] but remains a monophthong, as in *folc* ‘folk’, *holm* ‘wave’, *gold* ‘gold’, *word* ‘word’, *storm* ‘storm’, *wroht* ‘accusation’. In my view, it is the annotation of U within the nuclear projection that prevents the disintegration of the onset projection, as below:

(18) *word* ‘word’ (relevant part: [or])



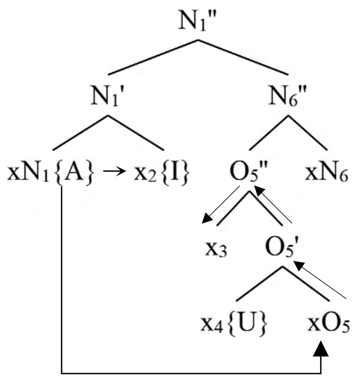
The licensing whose source is the nuclear head xN_1 sanctions the position x_3, but due to the presence of the element U, lodged under the nuclear projection N_1', the onset adjunction remains integrated. As a result, the position x_3 is not realised as a glide, but it solely contributes to the pronunciation of the consonant.

To sum up, the advantages of the inter-head licensing between the nucleus and the onset are threefold. Firstly, we avoid an arbitrary restriction on m-command, which would be necessary to explain the delayed pronunciation of the second melody without melody transfer to the nuclear head. This type of licensing between the nuclear head and the complement of the following onset projection might be responsible for the Early Middle English monophthongisation of [e^w] into the mid front round vowel [ö] (cf. Wright and Wright 1928: 30–31 and Lass 1992: 39–43), but, at an earlier stage, the licensing relation between heads assures the sequencing of phonetic portions. Furthermore, the inter-head relationship is not unusual. It inherently exists in the structure, as the nuclear head sanctions the onset head. It has to be noted that this type of licensing, when not based on the identity of annotated primes, does not integrate the projection, but it contributes to the sequencing of acoustic portions. Therefore, it does not increase the licensing potential of the head to integrate the projection but targets the positions independently. Secondly, we account for the compensatory lengthening combined with the loss of [x]. This single-layered projection with an empty head is prone to lose the position with categorial annotation, while the complement, originally placed within the onset projection, is reinterpreted as a nuclear complement, which contributes to the vocalic length. Thirdly, GP 2.0 helps us avoid the reference to a split root and the problem of the split root order present in the standard model. The sequencing of phonetic portions is encoded in an ordinary structure of GP 2.0. In particular, the element U annotated to the onset complement is realised as a glide that follows the vowel but precedes the consonant. This does not occur when the nucleus itself has the element U annotated. It appears that the presence of the same prime in the nuclear projection promotes the integration of the licensed onset projection.

As far as melodic annotation is concerned, we can draw a conclusion concerning the positioning of primes. The elements that are annotated to the highest complements are most easily interpreted as portions of the preceding vowels. There is a clear sequencing, i.e. vowel – glide – consonant, which is encoded in the structure without any ambiguity. However, notice that breaking fails to proceed before velar plosives. If the element U is annotated to their lower complements, there is one complement position – the highest position in the onset projection – that separates them from the preceding vowel, as below:

The lack of glide emergence in (19) can be explained by the presence of the empty position x_3, which stands between the nucleus and the lower complement x_4 annotated with U. Additionally, the closer complement is more integrated with the head by virtue of being its sister.

(19) *rec* ‘reek’ (relevant part: [ek])



Let us now examine some present-day phenomena that share certain similarities with the West Saxon breaking in that they also indicate the positioning of primes in the structures, but they show various degrees of integration within the onset and nuclear projections.

4. Diphthongs in Sursilvan

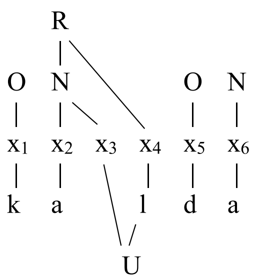
The Sursilvan dialect of the Surselva region belongs to the group of Romance languages spoken in south-eastern Switzerland, commonly known as the Romansh language. The varieties that I will focus on in the following sections are found in two areas: Vattiz and Trun and the data I draw on was collected and presented by Savoia (2015: 154–170). As far as the syllable structure of Romansh is concerned, according to Montreuil (1999), the general tendency is that open stressed syllables contain both long and short vowels. Long vowels in closed stressed syllables are excluded, but they occur before word-final consonants, which are regarded in GP as onsets preceding empty nuclei (see Kaye 1990a, Harris 1994, Harris and Gussmann 2002). In closed syllables, only short vowels and diphthongs are attested. Therefore, we find three types of stressed syllables: CV, CVV (with CVVC# possible) and CVC.

In the varieties of Vattiz and Trun, open syllables can contain long vowels, diphthongs or short vowels. There seem to be no strict regulations on the length of open syllables, although short vowels in open syllables might be viewed as a novelty, since they were originally closed (cf. Savoia 2015: 155–158). In closed syllables in Vattiz and Trun, however, not only short vowels are found, but also diphthongs [uə], [uɔ], [ia], [iə], [au], with the exception of [uɔ] in Trun as it is not attested there. The examples are given in (20):

(20) Diphthongs in closed syllables in Vattiz and Trun (Savoia 2015: 156–158, 179)
Vattiz: [ˈkuərta] ‘short.fem’, [uɔlp] ‘fox’, [ˈiarva] ‘grass’, [ˈpiərtʃ] ‘pig’, [ˈkaulda] ‘hot.fem’
Trun: [ˈmuəʃca] ‘fly’, [fuərn] ‘oven’, [piəʀc] ‘pig’, [aˈviaʀta] ‘open.fem’, [ault] ‘tall.masc’

The existence of these diphthongs in closed syllables has to be delved into since, if their phonological length is equivalent to that of long vowels, they are highly unusual. In that vein, the rising diphthongs [uə], [uɔ], [ia], [iə] are thoroughly analysed by Drabikowska (2019), who shows that their structure is phonologically identical to that of a short vowel. Of greater interest in this paper, however, is the representation of the diphthong [au]. It has to be noted that its distribution is heavily restricted, namely it is found only before the lateral [l] followed by a coronal plosive [t] or [d] or palatoalveolar [tʃ], as in [kaul^{t}]/[ˈkaulda] ‘hot.masc/fem’, [ault]/[ˈaulta] ‘tall.masc/fem’, [faultʃ] ‘scythe’. When this lateral is followed by a labial or velar, the nucleus is realised as the original vowel [a], as in [ˈpalma] ‘palm’. Savoia (2015: 180) and Baldi and Savoia (2017: 73) propose that the original vowel [a] is realised as a diphthong because the following consonant is velarised, as below:

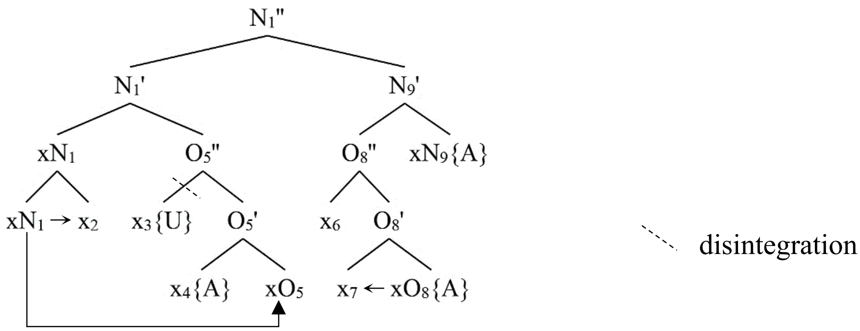
(21) [ˈkaulda] ‘hot.FEM’



In (21), the nucleus itself is composed of two skeletal slots, x_2 and x_3, whereby x_3 shares the element U with the lateral. However, this representation requires the existence of a super-heavy rhyme in the context where lengthening of the original [a] is unlikely. What is interesting is that this development resembles WS breaking on two grounds. Firstly, in both dialects, the vocalic items are expected to be short. In WS, diphthongs developed from short vowels and were later monophthongised back into short vowels. In the Sursilvan variations in question, the diphthong occurs in closed syllables, where short vowels are expected. Secondly, the context of the following consonant is similar. Namely, although the diphthongisation in WS proceeded in a wider context, what these two languages have in common is that the diphthongs are followed by a velarised lateral. Apart from that, there is a significant difference that offers us some insight into the role and positioning of melodic annotation within an onset projection. In particular, diphthongisation in Sursilvan is not effected when the consonant following the lateral is labial or velar.

Due to the above similarities, I argue that the emergence of the second part of the diphthong is caused by the disintegration of the onset projection and the inter-head licensing, as in WS. The highest complement within the onset encoding [l], annotated with the element U (which is in agreement with the proposal by Savoia 2015: 180 and Baldi and Savoia 2017: 73), is sanctioned by the preceding nucleus and realised as a vocalic portion in the signal. Hence the structure below:[11]

(22) [ˈaulta] ‘tall.FEM’



In (22), we can see an analogical construction to WS short diphthongs, where the position x_3 is realised as a glide that follows the vowel [a] and precedes the lateral. An additional argument in favour of the glide being lodged under the onset projection comes from the duration of the vocalic portions in the acoustic signal in closed and open syllables, provided by Savoia (2015: 159, 160, 181) and Baldi and Savoia (2017: 70). The diphthong [au] in a closed syllable has the duration of over 160ms, which is the length of a regular long diphthong in an open syllable. Therefore, it seems that the nucleus takes over the onset complement position together with its length. Again, we can see that, from a phonological point of view, the closed syllable is perfectly acceptable, since the nucleus itself is short, but the glide lodged within the onset projection is realised as the second part of the vocalic expression in the acoustic signal.

[11] I put aside the issue of licensing of the position x_6. There seems to be no m-command within the onset projection O_8", since Romance languages are generally characterised by full voicing and lack of aspiration, which places them among L-languages (cf. Krämer 2009: 45–46, but see Stevens and Hajek 2010a,b for research into aspiration in Italian). Pöchtrager (2006: 240) proposes p-licensing for such positions. Since the nature of this relationship does not influence the present analysis and requires further research, I leave this position in projections in (22), (24) and (26) unmarked for licensing.

In other dialects of north Italy and southeast Switzerland, the same context presents different results since the licensing for the disintegrated position comes in a different form. Consider the forms from the north Italian varieties of Lombardy, i.e. Villa di Chavenna, San Fedele Intelvi and Casorezzo (situated along the Italy-Switzerland border), where the preceding nucleus is realised as a back mid open vowel:

(23) The realisations of [a] in closed syllables (Savoia 2015: 179)

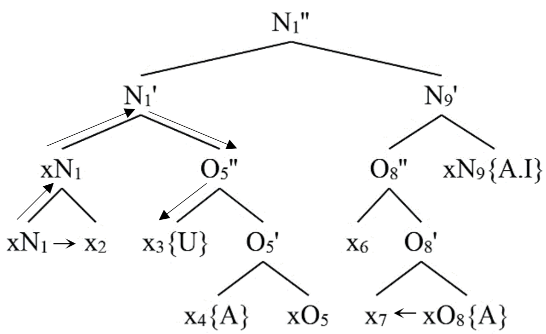
Villa di Chavenna: [ko:lt]/[ˈkoldɛ] ‘hot.masc/fem’, [ko:lts] ‘sock.pl’, [o:lt]/[ˈoltɛ] ‘tall.masc/fem’, [fo:ltʃ] ‘scythe’

San Fedele Intelvi: [kɔ:lt]/[ˈkɔ:lda] ‘hot.masc/fem’, [vɔ:lt]/[ˈvɔlta] ‘tall.masc/fem’, [ˈɔ:ltru]/[ˈɔltra] ‘other.masc/fem’

Casorezzo: [ˈkɔ:ldu]/[ˈkɔ:lda] ‘hot.masc/fem’, [ˈvɔ:ltu]/[ˈvɔ:lta] ‘tall.masc/fem’, [fɔ:ltʃa] ‘scythe’

As can be seen in the examples above, the closed syllables do not contain diphthongs but long vowels. It appears that the melody annotated to the onset complement is transferred to the preceding vowel, which can be achieved via m-command, as below:

(24) [ˈo:ltɛ] ‘tall.FEM’ in Villa di Chavenna



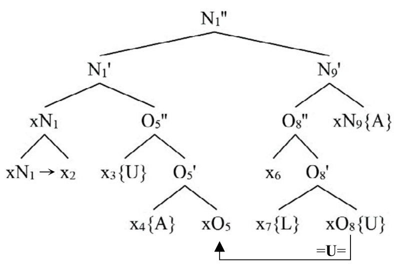
In the varieties listed in (23), inter-head licensing does not produce a glide, but m-command that holds between the nuclear head xN_1 and the complement x_3 transfers the melody to the nuclear projection. The application of different forms of licensing is, therefore, language specific. It can be further stated that in Villa di Chavenna, not only is the melody transferred but m-command also contributes to the length of the vowel. Recall that m-command either takes over the length of the m-commanded position or transfers its melody to the m-commander. However, here, we can notice that both transfers take place simultaneously. I would like to point out that we are dealing with transgression, where the nuclear head reaches over the highest onset projection to license its complement. In the case of onset projections, when the head reaches over its maximal projection, the consonant becomes long. Thus, I posit that transgression always contributes to length, also of vocalic expressions, irrelevant of whether licensed positions are annotated or not.

The final issue to be addressed here is the fact that [l] followed by a labial or velar consonant does not affect the preceding vowel [a] in all of the abovementioned varieties, as in the following examples (Savoia 2015: 179):

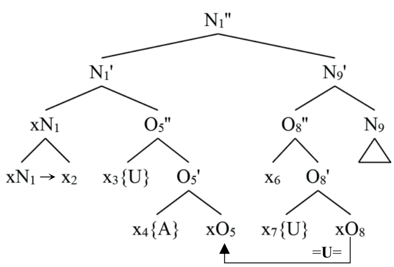
(25) [ˈpalma] ‘palm’ (Vattiz), [kalˈkaɲ] ‘heel’ (Casorezzo),
[ˈmalgɛ] ‘mountain cottage’, [falˈkevillat] ‘small hawk’ (Villa di Chavenna)

What has paramount importance is that the second consonant in such a cluster also contains the element U. Baldi and Savoia (2017: 74) consider dissimilation as a process that blocks the diphthongisation, while Savoia and Baldi (2017: 256) assume that consonants “intrinsically endowed with U” are not allowed to share it with the nuclear head of the domain. In my view, however, the dissimilative structural factor is not the status of U in the second consonant but the occurrence of U in both consonants and the licensing relationship within the cluster, i.e. the second onset licenses the first (see Pöchtrager 2006: 247). This can be easily expressed within GP 2.0, whereby the identity of annotation prevents the preceding constituent from disintegration, i.e. it is an integrating factor. When the projection remains integrated, the preceding nucleus does not have to sanction – or to go even further – it is not allowed to interact with the annotated onset position, be it via inter-head licensing or m-command. The proposed structures are as follows:

(26) a. [ˈpalma] ‘palm’ (relevant part: [alma])



b. [kalˈkaɲ] ‘heel’ (relevant part: [alˈk])



The structures in (26) demonstrate the licensing between onset projections, which involves the identity of annotation within projections. Recall my interpretation of WS back vowels, which did not break but promoted the integrity of the following onset (as in 19). It can be observed that the presence of the element U in the onsets in (26) supports the integrity of the preceding constituent.

The phenomena examined in Sections 3 and 4 show that a position that is more distant from the head is prone to disintegrate from the projection. As a result, it requires further licensing. It might come in several forms. One of the possibilities is licensing from the preceding nucleus. Depending on its form operating in a particular variety, it might lead to glide emergence (via inter-head licensing) or the preceding vowel might be coloured by the annotated melody and lengthened when m-command transgresses the highest onset projection. What seems interesting is that the licensing from the nucleus that does not contain the relevant prime fails to support the integrity of the onset projection and favours the sequencing in the signal, while such support is provided if it is based on the identity of primes annotated within projections.

In the following section, I will inquire into the influence of the velar nasal on the preceding vowel [a] in Sursilvan, but I will also make a reference to a similar context in Old English.

5. Original [a] and the velar nasal in West Saxon and Sursilvan

I will now concentrate on the development of the original vowel [a] when it is followed by the velar nasal. Mainly the Sursilvan dialect will be scrutinised, but I will also take a look at the Old English velar nasal in a similar context. This comparison will help us develop a better understanding of the melodic content of velars and the positioning of primes, which is language-specific.

The Sursilvan dialect can be characterised by a relatively free occurrence of the vowel [a], but it is not found when followed by the velar nasal (Savoia 2015: 166). In this context, it is diphthongised to [ɛu] in Vattiz and [au] in Trun, as in the following examples:

(27) [ɛu] followed by [ŋ] (Savoia 2015: 167)[12]

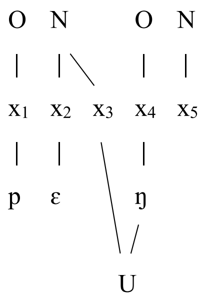
Vattiz: [mɛuŋ] ‘hand’, [tʃɛuŋ] ‘dog’, [pɛuŋ] ‘bread’, [ˈlɛuᵑna] ‘wool’, [ˈrɛuᵑna] ‘frog’, [sɛuŋ]/[ˈsɛuᵑna] ‘sane.masc/fem’

Trun: [mauŋ] ‘hand’, [cauŋ] ‘dog’, [sauŋ]/[ˈsauᵑna] ‘sane.masc/fem

[12] In Vattiz, the low vowel [a] was raised to [ɛ], which led to the emergence of the diphthong [ɛu] in this context. Since this vocalic change has no bearing on the present analysis, I will not be concerned with its nature.

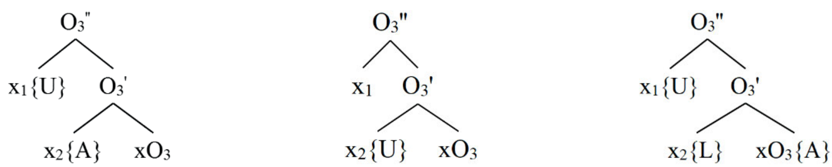
Savoia (2015: 169) and Savoia and Baldi (2017: 247-248) attribute the presence of the diphthong to the fact that velars are represented by the non-head U (cf. Backley's 2011). Savoia's (2015: 169) proposed representation for [pɛuŋ] 'bread' is as follows:

(28) [pɛuŋ] 'bread'



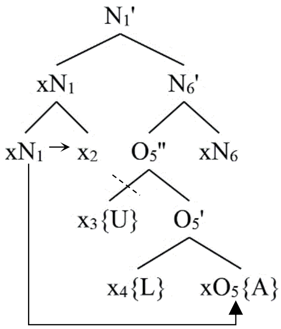
In (28), the velar nasal shares the element U with the preceding nucleus, which renders the second portion of the diphthong. My approach is somewhat similar but the structures of GP 2.0 allow us further to align velarised consonants and velar nasals and distinguish both of them from other velar consonants more clearly. Compare the following representations:

(29) a. velarised [l] b. [g] c. Sursilvan [ŋ]



In (29a), we can see that the velarised consonant has U annotated to the highest complement x_1, but the velar plosive in (29b) has it lodged in the complement position x_2 at the same level of projection as the head. The velar nasal in (29c) is a double-layered projection as stops have two potential complement positions that can bear the resonance element annotation. I exclude the head position xO_3, which, when annotated with U, encodes labiality. There exist two reasons to place this element in the highest complement x_1. The consonant [ŋ], being a nasal, has the element L annotated to the closest complement x_2, as advanced by Pöchtrager (2006: 87). Therefore, from the theoretical point of view, we want to avoid the representations with double annotation, since, if at all possible, they must be marked. Secondly, the diphthongisation places the nasal together with

(30) [sauŋ] 'sane.MASC' (relevant part: [auŋ])



velarised liquids, which require their annotated highest complement to be licensed by the preceding nuclei, as below:
The above structure is analogical to glide emergence in West Saxon. The preceding nucleus provides licensing for the complement position x_3, which, as a result, is realised as a vocalic portion that precedes the consonant. The placement of U-annotation can be also evidenced by the fact that the spectrogram shows a minor variation, whereby the velar nasal is realised as a pre-velarised coronal nasal [n] (hence adjunction in the head in 30). As reported by Savoia (2015: 168), "in intervocalic position, we find a noticeable velar appendix that prolongs the velar part of the diphthong and combines with the coronal part of the nasal" (my translation).[13] In effect, the velar nasal is in fact a velarised coronal, hence it is represented by adjunction in the head position in (30).

Before we deal with a similar context in West Saxon, a brief comment is in order regarding the influence of nasals on the preceding vowels. As noted by Savoia (2015: 165–167), other nasals, irrespective of their place of articulation, have a rounding effect on the preceding vowel. In contrast to the context before the velarised nasal, the [a] is rounded to [ɔ], as below:

(31) [a] → [ɔ] before nasals in Trun (Savoia 2015: 167)
[fɔm] 'hunger', [ˈkɔmba] 'leg', [jɛu ˈkɔntəl] 'sing.1st.sg.pres',
[jɛu ˈklɔməl] 'call.1st.sg.pres', [bɔɲ] 'bathroom'

This outcome is a dilemma for Element Theory. Although, as Backley (2011: 202) points out, both L and U are characterised by a concentration of energy in the lower frequencies, due to the way this framework is constructed, there seems to be no non-arbitrary way to connect the presence of L (or N in the mainstream

[13] Original: "in posizione intervocalica troviamo un'appendice velare percepibile che prolunga la parte velare del dittongo e si combina con la parte coronale della nasale."

of standard GP) in the nasal and the element U in the preceding nucleus. Nevertheless, the different outcome before the velar nasal [ŋ] implies that there is a connection between the element U lodged in the highest complement of this consonant and the realisation of the preceding nucleus.

Since, as I have proposed, the velarised nasal has a similar structure to the velarised liquids in Sursilvan varieties, we need to return to the issue of WS diphthongisation. Old English also had the velar nasal, but it did not cause the preceding vowel to break. On the contrary, in *The Vercelli Book*, one of the earliest WS written records, the vowels remained intact (see 32a below), but Bosworth's (2010) dictionary indicates that there was a variation between [a] and [o], as in (32b). Also, some of the present-day forms show rounding. However, it needs to be stressed that similar alternations are also observed before the other nasals [n] and [m], as in (32c). Consider the following examples:

(32) West Saxon (*The Vercelli Book* and Bosworth 2010)

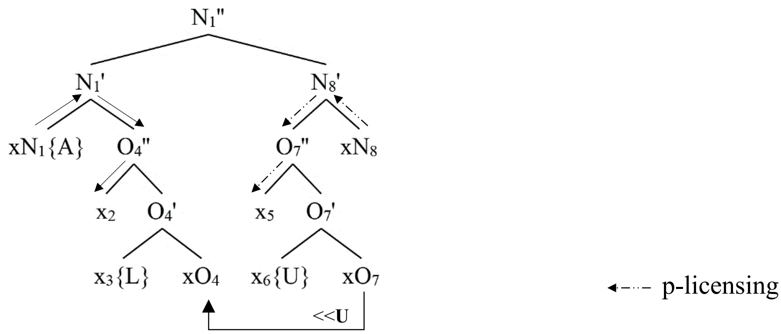
clang 'shrink.ppc', *ġetang* 'prostrate', *lange* 'long', *strang* 'strong', *neorxna-wang* 'paradise', *onsprang* 'rise.ppc'

ahangen/ahongen 'hang.ppc', *befangen/befongen* 'taken', *begang/begong* 'passage', *gang/gong* 'journey', *gangan/gongan* 'going', *ġecrang/ġecrong* 'sink.ppc', *ġelang/ġelong* 'belonging.adj', *ġemang/ġemong* 'crowd', *langsum/longsum* 'taking a long time', *onlang/onlong* 'along', *sang/song* 'song', *wang/wong* 'field'

rand/rond 'edge', *geblandan/geblondan* 'blend.v', *brand/brond* 'torch', *man/mon* 'man', *hran/hron* 'whale', *whanne/whonne* 'when', *and/ond* 'and', *swan/swon* 'swan', *hand/hond* 'hand', *tosamne/tosomne* 'together', *ham/hom* 'shirt', *gram/grom* 'angry', *nama/noma* 'name.n'

The examples in (32) illustrate that all nasals in WS, regardless of their place of articulation, had the same impact on the preceding vowel. In other words, the velar nasal is by no means special in this respect. The question that arises is how different it is in comparison to the Sursilvan velar nasal. The answer can be found when we examine the context in which the velar nasal occurs. As it becomes evident from the examples in (32a–b), the velar nasal is attested only in clusters when followed by a velar plosive. In light of this, I follow Pöchtrager's (2006: 247) treatment of clusters, where the element L in the onset projection attracts the resonance elements from the following onset. As a result, the cluster is homorganic. The resonance element, however, is lodged only in the second onset projection and is not annotated to any of the positions within the nasal, as below.

(33) *strang* ‘strong’ (relevant part: [aŋg]



The place of articulation of O_4" assimilates to the following onset O_7" by means of licensing that holds between these two constituents. The close relationship between positions at the same level of projection assures that the melody annotated to the complement x_6 also contributes to the pronunciation of the preceding consonant, rendering the nasal homorganic. The licensing of the highest complements in both constituents is provided in a form of p-licensing from xN_8 to x_5 and in m-command from xN_1 to x_2 (cf. lengthening in Hogg 2011: §5.202). However, there is no melody transfer from O_4" to the preceding nucleus (=no breaking) for the simple reason that there is no resonance element annotated to any of the positions.

To sum up, the data from Sursilvan and West Saxon show that the same representations of the velar nasal cannot be put forward in the two languages. Based on its behaviour, the Sursilvan nasal is grouped together with velarised liquids, whereby the element U is annotated to the complement immediately under the maximal onset projection. Such positions require additional licensing, which comes from the preceding nucleus. Consequently, a glide emerges. The nasal in West Saxon is velarised by the following velar plosive. In this Old English dialect, the nasal has no resonance prime to pass on to the preceding nucleus.

6. Potential implications for short diphthongs in Icelandic

Describing short diphthongs in Icelandic, Steblin-Kamenskij (1960: 43) refers to them as “diphthongoids” with a less pronounced movement of the tongue towards the regions characteristic of high vowels. This fact is used to deny them the phoneme-cluster status and fuels an analysis of the symmetry of the entire vocalic system within the structural framework (other structuralist accounts include, e.g. Haugen 1958). Ellis (1869), Ófeigsson (1924), Einarsson (1949) and Gíslason and Þráinsson (1993) distinguish them from their long counterparts in that their first part is shorter. Beyond phonetic descriptions, they are perceived as problematic for phonological theory. For example, Gussmann (2011: 85) states that "[t]heoretical implications of the representation of the Icelandic diphthongs are partially unclear and remain to be worked out", since, within the framework of Government Phonology, the root node must be split and must involve headed elements associated to both nodes (the presentation of my exploration into such a treatment can be found in section 3).

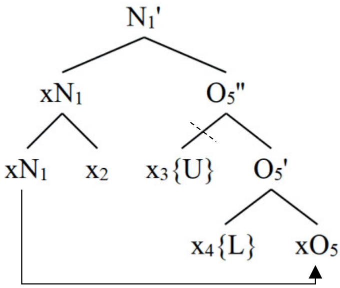
Historically speaking, the short diphthongs in Icelandic have two sources (cf. Árnason 2011). The first group result from shortening of long diphthongs and those short diphthongs occur in such forms as *ast* [aust] 'love' and *austur* [öystʏr] 'east', *hreysti* [reistɪ] 'valour', *rósta* [rousta] 'skirmish', and *næstur* [naistʏr] 'next'. The peculiarities of shortening and removal of nodes in vocalic expressions is beyond the scope of this paper[14], therefore, I will focus here on the other group, which developed before the velar or palatal nasal and can be found in *langur* [lauŋkʏr] 'long.adj', *lengi* [leiɲcɪ] 'long.adv' and *löngum* [löyŋkʏm] 'long.dat.pl'(Árnason 2011: 25), and other forms including *ang, ank* [auŋk], *ong* [ouŋk] (Einarsson 1949: 6-10). A potential complication might be the emergence of short diphthongs before [l] followed by a consonant, since in Icelandic it is never retracted (Einarsson 1949: 17) but clear, as in *skáld* [skauld] 'poet'. Nevertheless, the emergence of a glide seems predictable before the velar nasal and the palatal nasal. An interesting observation is also made by Einarsson (1949: 10), in particular, the first parts of the diphthongs [ei] and [ou] are higher than the regular monophthongs [e] and [ɔ] in other contexts.

The representations proposed within the GP 2.0 framework allow us to understand that the melody annotated within the following onset non-head position affects the realisation of the nucleus, as in the following structures for *langur* [lauŋkʏr] 'long.adj' and *lengi* [leiɲcɪ] 'long.adv':

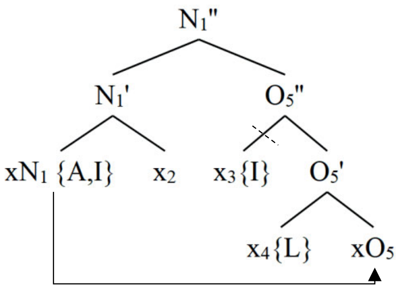
Similarly to West-Saxon and Sursilvan, in (34), the position x_3 annotated with the prime U or I becomes disintegrated and produces a glide. However, in Icelandic, not only does a glide emerge, but also the first portion of the diphthong becomes higher. This is possible due to the relationship that holds between the projection heads, xN_1 and xO_5, and in effect, the entire nuclear and onset projections. The form *löngum* [löyŋkʏm] might be a little more problematic since the glide is not back rounded. Gussmann (2011: 84) proposes that the mid central [y] should be represented by either I or I and U, which seems to go against the above proposal. What might be of importance here, however, is the fact that this glide emerges only when preceded by the mid central [ö], which is also represented by both I and U. A certain degree of interplay between the preceding nucleus and the following onset must be at play.

[14] Further analysis is necessary before any structural manipulations can be put forward, but my prediction is that the context enforces node removal which with the retention of melodic content is phonetically interpreted as a shorter contour entity.

(34) a. *langur* [lauŋkʏr] ‘long.ADJ’ (relevant part: [auŋ])



b. *lengi* [leiɲcɪ] ‘long.ADV’ (relevant part: [eiɲ])



7. Conclusions

In this paper, I explored short diphthongs occurring in West Saxon as well as present-day Sursilvan and Icelandic. The inter-head licensing is what seems to be responsible also for the West Saxon breaking. In this process, velar(ised) consonants require external support to sustain their melodic annotation. The said licensing renders onset projections partially reanalysed as belonging to the nucleus and the U-glide is produced. GP 2.0 can provide an explanation for short diphthongs by means of inter-head licensing. Another phenomenon that is accounted for by the particular positioning of melody within nuclear and onset projections is found in present-day Sursilvan. Namely, the falling diphthong [au] in Sursilvan bears a strong resemblance to short diphthongs in WS and its presence in closed syllables seems unusual. It occurs before the velarised liquid [l] followed by a coronal. The key difference is that the liquid does not cause diphthongisation when followed by labials or velars. The presence of the element U in the second consonant of the cluster supports the integrity of the preceding onset projection. Coronals, which do not contain the prime, are incapable of producing the same effect. In consequence, the inter-head licensing between the nucleus and the following onset contributes to the emergence of a glide. Some north Italian dialects use m-command to license the highest complement position annotated with the element U (in the velarised liquid), which renders the vowel mid-back. Additionally, they are long, since transgression contributes to vowel length. The resulting sequence of vocalic portions in a diphthong or m-command that holds between the nuclear head and the annotated complement do not affect the phonological length of nuclei, which structurally remain short, since the extra length of the monophthong and the second portion of the diphthong is lodged within the onset projection. This approach helps us explain why the diphthongs are considered short in West Saxon, and, in Sursilvan and north Italian varieties, they conform to the general requirement of the syllable being heavy in Italo-Romance languages (ruling out the possibility of super-heavy rhymes). The analyses of West-Saxon and Sursilvan data may contribute to our understanding of what Icelandic short diphthongs are. The emerging glide seems to result from the melody lodged within the projections in a licensing relation with the nucleus, but not the nuclear projection itself.

An additional issue addressed in this paper is the influence of the velar nasal on the preceding vowel [a] in Sursilvan and its comparison to WS. Diphthongisation in Sursilvan aligns the velar nasal with liquids, as the element U is annotated to the highest complement. The same mechanism, i.e. inter-head licensing, causes the emergence of a glide. In WS, however, this nasal does not differ from other nasals in its impact on the preceding vowel, which sets it apart from the velarised liquids and the voiceless velar fricative. The strict context of its occurrence, i.e. before a velar plosive, indicates that the projection that stands for the nasal is not annotated with any melody. On the contrary, its place of articulation is acquired from the following onset, because they remain in a close licensing relation.

In this paper, I advocate the idea that annotation to the head somewhat corresponds to the headedness of primes in standard GP. In the case of Old English and Sursilvan labials and velars, I adopted Backley’s (2011) approach, whereby labials are U-headed, while velars contain the non-head U. The differences between velar plosives and the voiceless velar fricative, velarised liquids in Old English as well as the velar nasal and velarised lateral in Sursilvan, and especially their distribution and phonological behaviour, cannot be properly accounted for by standard GP, even from Backley’s (2011) perspective. All the enumerated consonants, with the exception of the velar plosive, are capable of causing diphthongisation of the preceding front vowels. If velarisation is encoded by the non-head U, all of them should break the vowels. However, placing the annotation in the lower complement in a double-layered projection representing plosives provides a viable explanation for why breaking cannot occur before velar stops. The melody annotated to the non-head position which is not immediately under the maximal projection does not require further licensing (it is integrated with the head as its sister) and, moreover, it is separated from the preceding nucleus by a terminal node. Despite being represented by a double-layered projection as well, the velar nasal in Sursilvan has the element U annotated to the highest complement, because the prime L is lodged in the lower complement to encode nasality. In this manner, it is aligned with velarised liquids. In OE, on the other hand, this nasal is not specified with any melody, since it receives its velarity from the following onset that licenses it.

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