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## Contour structures in the vocalic system of Polish

ANNA BLOCH-ROZMEJ

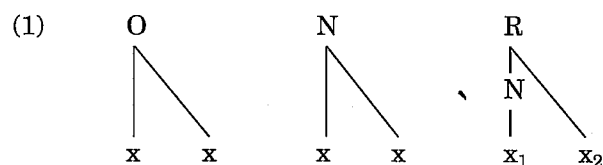
The aim of the following discussion is to analyse the problem of Polish nasal vowels with respect to the mechanism of phonological licensing and language-specific parameter settings. The theoretical framework adopted in this article is that of Government Phonology as proposed by Kaye, Lowenstamm, and Vergnaud (1985, 1990), Charette (1991) and Harris (1994). Using the tools provided by the government-based model we shall attempt to provide a phonological representation for these nasal vowels; we shall argue that their distribution is to a large extent conditioned by the specific structure that we propose. Previous analyses have tried to answer the question of whether nasal vowels actually exist as independent phonological units in Polish (e.g. Doroszewski 1963 or Laskowski 1975), or whether they should be viewed as sequences of vowels plus nasal segments (e.g. Biedrzycki 1963, Gussmann 1974, 1980, or Rubach 1984). The present analysis, however, identifies the nasal vowels as different from both other vowels and other vowel plus nasal sequences.<sup>1</sup> Specifically, we shall argue that they should be represented as contour (short diphthong) structures.

### 1. Theoretical background

Government Phonology is a representationally-oriented framework which assumes that phonological phenomena stem from a small series of universal principles and language-specific parameters. The relations of government defined as a binary asymmetric relation holding between adjacent positions can be established within syllabic constituents (constituent government), between constituents (interconstituent / transconstituent government), and between either nuclear or onset heads (projection government). Governing relations have to be strictly local and strictly directional at the level of both constituent and transconstituent government.

The model permits the existence of three syllabic constituents: the onset, nucleus and rhyme, all of which are maximally binary.

<sup>1</sup> One example of a non-linear approach to the nasal vowels which views them as distinct from oral vowels and vowel-consonant clusters is Bethin (1992). See also Bloch-Rozmej (1997a) for a different government-based analysis of Polish nasal vowels.



The domains of branching onsets and a branching nuclei are governing domains. Moreover, the rhymal complement position ( $x_2$ ) has to be governed by the following onset in accordance with the *Coda Licensing Principle* (Kaye 1990).

The primary determinant of a segment's ability to occupy a particular position of government is its complexity, which is calculable in terms of a number of elements that define it. Elements are fully specified at all stages of the derivation. Within a segment one element functions as the head while the others have a dependent status. A segment occupying a governing position may not be less complex than a governed one (Harris 1990).

In the sections which follow we shall try to consider the issue of Polish nasal vowels within the framework of phonological government.

## 2. The data

Polish has two mid nasal vowels spelled "ę" and "ą" in the phonetic literature, which are described as asynchronic or polysegmental (Dukiewicz 1968, Jassem 1973). They are realised as sequences of "an oral vocalic part analogous to [e] or [o] respectively and a segment, or segments" (Bethin 1992:56). The nasal vowels [eŋ] and [oŋ] appear as diphthongs only before continuants and word-finally (2a), while before non-continuant consonants we find sequences of oral vowels and homorganic nasal segments (2b).

(2) a.	[keŋs]	kęs	'bite'	[ideŋ]	idę	'I go'
	[voŋ]	wąż	'snake'	[mojoŋ]	moją	'my'
	[veŋχ]	węch	'smell'	[soŋ]	są	'they are'

b.	[domp]	dąb	'oak'
	[reŋka]	ręka	'hand'
	[kšeŋga]	księga	'book'

It is also noteworthy that no nasal vowels occur before [l, r, w, j]. Nor can any homorganic nasal-consonant clusters be found in this context. Consider the words in (3) below.

(3)	[dońć]		[dow] / [deli]	
	dać	'blew'	dał / deli	'he blew / they blew'
	[zasneŋ]		[zasneli]	
	zasnę	'I'll fall asleep'	zasnęli	'they fell asleep'

Moreover, nasal vowels in Polish are not found in word-initial position. This fact might imply that the nasal vowels do not exist as phonological nuclear segments, but are due to the interpretation of another, more complex structure which yields the phonetic units [eŋ] and [oŋ]. Yet, it should be noted that the nasal vowels display certain unique properties which distinguish them from both oral nuclei and vowel-nasal clusters. Specifically, Bethin (1992:57) points out that "they are peculiar in that they sometimes function as units and at other times as sequences of a vowel plus a nasal segment". For instance, in the morphology of certain verb forms the nasal vowels alternate with zero, thus displaying their unitary nature. Interestingly, in the infinitive they are realised as vowel-consonant clusters. Consider the examples in (4).<sup>2</sup>

(4)	/kop+ną+ć/	[kopnońć]	/kop+ną+e/	[kopnie]
	kopnąć	'kick, inf.'	kopnie	'kick, 3sg. fut.'
	/prag+ną+ć/	[pragnońć]	/prag+ną+e/	[pragnie]
	pragnąć	'desire, inf.'	pragnie	'desire, 3sg.'

Furthermore, the nasal portion of a nasal vowel is always homorganic with the neighbouring stop (Bethin 1992:56). In fact, it is only in this context that such sequences occur. On the other hand, when a fully specified nasal consonant follows an oral vowel, it may not be homorganic with the stop. Compare the words in (5a) and (5b) depicting the behaviour of nasal vowels and nasal consonants before plosive segments respectively.<sup>3</sup>

(5) a.	[domp]	dąb	'oak'	b.	[swomka]	słomka	'straw'
	[lont]	łąd	'land'		[χańba]	hańba	'shame'
	[reŋka]	ręka	'hand'		[kumkać]	kumkać	'croak'
	[tenča]	tęcza	'rainbow'		[mgwa]	mgła	'mist'
					[swonko]	słonko	'sun, dim.'

The table in (6) below summarises the evidence concerning the distribution of nasal vowels in Polish.

(6)	__[l, r, w, j]	__[continuant]	__#	__[stop]
	[vzow]	[vzowf]i	[vezmew]	[vzońć]
	wziął	wziąwszy	wezmę	wziąć 'take'

<sup>2</sup> The examples and their morphological division have been taken from Bethin (1992).

<sup>3</sup> The nasal-consonant sequences in (5b) are not true clusters, i.e. they are not immediately adjacent on the skeletal tier. This fact may account for the lack of homorganicity. However, any closer examination of these consonant groups lies beyond the scope of this article and, consequently, will not be attempted here.

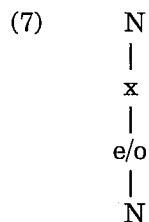
[kleli]	[klow̃f[i ]]	[kłońć]	
kleli	kławszy	kłać	'curse'
	[prew̃zić]	[prenga]	
	preżyć	prega	'to stiffen/a wale'

Thus, the nasal vowels can be found before continuants and in word-final position. When preceding stop consonants they are realised as vowel-nasal sequences, whereas before [l, r, w, j] no such expressions occur. Neither are the nasal vowels attested in word-initial position.

### 3. The nasal vowels and the theory of government

#### 3.1. The hypotheses

In this part we shall try to work out a phonological structure for the nasal vowels by considering some ways of representing them that are available within the framework of Government Phonology. One approach to these expressions is to treat them as having the same underlying structure as their oral counterparts i.e. a segment associated with a single nuclear slot. The difference between the nasal vowels and the oral ones would then consist in the presence of the nasal element (N) in the former and its absence in the latter. This possibility is depicted in (7) below.

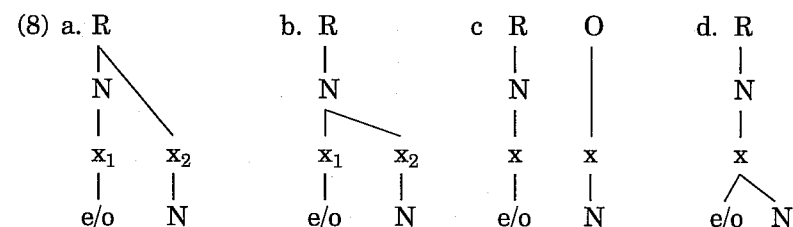


Admittedly, given the above structure we could account for the occurrence of the nasal vowels word-finally and before spirants. Unfortunately, the absence of such expressions before [l, r, w, j], as in [vzeli] *wzieli* or [dow] *dął*, would remain unexplained. As the vowel preceding these consonants is oral we would predict that the nasal element must have been delinked due to the influence of the following segment. However, the *Minimality Condition* would prevent an onset from penetrating the preceding nucleus.<sup>4</sup>

<sup>4</sup> According to one clause of the *Minimality Condition*, first proposed by Chomsky (1986) for syntax and applied to phonology in Charette (1989), "a position  $\alpha$  is prevented from governing a position  $\beta$ , if the immediate projection of  $\beta$ 's head excludes  $\alpha$ " (see also Harris 1994:170).

Similarly, the appearance of nasal stops before homorganic obstruent plosives would present a problem for the structure in (7). It seems that it is not an onset segment which is responsible for the decomposition of the nuclear expression. The decisive argument against the above representation is the absence of the nasal vowels in word-initial position. If the nasal vowels were independent phonological units, they should not be restricted in terms of their distribution. It has to be borne in mind that oral vocalic expressions can be found in all positions within a domain.<sup>5</sup>

Let us now look at a different analysis of the underlying structure of the nasal vowels, which assumes them to be combinations of oral nuclei and fully specified nasal segments. The various structural configurations expressing this possibility are illustrated below.



As depicted above, four main structures are available here: the nasal segment may be located in the rhymal complement position  $x_2$  (8a), it may be dominated by the following onset (8c), it may be part of the nucleus, where it is a nuclear complement  $x_2$  (8b), or it may belong to the nuclear contour segment (8d). The first representation allows us to account for the place assimilations between the nasal and the following non-continuant consonant, which are due to the governing relation holding between the rhymal complement and the adjacent onset positions. Within the model of Government Phonology, however, this structure could not be a representation of [e $\bar{w}$ ] and [o $\bar{w}$ ] in word-final position. Specifically, it would violate the *Coda Licensing Principle* which requires that the rhymal complement position be universally governed by the following onset (Kaye 1990). Even if we ignore this theory-internal argument against this structure we still have to explain why and how this vowel-nasal sequence is transformed into a nuclear nasal segment. Put differently, we need to find a way of "moving" the nasal element into the nuclear segment and "getting rid of" any other primes constituting the nasal stop.<sup>6</sup> Within our theoretical framework, segment lenition is likely to occur either in the governed position or one intervening within a governing domain. Unfortunately, neither possibility exists in (8a).

<sup>5</sup> Only the nasal vowels and [i] are barred from occurring in word-initial position.

<sup>6</sup> A fully-specified nasal sonorant would be made up of the elements (primes) of nasality (N), occlusion (?) and a place defining element, e.g. coronality (A) or labiality (U). The loss of any prime constituting a segment would imply the decomposition/reduction of this segment.

Considering the structure in (8b), in turn, we have to disqualify it on account of the fact that it represents a branching nucleus and Polish lacks underlying distinctions in vowel length. In the case of the third representation in (8c), the emergence of the nasal vowel could only be due to the lenition of the nasal segment, i.e. the delinking of the elements for place and stopness. This delinking would enable us to phonetically interpret the relevant nucleus-onset sequence, with the onset dominating just the nasal element, as a nasal vowel. However, if we attribute the emergence of the nasal vowels to the reduction of the onset nasal we are unable to account for their occurrence in word-final position, for instance. It has to be borne in mind that Polish has a great number of words terminating in a single nasal consonant where no nasal reduction takes place. Consider examples like [dom] *dom* 'house' or [on] *on* 'he' which are never realised as \*[dow̃] or \*[ow̃] respectively. Likewise, for word-medial position, with the structure in (8c) we would run into the problem of accounting for the occurrence of the nasal vowels before continuants and for the place assimilations between the nasal segment and the following stop. Drawing on the theoretical assumption that the relation of government is the driving-force behind phonological processes we would have to propose that the onset nasal and the following consonant constitute an interonset governing domain.<sup>7</sup> Since it is the nasal segment that undergoes modifications, e.g. reduction before continuants as in [kew̃s] *kęs* 'bite', it would have to find itself in the governed position.<sup>8</sup> Unfortunately, the direction of interonset government in Polish is from left-to-right and not vice versa, which basically proves that the interonset solution is incapable of accounting for the evidence.<sup>9</sup>

We have just presented a number of arguments which invalidate the representations in (8a), (8b) and (8c) as possible underlying structures for nasal vowels in Polish. In the following section we shall discuss in more detail the configuration depicted in (8d) and argue that this structure captures the distributional properties of the nasal vowels in the most satisfactory manner.

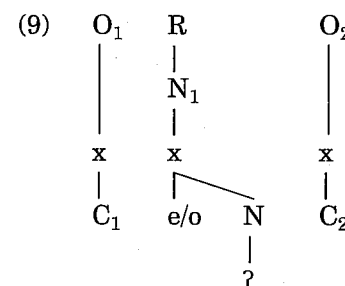
### 3.2. Contour structures in Polish

The representation of a nasal vowel should account for the relationship that exists between the "nasal part" of the nasal vowel and the following onset (e.g. the occurrence of homorganic nasal-consonant clusters) as well as making it clear why the nasal vowels do not appear word-initially but do occur word-finally. Bearing this in mind, let us consider the following structure.

<sup>7</sup> Interonset government is a kind of projection government holding between onset heads.

<sup>8</sup> With reference to this Harris (1990:289) points out that "segments which discharge governing responsibilities are immune to processes whose effect is to reduce complexity".

<sup>9</sup> For discussion of this issue, see Gussmann and Kaye (1993) as well as Cyran and Gussmann (in press).



The above representation assumes that the nuclear segment N<sub>1</sub> is a contour structure in which one skeletal point dominates both the vocalic elements and those constituting the nasal stop. Phonetically, this structure will be interpreted as a short nasal diphthong [e $\bar{w}$ ] or [o $\bar{w}$ ]. We shall further propose that due to a Polish-specific constraint this diphthongal expression has to undergo simplification, which would be attained through the delinking of the nasal stop from the nuclear slot. The existence of such a requirement would be compatible with a bar on the occurrence of branching nuclear structures in Polish. In other words, Polish tends to eliminate all sorts of complexity from nuclei. The kind of restructuring just mentioned should be regarded as a historical phenomenon whose effects have not yet been carried through to the end in the phonological system of Polish. This intuition is supported by the fact that there is a certain optionality in the use of the nasal vowels. Generally speaking, the use of the nasal vowels is severely restricted. Nonetheless, there are still many people who would employ the nasal vowels both word-finally and medially regardless of what consonant follows.<sup>10</sup> The constraint suggested above can account for the increasing preference for employing oral vowels in word-final position. For instance, the verb *będe* 'I'll be' is frequently realised as [bende]. In sum: the operation of the simplifying constraint may be parameterised, for some speakers it will be set in ON and for others in OFF.

Given the structure in (9) we are able to account for the occurrence of nasal vowels in word-final position in a straightforward manner. For speakers who preserve the nasal vowel at the end of words this expression will have the phonological structure of a contour segment. For those who employ the oral counterpart the short diphthong simplification must take place.

Word-medially, the elements of the parametrically delinked nasal stop will seek to manifest themselves through attachment to the Rhyme constituent, more precisely, to the rhymal complement point. A "coda" position, in turn, will be automatically created if such a manifestation is possible.<sup>11</sup> What seems vital at this stage is that the coda point should be created simultaneously to the setting

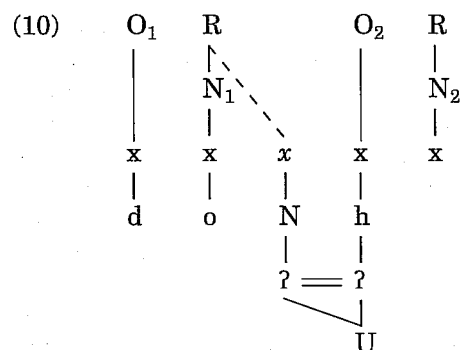
<sup>10</sup> For example the word like *będe* 'I will be' would be pronounced [bewdew̃]. Generally, this kind of pronunciation is regarded as hypercorrect.

<sup>11</sup> The automatic creation of a skeletal position is clearly allowed by this model and this possibility is exploited in various languages (e.g. Harris 1994:248).

of the string positions at the P<sup>0</sup> projection where the relations of constituent and transconstituent government are established. In this way we avoid a violation of the *Projection Principle* which requires that "governing relations be defined at the level of lexical representation and remain constant throughout a phonological derivation" (Kaye 1990:221).

The emergence of the rhymal complement position, and consequently, the licensing of the nasal and/or stop elements will depend on the nature of the following onset. The coda point will appear provided the conditions on transconstituent government are satisfied. The primary prerequisite to be fulfilled by any two potential members of a transconstituent domain is the *Complexity Condition*, under which the governor may not be less complex than the governee (Harris 1994:170).

Bearing in mind the above observations, let us examine the occurrence of nasal segments before homorganic plosive consonants in Polish. This phenomenon is characteristic of such words as those listed in (5a). Consider the representation of [domp] *dqb* 'oak'.

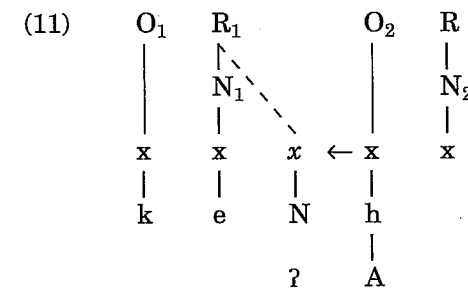


The structure depicted above shows that a rhymal complement position can be created because the bilabial plosive which is composed of three elements constitutes an appropriate transconstituent governor for the nasal stop. The segment [p] can freely perform the function of the onset governor since the required complexity slope for the coda-onset relation is respected. Consequently, the coda point licenses the nasal and occlusion elements, whereas the onset supplies the place element (U) which is interpreted over the whole coda-onset governing domain. As a result, a homorganic [mp] cluster is created.

A somewhat different situation arises when the delinked nasal stop is followed by a fricative segment which lacks the stop element in its internal make-up. The availability of the occlusion element in the governing onset seems to be indeed crucial for the emergence of homorganic nasal-obstruent clusters. It has to be recalled that before continuants only nasal vowels and not nasal stops are found (e.g. see (2)). The importance of the element (?) hinges on the fact that no nasal stops are ever realised, even before voiced fricatives, which may contain three elements, e.g. before [z] which is defined by the elements (A) = (coronality),

(h) = (noise) and (L) = (low tone). Since in such contexts the complexity gradient would obtain for the governing continuant and its potential nasal governee, the inability of realising the stop element should be attributed to the absence of (?) from the composition of the fricative. It seems, therefore, that in order to be manifested, the occlusion element needs support from another stop prime in the governing position. In this sense we can speak of a kind of stop-bridge within the governing domain contracted by the onset and the preceding coda point. In other words, an occlusion element can be licensed by the governed position only if it forms a stop bridge with the relevant element which is specified in the segment linked to the governor's point. If this were the case for Polish, it would resemble Irish, where similar types of relations have been attested. For example Cyran (1997) proposes the existence of an A-bridge in Munster Irish between nuclear segments involved in a licensing relation. There the presence of the element (A) in the licensed position makes it possible for the licenser's point to sustain A.<sup>12</sup> On the other hand, in Connemara Irish an element bridge can be contracted by occlusion primes specified in segments whose skeletal positions form an interonset governing domain.<sup>13</sup>

Returning to the occurrence of nasal vowels before continuants, let us consider the example of [kews] *kəs* 'bite'.



As depicted in (11), only the nasal element can be licensed by the coda position when the onset segment to its right is composed of two elements. The occlusion element remains unattached and hence unrealised phonetically. The phonetic interpretation of R<sub>1</sub> is a nasal vowel. The coda's inability to license the stop element derives not only from the necessity to preserve the complexity slope between the governor and governee but, primarily, from the absence of stop bridging between the potential nasal plosive and the following [s]. It is interesting that even in borrowings Polish tends to simplify nasal-fricative clusters.<sup>14</sup> Consider the examples below.

<sup>12</sup> This is just a very rough approximation of what happens there. See Cyran (1997:57) for a detailed analysis of this phenomenon.

<sup>13</sup> The existence of stop-bridging in Connemara Irish was proposed in Bloch-Rozmej (1997b).

<sup>14</sup> There is also the possibility of pronouncing a full nasal-fricative sequence in the examples given in (12), e.g. [informacja].

- (12) [ã<sup>(u)</sup>fora]      amfora      'amphora'  
 [fã<sup>(u)</sup>sa]        szansa      'chance'  
 [avã<sup>(u)</sup>s]        awans      'promotion'  
 [ĩ<sup>(u)</sup>formacja]    informacja 'information'

It seems that the forms where the nasal vowels occur have been adjusted to the phonological system of Polish by imposing the requirement of stop bridging in a coda-onset domain where the coda is occupied by a nasal stop. The occurrence of nasal-stop clusters in such loan words as those listed in (13) appears to support our bridging hypothesis.

- (13) [emp'irja]      empiria      'empiricism'  
 [amb'icja]        ambicja      'ambition'  
 [baŋknot]        banknot      'banknote'

We would like to argue that these words are treated by Polish as having a structure analogous to [domp] *dqb* 'oak' or [lont] *lqd* 'land', i.e. one in which the coda position dominating the nasal will be able to license the occlusion element thanks to the existence of stop-bridging between the nasal and the plosive.

Finally, we have to account for the absence of nasal vowels or nasal-consonant clusters in words like [dow] *dqt* 'he blew'. It will be maintained that in the context of a following liquid or glide no rhymal complement point will emerge, as no transconstituent government is possible between the nasal stop and the following onset segment. We demonstrate this configuration in (14) below.

- (14) O<sub>1</sub>    R<sub>1</sub>                    O<sub>2</sub>    R
- |   |                |   |   |                |
|---|----------------|---|---|----------------|
|   |                |   |   |                |
|   | N <sub>1</sub> |   |   | N <sub>2</sub> |
|   |                |   |   |                |
| x | x              |   | x | x              |
|   |                | ≠ |   |                |
| d | o              | N | U |                |
|   |                |   |   |                |
|   |                | ? |   |                |

The structure in (14) shows that neither the nasal nor the stop element can be realised phonetically, this state of affairs being due to the lack of a rhymal complement position to which they could be linked. The coda point, in turn, cannot be created because the nasal stop and the following monoelemental [w] are not potential members of a well-formed transconstituent governing domain. Even if the potential coda licensed just one element no cline in complexity between the governing onset segment (O<sub>2</sub>) and the (hypothetical) preceding rhymal complement expression would be observed. In conclusion, the inability to realise the elements (N) and (?) follows directly from the internal structure of Polish liquids and glides as single-element segments. Hence, no nasal vowels or homorganic

clusters are allowed to arise before [l, w, r, j]. We have assigned [l] to this group even though in many government-based analyses it has been represented as composed of two elements: (A), i.e. "coronality" and occlusion (e.g. in Harris 1994:171).<sup>15</sup> Its behaviour with respect to the nasal vowels makes it similar to [w, j] and [r]. We would like to propose that these segments are alike in the sense of being monoelemental.<sup>16</sup> One argument supporting such an intuition would be the absence of true [rl] clusters in native Polish words.<sup>17</sup> We could stipulate that such transconstituent domains would be a breach of the required complexity profile between the governor ([l]) and the governee ([r]). Frequent substitutions of [l] for [r] made by children in the process of language acquisition also appear to support our prediction. At this stage, however, the proposal concerning the complexity of [l] has to be treated as a stipulation calling for further investigation.

In conclusion, we have argued that the elements of the parametrically delinked nasal stop can be manifested only through association to the rhymal complement position whose emergence, in turn, is contingent on the nature of the following onset segment. Specifically, the coda point will be created should the nasal stop and the onset segment constitute a well-formed transconstituent governing domain. If the onset dominates an obstruent plosive or fricative such a relation can be established. Then the coda position licenses the elements (N) and (?) or just nasality respectively. Before onset fricatives the occlusion element will fail to be licensed even if the complexity gradient is observed, this being due to the lack of stop bridging between the nasal stop and the fricative segment. The absence of the required complexity slope between the delinked nasal stop and the following liquid or glide makes it impossible for the coda point to be created, and hence the preceding vowel remains oral.

### 3.2.1. Nasal vowels and the notion of headedness

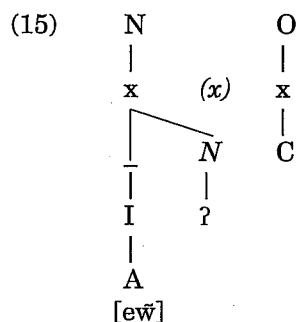
Turning now to word-initial position, we need to remark that within the theory of Government Phonology certain sequences are barred from occupying this site. Specifically, a sequence of an empty onset followed by an empty rhyme is ruled out. In many languages there are specific parameters which prohibit the occurrence of certain segments word-initially. In Polish we find the nasal vowels ex-

<sup>15</sup> Harris (1994) uses the element (R) to define the coronality of segments. The present analysis follows Broadbent (1991) and Cyran (1997) in dispensing with (R) and employing the element (A) to specify the coronal place of articulation.

<sup>16</sup> At this stage we are not able to decide which element should define the coronal liquid [l] in Polish. It may be the case that the same element (A) can specify both [l] and [r], but in one of them it will occupy the head position and in the other that of the operator (see Ritter 1996). Government Phonology recognises the possibility of a segment being empty-headed, i.e. having no active element in the head position.

<sup>17</sup> We speak of true clusters when their members are immediately adjacent on the skeletal tier.

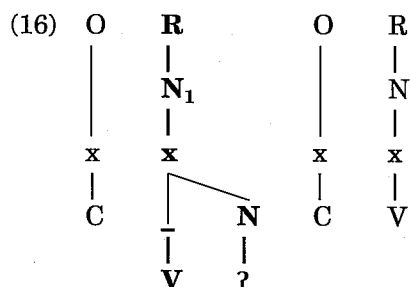
hibiting the same behaviour as the vowel [i]. There are no words in Polish which begin with [i]. The restriction on the distribution of [i] and the nasal vowels cannot be accidental. Rather it should be attributed to some Polish-specific parameter. Notice that [i] can freely occupy this position, the difference between [i] and [ĩ] consisting in the headlessness of the former and I-headedness of the latter. It appears that Polish does not allow a sequence of two empty-headed positions domain-initially (i.e. the onset is empty and the following nucleus is empty too). In some way an empty onset position requires the support of a segmentally complex headed nucleus, i.e. a stronger licenser. In other words, in the phonological system of Polish a sequence of an empty onset and an empty-headed nucleus is just as offensive as that of two empty positions (i.e. two constituents whose skeletal positions dominate no segmental material). If the above line of reasoning is correct, we can attribute the non-occurrence of nasal vowels in word-initial position to their being empty-headed.



The nasal vowels would be liable to the same restriction as the lax vowel [ɪ]. Specifically, they would be allowed to occur only after an onset dominating some segmental material.

#### 4. Conclusion

In this article we have considered the problem of the nasal vowels in Polish and proposed the following phonological representation for these expressions.



We have argued that this contour structure has undergone historical restructuring due to which the nasal "portion" (i.e. (N) and (?)) of the nasal vowel) has been parametrically delinked from the nuclear position. Synchronically, the nasal stop is part of a string of melodies which are associated to their skeletal positions once the governing relations have been established. Since both formal and substantive conditions have to be satisfied for a governing domain to be contracted, there exists a possibility that the elements (N) and (?) will not be licensed by any position and hence remain unrealised phonetically. We have demonstrated that this happens before [l, w, r, j]. The number of the elements licensed to attach to the rhymal complement position depends on the complexity of the governing segment, universal constraints concerning the "coda" position, and the relation of stop-bridging involving segments which constitute a governing domain. Hence only the nasal element can be licensed by the coda before fricatives, whereas before obstruent plosives a full nasal segment is found. By leaving the nuclear head position empty and proposing a parameter which prohibits any sequence of an empty onset followed by an empty-headed nucleus we explained the inability of the nasal vowels to occur in word-initial position.

In this article we have tried to account for the unusual distribution of the nasal vowels and their instability in the phonological system of Polish. We hope that by representing them as contour structures we have managed to produce a satisfactory result.

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## The vowel that cannot be long: the story of the Welsh central vowel [ə]\*

ANITA BUCZEK

The aim of this paper is to discuss the role and nature of the central vowel [ə] in the Welsh language. This vowel can be shown to be sometimes present lexically while in other cases it is the realisation of an underlying unlicensed empty nucleus. The distribution of this vocalic segment is somewhat restricted. It can occur both in stressed or unstressed syllables, (provided they are not word-final), and is always short. Schwa is also the outcome of a well attested alternation termed Vowel Mutation, where it can be shown to derive from a number of sources which are of considerable importance for the phonological representation of the schwa vowel in this particular system.

I would like to address two issues concerning the somewhat unexpected and irregular behaviour of this segment, namely why it occurs sometimes in final syllables while generally it is confined to non-final syllables, and why this vowel appears word initially in front of certain heavy consonantal clusters. I employ the principles of Government Phonology as first formulated in, for example, Kaye, Lowenstamm, and Vergnaud (1990), Charette (1991) and Harris (1994). In this model vowels are represented by elements (A), (U), (I) and ( ). Although the function of the headless expression ( ) in GP is still a matter for debate, in that it is not assumed by everybody to have the status of an element (see, e.g. Backley and Takahashi, Charette and Göksel, and Cyran and Nilsson, this volume), I will demonstrate that it is actually necessary to treat it as an element if we are to describe the Welsh system properly.

### 1. The facts

To be able to answer the question why the central vowel is never long in Welsh, it has to be determined what this segment is made up of in terms of phonological elements. To establish this, the facts concerning the vocalic system of Welsh have to be examined.

If we look at the phonetic evidence we see that there are eleven vocalic segments in the southern dialect of Welsh.

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