Linguistica Silesiana 35, 2014
ISSN 0208-4228

ANITA BUCZEK-ZAWIŁA
Pedagogical University of Cracow

NASALS AS RADIAL CATEGORIES IN POLISH AND WELSH: AN ATTEMPT AT COMPARISON

Nasal consonants feature in phonological systems of both Polish and Welsh, yet, apparently, they are active in a different manner and to a different degree. The paper aims first at establishing the 'players' – the prototypical segments and their non-prototypical variants. The relevant inventories seem to be comparable, however, the contextually and non-contextually dependent realizations vary considerably in the two systems. Polish nasal consonants do not appear to have terribly complex phonology, their occurrence and phonotactics seems to be dictated through use (Bybee, 2001). Nasal segments in Welsh, on the other hand, are actively involved in the alternation of Initial Consonant Mutation, where they occur as strengthened equivalents of plosives through (possibly) assimilation (Buczek, 1995). It remains to be discovered whether nasals in general (and the so-called voiceless nasals in particular) are independent categories or rather, additionally they feature as non-prototypical variants of plosives. There is, indeed, substantial overlap here. Secondly, the paper looks at certain instances of what appears to be sonorant lenition in Welsh, where nasals [m] and [n] are broken into complex consonantal diphthongs [mh] and [nh] respectively (Pilch, 1975). In its entirety, this paper examines the two systems, hinting at the similarities and exploring the points of difference, especially in cases where the similar phonetic realizations possibly result from different categorical membership.

1. Introduction

The property of 'nasality' is encountered in a number of phonological systems, Polish, English and Welsh among them. Investigations into the realization of nasality, its status and behaviour in English and Polish have been performed before by numerous scholars, also in the contrastive tradition (see, among others, Gussmann 1974). Individual descriptions of nasal segments are available, however, no attempt so far has been made to compare and contrast the phonology of nasals in Polish and Welsh. While such a juxtaposition may

appear strange at first sight, one quickly realizes that these two languages have come into contact since the Polish accession to the European Union and due to a substantial Polish *émigré* community (especially) in north Wales. Thus, there is ground to suspect and expect contact situations to occur, with the potential development of applied phonological contrastive analysis. It has to be underlined that the paper is a preliminary attempt at such a comparison, with attention and focus limited to consonantal segments only.

Nasal consonants feature in phonological systems of both Polish and Welsh, yet, apparently, they are active in a different manner and to a different degree. The paper aims first of all at establishing the 'players' – the prototypical segments and their non-prototypical variants. The relevant inventories seem to be comparable, however, the contextually and non-contextually dependent realizations vary considerably in the two systems. Fisiak (1975) explains that to contrast the selected phonological systems, in other words, to state "the identities and differences between a given pair of languages" (Fisiak 1975: 345) typically the techniques of phonological translation is applied. "It allows us to determine which elements are equivalent in any two languages and which are different" (ibidem). Thus, it is imperative to begin with stating the phonetic facts pertaining to the nasal consonants in both systems, their inventories, distribution and, where relevant, phonotactics. It needs to be added, though, that no formal rule-comparisons are going to be performed and no theoretical explanations are aimed at.

2. Phonetic facts

Nasal sounds are (phonetically) those which are articulated with a lowered soft palate, allowing the air to escape through the nose as well as through the mouth. The most conspicuous difference between the phonological systems of Polish and Welsh is in the phonetic inventory of their nasal segments.

2.1. The nasal consonantal segments of Polish

Polish is usually said to have three independent nasal consonants: bilabial and dental, as well as the palatal, that is [m, n] and [ɲ] respectively (Ostaszewska & Tambor 2010: 117–120), as exemplified in the words *s̲mażyć* [s̲maʒɨtɕ] 'fry', *n̲asz* [n̲aʃ] 'our', *Niagara* [n̲agara]. Alternatively, it is claimed (Dukiewicz & Sawicka 1995: 131) that the phonological system of Polish comprises four separate consonantal nasal phonemes, counting the velar [ŋ] as an independent unit which arose through breaking of nasal vocalic segments into /VN/ sequences. In addition, Polish is claimed to possess nasal glides: the apparently phonemic (according to Ostaszewska & Tambor 2010) [w̃] as in *wąs* [vɔ̃w̃s] 'moustache' and a palatal nasal glide [j̃] – a non-occluded variant of [n̲]. Each of these segments has positional variants (Ostaszewska & Tambor 2010; Klebanowska 2007). The situation is illustrated in (1) below:

(1) a. the bilabial [m] – main variant
the positional variants:
- the palatalized [mʲ] as in *mizerny* [mʲ izɛrnɨ] ‘sickly, poor’
- the devoiced [m̥] as in *pasm* [pasm̥] ‘streaks, gen.pl’
- the labio-dental variant [ɱ] as in *emfaza* [ɛɱfaza] ‘emphasis’

b. the dental [n] – main variant
the positional variants:
- voiced alveolar [n̪] as in *męczyć* [mɛn̪ʧɨtɕ] ‘to torment’
- devoiced dental [n̪] as in *piosnka* [p’josn̪ka] ‘song’
- half-palatalized, postdental as in *pan Igor* [panʲ igor]
- the labio-dental variant [ɱ] as in *informacja* [iɱformacja] ‘information’
- the velar nasal [ŋ] in sandhi contexts as in *ten kot* [tɛŋ kot] ‘this cat’

c. the pre-palatal [ɲ] – the main variant
the positional variants:
- the devoiced [ɲ̥] as in *pleśń* [plɛɕ ɲ̥] ‘mould’
- voiced prepalatal nasal glide [j̃] as in *tańszy* [taj̃ʃɨ] ‘cheaper’

d. the velar nasal [ŋ] as in *tango* [taŋgo]– main variant

the positional variants:
- the back nasal glide [w̃] as in *wąs* [vɔ̃w̃s] ‘moustache’
- the devoiced velar nasal [ŋ̊] as in *piosnka* [p’josŋ̊ka] ‘song’ (Kraków-Poznań speech)
- advanced postpalatal nasal [ŋʲ] as in *ringi* [riŋʲgi] ‘rings’

As for the distribution of the segments, the bilabial nasal [m] occurs initially, medially and finally. When in the domain final position it may be devoiced after a voiceless obstruent. Before a following labio-dental consonant it is articulated in a likewise fashion. The palatalized variant [mʲ] can never appear before the high central vowel [ɨ], it is found in word initial and medial positions before a vowel, never before a consonant.

The main variant of [n] is dental in Polish, again showing up in initial, medial and final positions. It can be partially devoiced after a voiceless consonant and before a labio-dental segment it is articulated as [ɱ], as in *informacja* [iɱformacja] ‘information’, thus overlapping with the variant of [m]. It is also sensitive to the following high front vowel, which half palatalizes it as in *panislamski* [pan’ islamski] ‘pan-Islamic’. In sandhi words, in colloquial speech with some speakers[1] it assimilates to the velar nasal [ŋ]

[1] These would typically be speakers of the Kraków-Poznań speech, where [ŋ] has the widest distribution, although with the younger generation of speakers it is gradually disappearing from certain characteristic contexts if not from the phonetic inventory.

The pre-palatal nasal [ɲ] occurs in all positions as long as it is not followed by the front retracted [i̟]. The segment gets partially devoiced word-finally when following a voiceless obstruent as in *pieśń* 'song' or *baśń* 'fairy tale'. It is pronounced as a nasal semi-vowel [j̃] in the pre-spirantal position, regardless of the voicing state of the fricative.

The other nasal segment – the back high nasal glide [w̃] is the articulatory 'cousin' of the velar nasal sonorant [ŋ] which is back and high itself and, additionally, it is never found on its own in the system but is followed by a velar obstruent. The nasal semi-vowel occurs typically as part of the so-called nasal diphthongs in Polish, pre-spirantally as in *sens* [sɛ̃w̃s] 'sense' and also in the word-final position as in *dobrą* [dobrõw̃] 'good, acc.sg.'. As mentioned by Dukiewicz & Sawicka (1995: 134–135), the non-occluded glide [w̃] is best treated on parallel with other such variants of nasal phonemes in Polish, thus contributing to the symmetry of the system. Other Polish phonologists have opted for a different treatment of the glide, granting a phonemic status to it and treating instances of phonetic [ŋ], [n̪] and [ŋʲ] as positional variants of the back nasal glide. The argument is based on distributional grounds: the respective variants are conditioned by the presence of a following velar plosive (both in Standard Polish and in the so-called Kraków-Poznań speech) whereas no other nasal segment is possible in this context. The distribution is thus heavily constrained and dialectally dependant. Also, one observes the obvious phonetic similarity between the glide and the velars. The decisive factor, however, appears to be the need to preserve the logical symmetry in the phonemic inventory of nasal segments in Polish, therefore we choose to follow the pattern defined in Dukiewicz and Sawicka (1995), where the glides are granted the status of variants, not the central segment.

As can be seen from the above survey of the Polish situation, the three main nasal phonemes appear freely in the system, the problematic velar nasal is much more restricted. All of them have variants which result mostly from assimilatory phonetic processes. Unlike in English, in Standard Polish they are never syllabic[2] but may be geminated (*rana – ranna; gama – gamma*).

Polish nasal consonants do not appear to have terribly complex phonology, their occurrence and phonotactics seems to be dictated through the context and use (Bybee 2004), as if appropriate schemas have been worked out through regular repeated occurrences.

2.2. Nasal consonants in Welsh

Nasal segments in Welsh, on the other hand, are actively involved in the alternation of Initial Consonant Mutation, where they occur as strengthened equivalents of plosives through (possibly) assimilation to preceding nasal element

---

[2] See, however, the examples of a syllabic [m] in dialectal pronunciation (Silesian Polish) in Porzuczek (1994).

(Buczek 1995). Technically, the Welsh inventory of nasals contains three main segments with three contrastive places of articulation, as listed in (2):

(2) the bilabial [m], as in *maint* [maint] ‘size’;
the alveolar [n] as in *nos* [nos] ‘night’
the velar [ŋ] as in *llong* [ɬɔŋ] ‘ship’.

Jones (1984: 50) points out that traditionally two series of nasal consonants are distinguished: the voiced [m, n, ŋ] and the so-called voiceless ones [m̥, n̥ ŋ̊]. The bilabial and alveolar nasals can be partially devoiced by a preceding voiceless obstruent as in *cnaif* [kn̥aiv] ‘a shearing’, or *smala* [sm̥ala] ‘droll’. The alveolar [n] is sensitive to the following consonant, assimilating the place of articulation to [m] before bilabial consonants and to [ŋ] before velars, also across word boundary, as in *ugain munud* [igɛm̲ mɪnɪd] ‘twenty minutes’ (but *ugain afal* [igɛn aval] ‘twenty apples]); *mewn cwdyn* [mɛuŋ̲ kudɪn] ‘in a bag’ (but *mewn eglwys* [mɛun ɛgluis] ‘in a church’). Like in Polish (or English, for that matter) [m] and [n] assume the labio-dental place of articulation when followed by labio-dental segments as in *cam-farnu* [kaɱvarnɪ] ‘misjudge’. As Ball and Williams (2001: 52) point out, “a cluster of two word-final alveolars may also be affected by assimilation, causing change to both elements of the cluster”, where the first one is a nasal (*plant bach* [plamp bɑχ] ‘little children’). The alveolar nasal in place names beginning with the element *Llan-* is particularly prone to change in the place of articulation assimilating it to the value of this property in the following segment (*Llanbedr* [ɬambɛd]; *Llangefni* [ɬaŋgɛvni]). In citation forms the bilabial and the alveolar nasals appear in all positions in the word, whereas the velar nasal occurs medially, in syllable final position and word finally. It is possible word-initially in secondary mutated forms as an alternant of [g], the voiced velar stop.

A brief note relating to the characteristic typological feature of Celtic languages – initial consonant mutations – seems to be in place. As explained by Griffen (1997: 353): “the mutation system of Welsh is a system of initial consonant gradation motivated by what are now grammatical considerations (originally these developed from phonological environment) […] (T)he radical at the beginning of a word can be seen to change to its appropriate mutation form within a specific grammatical environment”. The significance and the pervasive nature of these changes in Modern Welsh have been extensively commented upon, similarly, the syntactic and morphological contexts where the alternations are found. Distributionally, the mutation changes, illustrated in table 1 below, typically occur word-initially or after certain derivational prefixes.

Table 1. The Welsh mutation changes (taken from Griffen 1997: 354)

Table 1: The Welsh mutation system I			
Radical	Soft	Nasal	Spirant
p	b	m̥h	f
t	d	n̥h	θ
k	g	ŋ̊h	χ
b	v	m	
d	ð	n	
g	-	ŋ	
m	v		
ɬ	l		
ρ	r		

In the table above the mutating radicals fall into three groups, but only one of them, the voiceless stops, is affected by all three mutation rules. The secondary forms as arising through Nasal Mutation are of particular interest to us here, since they incorporate the segments not encountered anywhere else in the system[3] – "they exist only as reflexes of these changes, but the phonetic make-up of the sounds in question here is also important in raising the questions concerning phonemic status" (Ball & Williams 2001: 14). As a result of the operation of the Nasal Mutation rule three so-called voiceless nasals arise. These are typically found at the beginning of words or, in a small set of derived lexical items, across syllable boundaries within words. Phonetically these segments are a complex sequence consisting of a nasal and an aspirated segment, thus they more appropriately ought to be referred to as aspirated nasals (Jones 1984: 51). Ball and Williams (2001: 96-98) outline the experimental study by Scully into the phonetic nature of these segments. The study supported the view that these are indeed not single units but sequences of nasal followed by heavy aspiration. Jones (1984) additionally points out that in those dialects of South Welsh which lack the glottal spirant also lack the 'voiceless nasals'. Consequently, [m̥^{h}, n̥^{h} ŋ̊^{h}] are not classed as phonemic units in any variety of Welsh. Interestingly, Pilch (1975: 97) lists several examples of words where the 'voiceless nasal' appears word initially as a result of initial vowel elision: *ymhatru* [əm̥^{h}atri] 'undress'. This occurrence is, however, reminiscent of the alternation that he (ibid.) terms *syllable initial aspiration*, where [m n ŋ][4] when initial in stress-groups and preceded by a proclitic group, alternate with [m̥^{h} n̥^{h} ŋ̊^{h}], as in (3)

---

3 Griffen (1997) further comments on the system expansion, where the affricates are integrated into the consonantal system and, in some dialects, enter into the mutation pattern, giving rise to what he calls 'nasal affricates'. These, however, are not subject to our investigation.

4 Also [r] and [zero] but these are irrelevant to the discussion on nasal segments.

(3) *cynnes* [‘kənɛs] ‘warm’: *cynhesu* [kə ‘n̥ʰ esi] ‘to warm’
cymedroli [kəmɛ’droli] ‘to moderate’: *cymedrol*[kə‘m̥ʰedrol]‘moderate(adj.)’
angau [‘aŋai] ‘death: *angeuol* [a ‘ŋ̊ʰəiol] ‘fatal’

The alternation in (3) could possibly be accounted for taking into consideration historical developments of tense and lax sonorants in Celtic. Still, it does not offer any substantial argument in favour of positing the voiceless/aspirated nasals as separate phonemes in the phonological system of Welsh. It remains to be discovered whether nasals in general (and the Welsh so-called voiceless nasals in particular) are independent categories or rather contextual realizations of basic units. Additionally, it must be stated, they feature as non-prototypical variants of plosives. There is, indeed, substantial overlap here.

3. Prototypical and non-prototypical nasal segments of Polish and Welsh

If indeed, as claimed by (among others) Bybee (2004), only surface forms of phonological units have psychological reality, it ought to be assumed that there are networks of connections which relate allophonic variants to each other. This supports the idea that “people do perceive phonemically, […] they hear their language as a string of basic sounds […] they are not normally aware of the variations in those basic sounds that are induced by their position in the word or larger prosodic unit” (Nathan 2007: 615). This means that speakers become aware of these variants only when they occur in inappropriate positions or are substituted and modified accordingly in speech production errors. Thus, within Cognitive Phonology, phonemes are cognitive/mental categories to which cognitive principles of categorization are applied for identification, thus attributing non-classical structure to phonological categories (Taylor 2007: 247). These principles comprise, among others, the notion of radial categories as fundamental to linguistic organization.

Nathan (2007, 2008) explains that certain segments in phonological systems appear to be prototypical, especially when compared to others. As he puts it: “It has been known in a kind of common sense way for a hundred years that some sounds are common throughout the world’s languages, while others are very rare” (Nathan 2008: 33). Taylor (2007: 248) evokes Daniel Jones’ definition of a phoneme “with its reference to a family of sounds which are related in some ways” where the presence of a central important segment, generally the most frequently occurring member, is suggestive of a prototype approach. Therefore, individual phonemes are to be treated as clearly non-semantic categories. As Nesset (2008: 34) points out, “instead of including a whole network for each phoneme, it is often more efficient to represent them as the schemas for the default allophones”. More than that, Nathan observes that the major guiding principle in identifying the phoneme inventory of a language appears to

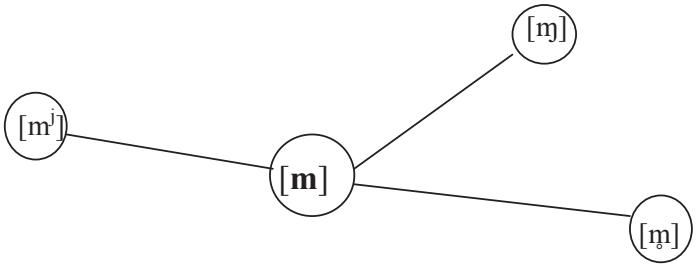
be a preference for symmetry in the system. In addition, there is a strong tendency to find at least three points of articulation, roughly labial, coronal and velar. That is to say, it is possible to have more, but at least this three-point-distinction (ideally) is always there. These ideas are reflected in the discussion below.

Within inventories of sounds, the instantiations of some phonemes are wildly diverse and, taken as a whole, share few common defining parameters. Yet, ordinary speakers do not normally notice the slight or not-so-slight differences in articulation – this is taken as substantial evidence of phonemic perception of sound strings. Thus, Nathan (2007: 617) argues that sound categories (= phonemes) are to be understood as classic examples of radial sets "with a prototypical central member and the other members of the phoneme radiating outwards according to well-defined phonetic principles, analogous to the extensions described by Lakoff involving such principles as metaphor, metonymy, and image schema transformation". From the prototypical member it is possible to adjust the target towards alternative forms dependent on the immediate or larger phonetic environment, thus establishing chaining relationships on the basis of, among others, phonetic similarity between the individual members of a particular sets/categories (Taylor 2007). In Cognitive Grammar terms, allophones, then, are conceived of as image schemata transformations of prototypical sounds, allowing them to adjust and fit the particular surrounding context by means of natural processes as defined by Nathan (2008). This speaks in favour of the idea that allophonic variation is normally computed during speech. Additionally, it needs to be borne in mind that speech processes only minimally change target sound, to make them adjusted to the particular environment. Such facts underlie the perceptible phonetic similarity between the different members of a given radial set. Let us now establish the relevant radial sets of nasal consonants in Polish and Welsh, before we proceed with investigating instances of overlap and the resulting neutralization in the two phonological systems.

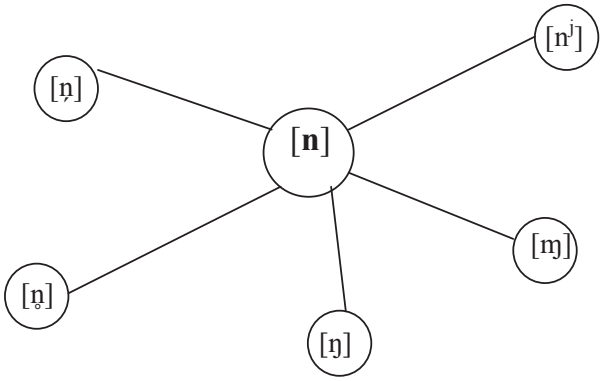
The figures presented in (4) below depict the four categories of nasal segments in Polish. Evidence from a number of different sources, including distributional and combinatorial properties[5] suggests that the voiced bilabial non-palatized [m] (4a), the voiced dental non-palatized [n] (4b), the voiced pre-palatal [ɲ] (4c) and the voiced velar non-palatized [ŋ] (4d) are the respective central members in each category.

[5] The evidence has been only briefly presented in this paper. The reader is referred to numerous works on the phonetics and phonology of Polish nasal segments available, some of which are mentioned in the bibliography section.

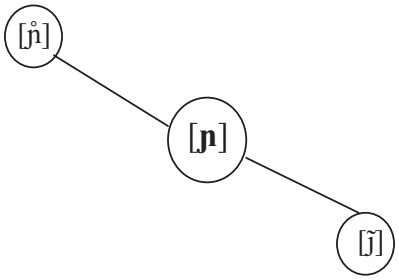
(4) a. the bilabial set



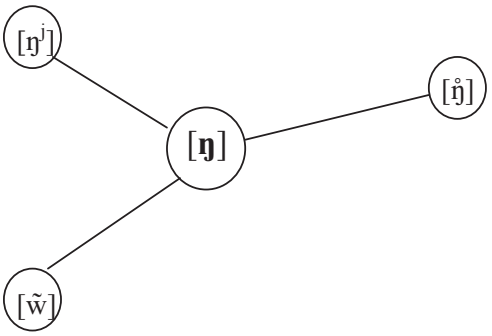
b. the dental set



c. the pre-palatal set



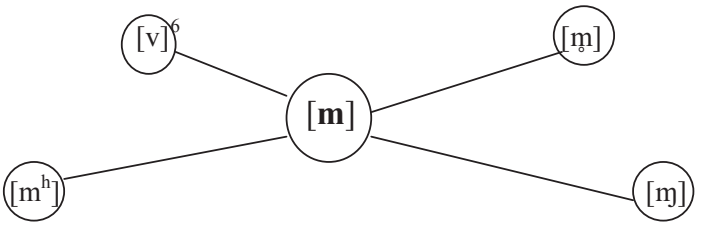
d. the velar set



As can be observed from the members of each radial set, certain regularities transpire within the particular allophonic alternants. Except for the pre-palatal [ɲ], all other nasal phonemes have their palatalized variants when followed by a high front vowel. Likewise, all nasals have a devoiced non-prototypical realization in the vicinity of another voiceless segment, typically through the process of progressive assimilation. Regressive assimilation, also in a sandhi context across word-boundary, gives rise to spirantized variants where they obtain. It ought to be remembered that the glidal realizations of [ɲ] and [ŋ] occur in such contexts. The segments seem to exhibit preference for agreement in terms of place of articulation in clusters.

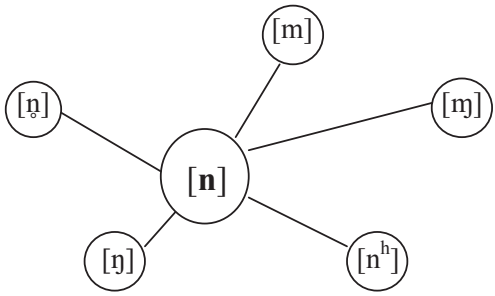
In (5) we illustrate the radial sets as pertaining to nasal segments in Welsh. These will inevitably differ, not only at the basic inventory level but also in terms of allophonic variants. Incidentally, the three prototypes will be identical to those found in Polish and following the idea of three prototypical (symmetrical) places of articulation: labial, coronal and velar.

(5) a. the bilabial set

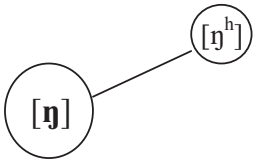


6 The spirant here is included as a non-prototypical allophone of /m/ arising through the Soft Mutation.

b. the alveolar set



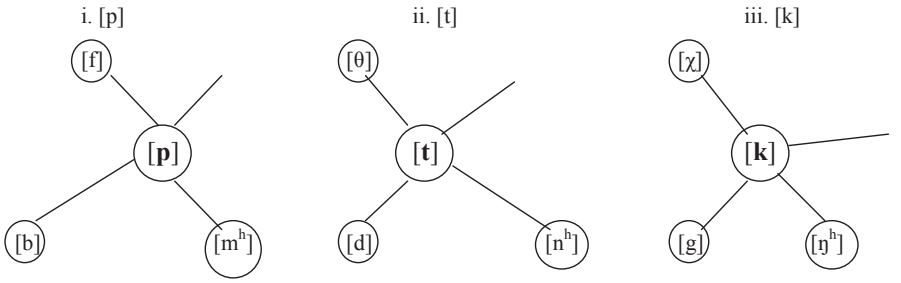
c. the velar set



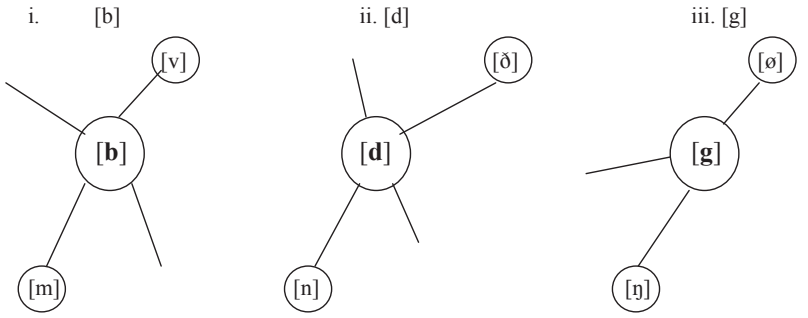
It needs to be added, though, that the radial categories as presented in (5) do not portrait the Welsh phonological system exhaustively. As mentioned above, the so-called 'voiceless' nasals – nasal segments followed by aspiration – [m̥ʰ, n̥ʰ ŋ̊ʰ], are primarily seen not as separate phonemes or allophonic variants of the ordinary voiced sounds, but rather as Nasal Mutation reflexes of voiceless stops [p t k]. Similarly, the radical voiced stops in Nasal Mutation turn up as the respective nasals ([b d g > m n ŋ]). Therefore, to make the picture slightly more complete and present also those nasal segments which characteristically occur only as (mutation-induced) allophones, in (6) we show the prototypical plosive phonemes with some of their non-prototypical variants, limited to those occurring in the Initial Consonant Mutation system[7].

[7] An attempt as exhaustive investigation into the categories of plosives goes far beyond the scope of the present paper and is not immediately relevant to the main subject matter.

(6) a. the voiced plosives



b. the voiceless plosives

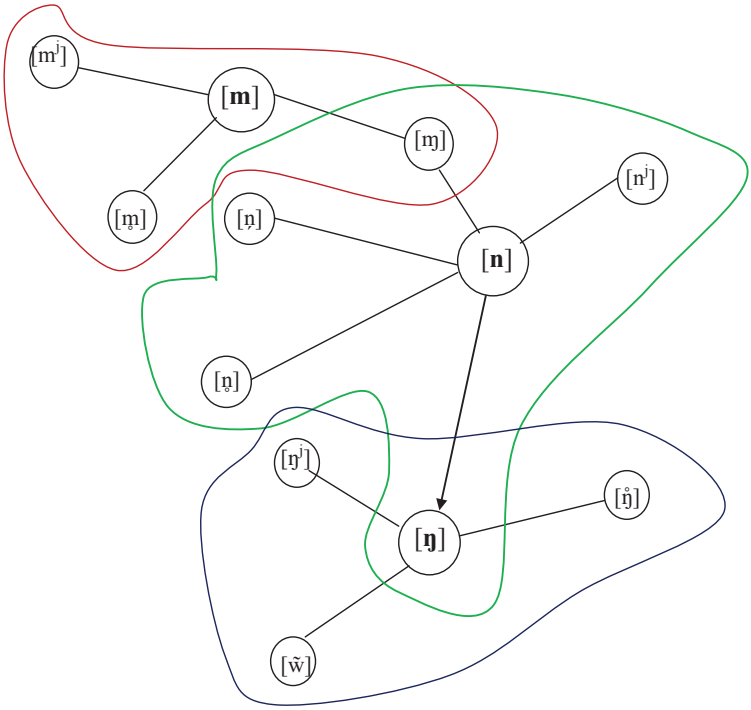


At a closer inspection, it becomes transparent that the networks presented above in (4), (5) and (6) contain some repetitions. As proposed by Nesset (2008: 33) phonemes are represented here as context-free schemas, i.e. schemas for the default allophone or the entire category, while schemas specifying a certain context are used for allophones. It is important to bear in mind that the schemas represent *categories* of related sounds. The data show that the categories are not completely distinct but overlap in one or more areas. Thus the various positional realizations are assigned to different prototypes, where some of the prototype instantiations "encroach on the phonetic space of other phoneme categories" (Taylor 2007: 252). This necessarily raises the question about the nature of the phonological prototypical category itself.

As explained by Nesset (2008), cognitive linguistics embraces Daniel Jones' definition of a phoneme as a "family of related sounds", at the same time accommodating the idea of phonemes as contrastive segments serving to distinguish between meanings. However, both Nesset (2008) and Nathan (2007, 2008) treat the 'elsewhere' instance of a segment, 'the default allophone' as the

prototypical category – the main variant. Thus, the prototype is not simply the category label, but the psychologically real ideal instance: "sounds are subject to prototype effects both at the individual sound level and at the 'selection' level—the level of creation of inventories. It is the same set of prototypicality principles at work at both levels. At the individual level, they select one among a number of alternative sounds as the one ideal instance; at the system level, they filter out altogether those suboptimal sounds that traditionally have been labelled 'marked'" (Nathan 2007: 623). When we try to compare the relevant radial categories of nasal segments in Polish and Welsh we see that certain oppositions are neutralized – the variants, at least to some extent, overlap. This is a novelty, since in previous approaches the possibility of category overlap was denied. Much of this overlap concerns the non-prototypical members, but some involves the prototype itself. The relevant relationships are shown below in (7) for Polish and in (8) for Welsh.

(7) Radial sets of nasal segments in Polish

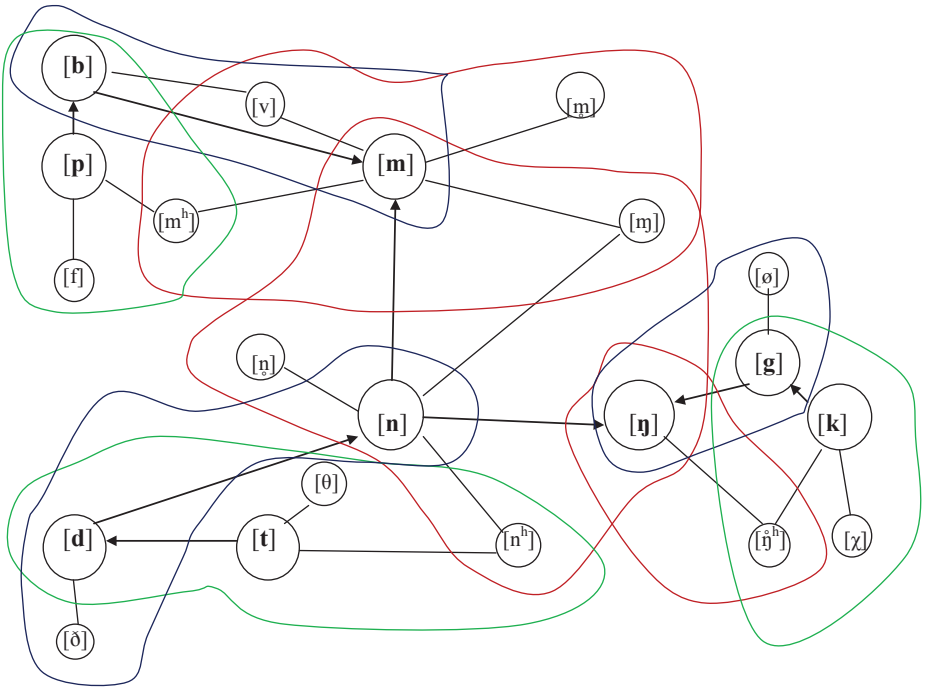


The network portrayed above shows the spirantized allophone [ɱ] as a non-prototypical variant of both [m] and [n]. Native speakers will probably assign the sound to the closest prototype – in this instance probably the dental [n]. However,

in sandhi context, a substantial number of speakers will exhibit category overlap between two prototypes: the dental and the velar nasals. Across word boundary the prototypical phoneme [ŋ] will function as an allophone of [n] before velar obstruents [k g] which appear in the onset of the second word. In (8) more such instances are depicted for Welsh.

The diagrams in (8) comprise both the complete radial category representation for the nasal phonemes of Welsh as well as fragments of radial sets representing voiced and voiceless stops, since these are the prototypical categories for the voiced and voiceless nasals respectively. The details not related to the sounds investigated here are thus not included.

(8) Radial sets of nasal segments in Welsh



The network pictures the radial sets in which nasal segments feature prominently. As can be seen, the prototypical members of a category not only interact with the non-prototypical ones, but may themselves function as non-prototypical variants of prototypes in a different radial set. It is an interesting fact that not all variants result from place (or manner) of articulation assimilations.

The rather complicated network of mutual interdependencies certifies to the complexity of the issues involved. Indeed, there is a lot of overlap as far as allophonic material is concerned, however, equally frequent are the neutralizations

of phonemic oppositions. The nasal segments in Welsh indeed seem to have a complex phonology. Their distribution follows the typical prototype category structure (even if some instances of categorical membership are controversial) and the major category types are universal and prototypical. The interactions between the main categories as well as the positional variants stem from a complex system of regularities in the form of schemas traditionally labeled Initial Consonant Mutations. These have been extracted from once phonologically active processes of assimilation and developed into a well-rehearsed routine (entrenchment) (Bybee 2004) in selected grammaticalized contexts. Still, a cognitive account of even a small part of the system neatly expresses the networks in which the sounds are linked. Although the present author sympathizes more with a functional approach to the representation of the phonological system, it is also appealing to look at phonemes in a language as entities that "describe relations of similarity among parts of phonetic strings" (Nathan 2007: 625). Thus the usage-based model of looking at the phonology offers also some insightful ideas, such as the one that dispenses with the morphophonemic rules – the ones we would need in a more structuralist approach to account for phoneme-to-phoneme alternations as shown in (8) for Welsh. Instead, Bybee (2004) claims that speakers extract commonalities among related forms to form higher-level schemas – the issue will not, however, be investigated here.

4. The phonology of nasals in Polish and Welsh: a comparison

Nasal segments in the phonological systems of Welsh and Polish show regular similarities as well as differences. Since they feature prominently in both languages, there is ground for comparison. In Fisiak's (1975) terms, we can talk about mutual translatability of categories.

Beginning in a classical fashion with establishing the similarities: while the inventories differ in the actual number of consonantal nasal phonemes, these essentially observe the unmarked, prototypical distinctions that appear in numerous, if not all, languages of the world. In both systems we find the labial, the coronal and the velar nasals. As mentioned earlier, these are considered the universal points of articulation in consonantal systems. Furthermore, they follow the languages preference for symmetry: just as we have labial, coronal and velar stops, we also encounter labial, coronal and velar nasals in the inventory. Polish additionally has the pre-palatal phoneme [ɲ] which is legitimized in the system also through the presence of the other prototypes. This follows also from the presence of other distinctions among the palatal phonemes of Polish[8]. Thus both languages seem to follow certain natural general tendencies in terms of establishing phoneme inventories.

---

8 Notice the finer distinctions there among the fricatives and affricates. Also, the velar plosives can have an advanced or palatalized positional variants.

Needless to say, in terms of marked or unmarked features, in both systems, for nasals, voicing is unmarked (Nathan 2008: 35), while "*voiceless* nasals are very rare". And since "markedness is also related to the concept of prototypicality" (Nathan 2008: 35), the voiced nasal consonants enjoy the prototypical status of the phoneme. Where the context dictates it, they will be de-voiced – as in Polish, or aspirated – as in Welsh. This is one aspect of the fact that in both phonological systems automatic, exceptionless, phonetically-motivated processes govern allophonic variation and rapid speech reductions, which are real-time mental events (Nathan 2008: 74) hence the presence of regular and, to a point, parallel allophones, also in a sandhi context. This is particularly well documented in those cases where we observe instances of place of articulation assimilation – the most common phonological process in the world as far as nasals are concerned in the opinion of many. "Prototypically, a coronal nasal changes its point of articulation to match the point of articulation of a following stop" (Nathan 2008: 77). This type of assimilation, which in cognitive phonology is treated as lenition (Taylor 2007), is evident in the positional variants both in Polish and in Welsh. The coronal nasal is indeed the one most susceptible to this kind of anticipatory assimilation.

The differences between the two subsystems are also apparent. The first is typological in nature – the number of radial sets is different, with Polish having one more category – the palatal segment. The other three radial sets have prototypes that are universal across phonological systems. The number of non-prototypical members is also generally different. Additionally, in Welsh all sets interact and overlap, resulting in neutralization of oppositions, whereas in Polish the palatal set as if stands outside the system, though when considering the allophones it turns out that like in the case of other categories we have a de-voiced and a spirantized variant, thus following the lenition path where characteristics of a segment are downplayed "by reducing the articulatory distance between the segment and an adjacent one" (Taylor 2007: 255). In Welsh, generally, we seem to observe more interaction among the different radial sets. They are more intertwined into the whole sound system, alternating also with plosives in what amounts to be a case of contextually-determined neutralization of Initial Consonant Mutations. Needless to say, the effects of the processes that in other framework(s) would be called '*morphophonemic*' are easily perceptible by the speakers while the processes are not unconscious (Nathan 2008: 93). Likewise, nasals breaking into complex segments containing the nasal part and an aspirated part, which phonetically are akin to the so-called voiceless nasals pervading the mutation system, present an instance of a change or process that does not appear to be phonetically motivated and, moreover, limited to only certain occurrences of nasal segments. It remains to be investigated whether those alternations which originally arose purely due to phonetic triggers are now only schemas worked out by speakers through repeated use and exposure – which, tentatively, we believe to be the case – or, alternatively, they have become fully grammaticalized and fully sensitive to the morphosyntactic structure of a given linguistic form and there is no phonology here at all.

To sum up, it has to be clearly stated that this preliminary comparison of just a fraction of the two phonological systems suggests promising future examination paths. It is believed, however, that it can constitute a nice beginning although no attempt is made here to define or state the processes that can be thought of as the implementation of prototypicality effects on individual phonemes. This will be the subject of further research.

References

Ball, M. J. and B. Williams. 2001. *Welsh Phonetics*. Lampeter: The Edwin Mellen Press.

Buczek, A. 1995. Lenition and fortition: consonant mutation in Welsh. In E. Gussmann (ed.), *Licensing in Syntax and Phonology*, 187-216. Lublin: Wydawnictwo Folium.

Bybee, J. 2004. *Phonology and Language Use.* Cambridge: Cambridge University Press.

Dukiewicz, L. and I. Sawicka. 1995. *Gramatyka współczesnego języka polskiego. Fonetyka i Fonologia*. Kraków: Wydawnictwo Instytutu Języka Polskiego PAN.

Fisiak, J. 1975. The contrastive analysis of phonological systems. *Kwartalnik Neofilologiczny* XXII (3/1975): 341-351.

Griffen, T. D. 1997. Welsh alveopalatals: functional pattern attraction. *Word* 48: 353-366.

Gussmann, E. 1974. Nasality in Polish and English. *Papers and Studies in Contrastive Linguistics* 2: 105-122.

Jones, G. E. 1984. The distinctive vowels and consonants of Welsh. In M. J. Ball and G. J. Jones (eds.) *Welsh Phonology. Selected Readings*, 40-64. Cardiff: University of Wales Press.

Klebanowska, B. 2007. *Interpretacja fonologiczna zjawisk fonetycznych w języku polskim – z ćwiczeniami*. Warszawa: Wydawnictwo Uniwersytetu Warszawskiego.

Nathan, G. S. 2007. Phonology. In D. Geeraerts and H. Cuyckens (eds.) *The Oxford Handbook of Cognitive Linguistics*, 611-631. Oxford: Oxford University Press.

Nathan, G. S. 2008. *Phonology. A Cognitive Grammar Introduction*. Amsterdam/Philadephia: John Benjamins Publishing Company.

Nesset, T. 2008. *Abstract Phonology in a Concrete Model. Cognitive Linguistics and the Morphology-Phonology Interface.* Berlin/New York: Mouton de Gruyter.

Ostaszewska, D. and J. Tambor. 2010. *Fonetyka i fonologia współczesnego języka polskiego*. Warszawa: Wydawnictwo Naukowe PWN.

Pilch, H. 1975. Advanced Welsh Phonemics. *Zeitschrift für celtische Philologie* 34: 60-102.

Porzuczek, A. 1994. The role of the Silesian Polish phonological system in the process of acquisition of the phonological component of English by upper Silesian students. In J. Arabski (ed.) *Papers in Linguistics and Language Acquisition*, 94-101. Katowice: Wydawnictwo Uniwersytetu Śląskiego.

Taylor, J. R. 2007. *Linguistic Categorization.* Oxford: Oxford University Press.