Phonological processes as lexical insertion
More evidence from Welsh and elsewhere

Pavel Iosad
Moscow State University
p.iosad@gmail.com

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1 Welsh initial consonant mutation

Welsh initial consonant mutations happen in certain lexical, morphophonological or syntactic conditions. They have a relatively clear diachronic origin, and historically the following rationale is more or less straightforward.

Table 1: The mutations of Welsh (cf. e. g. (Ball and Müller, 1992))

	Plosives						Nasal	"Liquids"	
Radical	p	t	k	b	d	g	m	ɬ	r̥ʰ
Soft mutation	b	d	g	v	ð	∅	v	l	r
Nasal mutation	m̥h	n̥h	ŋ̥h	m	n	ŋ			
Aspirate mutation	f	θ	x						

It is equally clear that the soft mutation is difficult to describe in a unified way

- The affected consonants do not form a natural class
- The shifts cannot be described by a single feature
  - Voicing and spirantization? In most Welsh dialects it is unclear whether [voice] or [aspiration] is distinctive in stops.
  - [m] is affected, but not [n]
  - Phonologically, [ɬ] is a spirant, not an unvoiced liquid in Welsh: Kibre (1997) invokes phonotactic considerations; Ball (1984) notes that [l̥] exists separately, as a variant of [l] after aspirated stops. On the other hand, [r̥ʰ] clearly patterns with the unvoiced nasals in distribution.
- Hamp (1951) proposes diacritic "morphophonemes", an approach echoed by Roberts (2005)

1.1 Mutation and Case

The "Direct Object Mutation" of Welsh is triggered not by a specific lexical item or a class of those, but rather by a certain syntactic configuration: in simple terms, whatever comes directly after the first post-verbal constituent undergoes soft mutation. In particular, this includes the object NP in VSO clauses.

(1) *Wel-odd* *Emrys* *ddraig*
gwelodd draig
see-PST.3SG E. dragon
'Emrys saw a dragon'

However, it is not only objects that mutate in this position: so do arguments of monovalent verbs if they do not follow the verb directly.

(2) *Mae* *ar* *y* *mynydd* *ddraig*
draig
be.PRES.3SG on the mountain dragon
'There is a dragon on the mountain'

With the impersonal forms, no mutation is seen on the objects (cf. (Tallerman, 2006) for a review of the data)

(3) *Gwel-wyd* *draig* *ar* *y* *mynydd*
see-IMPERS.PST dragon on the mountain
'A dragon was seen on the mountain'

However, if something intervenes between the impersonal verb and the object, the object undergoes mutation

(4) (a) *Gwel-wyd* *ar* *y* *mynydd* *ddraig*
draig
'idem'

(b) *Ni* *faddeu-ir* *byth* *gabledd*
maddeuir cabledd
not forgive-IMPERS.PRES ever blasphemy
'blasphemy [against the Holy Ghost] shall not be forgiven [unto men]' (Matthew 12:31; quoted in (Morgan, 1952, 429))

Roberts (2005) still proposes to see this mutation as Case (or rather, as a manifestation of a floating diacritic L that is licensed by the v head: hence impersonal verbs, which do not license a v, cannot assign accusative Case). Tallerman points out that examples like (4) provide evidence against this claim. Her solution (Borsley and Tallerman, 1996; Tallerman, 2006) is the XP-Trigger hypothesis: "XP triggers soft mutation on the initial consonant of the right-adjacent constituent which it c-commands".

- It appears that an adequate account of Welsh mutations requires diacritic features (Hamp, Roberts), a reinterpretation of the feature system ((Gnanadesikan, 1997; Griffen, 1985), but cf. (Green, 2005) for a refutation) or a direct-syntax rule with an unclear status in the phonology. Is there another way?

2 More evidence against floating features

Mutation after lexical items is often supposed to follow from floating features/diacritics associated with right edges of triggers (cf. Lieber, 1983). However, some Welsh data contradict this view.

- The definite article triggers soft mutation on feminine singular nouns, with the proviso that *ll* and *rh* are unaffected ("limited soft mutation"). Consequently, a diacritic L' has to be postulated. However, Morgan (1952, 12–13) states that "*ll* and *rh* are not exceptions to the rule that the consonant of an adjective that is placed before a feminine singular noun undergoes mutation after the article"[1] [my translation]. Cf. *y lom aelwyd* 'the poor hearth' (*llwm*, fem. sg. *llom* 'poor, destitute'). If this so, we need a special allomorph of the article that subcategorizes for adjectives rather than nouns.

- According to Morris-Jones (1930, 177), "A noun in apposition to another has usually its radical consonant if it immediately follows it; if it precedes it or is separated from it [...] it usually has a soft initial [...]". This rule appears to hold not only of "nouns", but of NPs in general. It seems that if we are to ascribe soft mutation to a floating feature here, we need a mechanism to ensure that wherever such an NP may land it will find a diacritic to make the mutation happen. Alternatively, one could hypothesize a special preposition for such dislocated NPs?

- Hannahs and Tallerman (2006) convincingly show that there are several layers of lexical insertion needed for Welsh. In particular, *g* deletes under soft mutation, and that means that some words (like *gardd* 'garden') have both C- and V-initial variants. At the same time some items choose their form depending on whether the following word-form is C- or V-initial: this is true of items like $y(r)$ 'the' and $na(d)$ 'that not'. However, $y(r)$ is sensitive to the post-mutation form (cf. *yr ardd* 'the garden'), but $na(d)$ makes reference to the underlying form: *na allaf* 'that I cannot' (*gallaf* 'I can'). It appears that $y(r)$ is inserted after the mutation is completed—but it is precisely $y(r)$ that is responsible for the mutation. Do we suppose that the floating diacritic is inserted to the slot before the segmental content?

- In some Celtic languages, mutation can feed other phonological processes. The prime example is Breton, where obstruents tend to devoice following consonants. With a mutation rationale similar to the Welsh one, it shows examples like *ar voereb kozh* 'the old aunt', instead of the expected **ar voereb gozh* (Jackson, 1967). This is generally regarded as "failure of mutation" (perhaps in line with OT assumptions); however, Jackson points out that a spirant arising from a stop can be devoiced, too—which implies a derivation-based account.

3 Why lexical insertion?

It appears that a floating-feature (and even a diacritic-based) account leads to some very cumbersome solutions. It is also not the case that mutations are exponents of morphosyntactic meanings (we have seen that the Case account is untenable). On the other hand, syntactic configuration appears to play a role (cf. the XP-trigger hypothesis).

I suggest that a purely phonological account of the mutations of Welsh is too complicated and ultimately undesirable. What we are dealing with, according to my proposal, is not a

[1] "Nid yw *ll* a *rh* yn eithriadau i'r reol hon, fod cytsain ans[oddair] a leolir o flaen enw ben[ywaidd] un[igol] yn treiglo ar ôl y fannod"

phonological derivation from some single underlying form, but a choice from several listed forms that is made in the course of the syntactic derivation. One crucial difference vis-a-vis the floating-feature theory is the fact that mutations are not an epiphenomenon of trigger properties: they are indeed changes in the form of the target (otherwise we are stuck in a circle: sometimes the trigger has to be selected with reference to the properties of the target, as in the article and adjective case).

This proposal allows to eschew several difficulties with Welsh mutations.

- The findings of Hannahs and Tallerman (2006) fall out directly, as long as we have a clear picture of the syntactic derivation (remember that items with a different sensitivity to the following words have different syntactic properties: one is a determiner, the other a complementizer)

- Duke-of-York derivations disappear. If we assume that mutation is sensitive not to the actual presence of the "trigger" in the relevant position but to the nature of the position to the left of the "target" (i. e. the grammar "knows" how the position can be filled), we can formulate the rules of choice accordingly. This allows to deal with the Breton "mutation failures"[2]. Another case is found in Welsh itself. Inflected verbs commonly undergo soft mutation by default. The traditional account is that we are dealing with the preverbal particles *mi* and *fe* (commonly appearing and triggering soft mutation) that are deleted in PF (Ball and Müller, 1992; Roberts, 2005). I suggest that the mutation is triggered because the syntactic position (Fin according to Roberts) can be filled with these elements. It is then superfluous to spell them out, since they are easily recoverable: there are no other elements that trigger soft mutation and appear preverbally and can be dropped[3]. The same mechanism is responsible for the common dropping of *fy* 'my' (*ngwraig* (*i*) 'my wife', lit. 'wife.nasal-mutation I'): it is almost the only prenominal element to trigger nasal mutation, and the only possessive pronoun to do so, hence it is easily recoverable. Prenominal soft mutation triggers are too numerous for their omission to prevent ambiguity, hence we never see such phenomena.

- Mutation can create marked structures. In particular, both *b*- and *m*-initial words appear with initial *f*- [v], which is otherwise very rare: the exceptions are borrowings like *fideo*, truncations like *felly* 'thus' (Middle Welsh *yuelly*) and permanently mutated variants (like *fy* from earlier **min*). Also, aspirated/unvoiced nasals are disallowed except in the onset of a stressed syllable—and under nasal mutation. If these forms do worse on markedness, they must be more faithful—but to what? I suggest that, in a sense, we *are* dealing with faithfulness—but this requires abandoning the assumption that mutation is derivation from a single form.

4 The nature of the lexicon

The spirit of this proposal is close to that of Green (2003, 2005), who suggests that "mutation is like Case", i. e. that it is a feature-like property of a word-form that is conferred on it by a trigger. I suggest that we are indeed dealing with a number of forms listed in the lexicon for each word-form (in the strictly morphological sense: a lexeme plus a bundle of features), each of which has a kind of subcategorization frame that shows in which context the variant can appear. These can be formalized as feature structures, for example. Thus, variants one would

[2]These are not really problematic, because the back-and-forth derivation has no effect on surrounding segments.

[3]The only exception is the negation marker that is *ni* in Literary Welsh (and triggers "mixed mutation") but very seldom appears in Colloquial Welsh and is always accompanied by other negation elements.

describe as soft-mutated uniformly mention phenomena like the XP-trigger; some of such forms also happen to mention, say, the article's slot (and possess the morphological characteristic FEMININE SINGULAR), or list the many lexical items known as triggers.

In this model, the status of a trigger is not a given, and not even part of the grammar: it is the emergent property of some lexical items that happen to be repeatedly mentioned in these frames.

One prediction this model makes is that the link between morphosyntactic characteristics and mutation behaviour will not be absolute: since the two are in principle independent, the general rationale can break down, as in the case of *pobl* 'people' undergoing mutation after the article in the plural, or the word *Cymraeg* 'Welsh language' failing to trigger mutation on the adjective despite being otherwise a feminine singular noun (Morgan, 1952)[4]. Target irregularities also fall out naturally (as in *braf* 'fine' failing to mutate in many contexts[5]).

How does this model address the fact that forms with similar initial consonants have very similar subcategorization frames? I suggest that speakers make generalizations over this lexicon that are as robust as to become productive (cf. the via-rules of Natural Phonology, and the on-line production model of Koenig and Jurafsky (1995)). This captures the regularity that is absent in other lexicon-oriented treatments (e. g. that of Borsley (1999)).

Note that familiar cases of phonologically conditioned allomorph selection (Yip, 2004) are a natural consequence of this proposal: they imply the existence of the variants with no specific information about the distribution.

In a nutshell, the proposal means that if there is a pattern, it is not necessarily the domain of phonological derivation (cf. (Booij, 2002)).

5 Constraining the theory

One drawback is that in principle we could postulate any phenomenon as an influence on the mutation "status"; however, we find that mutation is limited to linear and/or syntactic adjacency.

In Altamurese Italian, certain types of *raddoppiamento fonosintattico* only happen if there is a certain "syntactic distance" (Loporcaro, 1997) between trigger and target, linear adjacency is not sufficient: [trɛ kkɛ͡in] 'three dogs' , but [trɛ sɔtt o tau͡] 'three under the table'. "Tone cases" in Bantu languages like Umbundu (Schadeberg, 1986) and Herero (Lutz Marten p. c.) only appear on nominals immediately adjacent to verbs.

I hypothesize that this restriction falls out from something like the Phase Impenetrability Condition: once the derivation happens "too far" upwards, the selection of the variant cannot happen, since it is already opaque to these processes. For example, in Welsh, after the XP-trigger condition has been checked once, it cannot be checked again vis-a-vis another, higher XP. Thus all such processes are predicted to make reference to only the "nearest" context.

References

Ball, Martin J. 1984. Phonetics for phonology. In *Welsh phonology: selected readings*, ed. Martin J. Ball and Glyn E. Jones. Cardiff: University of Wales Press.

Ball, Martin J., and Nicole Müller. 1992. *Mutation in Welsh*. London—New York: Routledge.

[4]Irish possesses a similar case in *caora* 'sheep': *an chaora* 'the sheep', but *an chaora ban* 'the white sheep', instead of the expected **an chaora bhan*.

[5]But not all, *contra* (Ball and Müller, 1992; Green, 2003): the entry for the word in the *Geiriadur Prifysgol Cymru* only claims it does not mutate after a a feminine singular noun; and Morgan (1952, 415) has an example of a mutated compound starting with the root: *y guir vravdur*.

Booij, Geert. 2002. The balance between storage and computation in phonology. In *Storage and computation in the language faculty*, ed. Sieb Nooteboom, Fred Weerman, and Frank Wijnen, 115–138. Dordrecht: Kluwer.

Borsley, Robert. 1999. Mutation and constituent structure in Welsh. *Lingua* 109:263–300.

Borsley, Robert D, and Maggie Tallerman. 1996. Phrases and soft mutation in Welsh. *Journal of Celtic Linguistics* 5:1–49.

Gnanadesikan, Amalia. 1997. Phonology with ternary scales. Doctoral Dissertation, University of Massachusetts, Amherst.

Green, Anthony Dubach. 2003. The independence of phonology and morphology: The Celtic mutations. *ZAS Papers in Linguistics* 32:47—86.

Green, Anthony Dubach. 2005. Phonology limited. Book ms.

Griffen, Toby D. 1985. *Aspects of dynamic phonology*. Amsterdam: John Benjamins.

Hamp, Eric P. 1951. Morphophonemes of the Keltic mutations. *Language* 27:230–47.

Hannahs, SJ, and Maggie Tallerman. 2006. At the interface: Selection of the Welsh definite article. *Linguistics* 44:781–816.

Jackson, Kenneth Hurlstone. 1967. *A historical phonology of Breton*. Dublin: DIAS.

Kibre, Nicholas J. 1997. *A model of mutation in Welsh*. Bloomington: Indiana University Linguistics Club.

Koenig, Jean-Pierre, and Daniel Jurafsky. 1995. Type underspecification and on-line type construction in the lexicon. In *Proceedings of the Thirteenth West Coast Conference on Formal Linguistics (WCCFL) 13,*, ed. Raul Aranovich, William Byrne, Susanne Preuss, and Martha Senturia.

Lieber, Rochelle. 1983. New developments in autosegmental morphology: consonant mutation. In *Proceedings of WCCFL 2*, ed. Michael Barlow, Daniel P. Flickinger, and Michael T. Wescoat, 165–75. Stanford: CSLI.

Loporcaro, Michele. 1997. Lengthening and *raddoppiamento*. In *The dialects of Italy*, ed. Martin Maiden and Mair Parry. London, New York: Routledge.

Morgan, TJ. 1952. *Y treigladau a'u cystrawen*. Caerdydd: Gwasg Prifysgol Cymru.

Morris-Jones, John. 1930. *Welsh syntax: an unfinished draft*. Cardiff: University of Wales Press.

Roberts, Ian. 2005. *Principles and parameters in a VSO language: A case study in Welsh*. Oxford: Oxford University Press.

Schadeberg, Thilo. 1986. Tone cases in UMbundu. *Africana Linguistica* X:423–447.

Tallerman, Maggie. 2006. The syntax of Welsh "direct object mutation" revisited. *Lingua* 116:1750–1776.

Yip, Moira. 2004. Phonological markedness and allomorph selection in Zahao. *Language and Linguistics* 5:969–1001.