MUTATION AS MORPHOLOGY:
BASES, STEMS, AND SHAPES IN SCOTTISH GAELIC

DISSERTATION

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ABSTRACT

The description of initial consonant mutations in the Celtic languages has

frequently been attempted. Theoretical treatments have tended to focus on either the

phonological aspects of the alternations or the syntactic aspects of distribution. Both of

these perspectives, however, leave the topic incompletely covered. On the one hand, there

is no reliable synchronic phonetic conditioning generally to be found in the modern

Celtic languages. On the other, the syntactic conditions are not unified and frequently

make reference to strictly local, rather than hierarchical, relations between "triggers",

which seem to condition the mutations, and "targets", the word or words which actually

instantiate the particular mutations. Attempts to bridge the theoretical gap directly by

means of a so-called "syntax-phonology interface" consistently miss the functions of the

mutations as part of word formation, i.e. the morphological function of mutations.

This dissertation treats consonant mutation in Scottish Gaelic (SG) as a set of

morphological processes, operative in relating one lexeme to another, a lexeme to its

various inflected word-forms, and word-forms to particular shapes of those word-forms

required by particular syntactic constructions or collocations. In this way, mutations are

shown to be deeply integrated in the realizational and demarcative morphological

systems of SG. Mutations are used in constellations of functions that are characterized by

partial formal generalizations, and so they are unified only abstractly.

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adequate when processes beyond clear, segmentable concatenation are considered morphological. He also encouraged me to look into Greg's theoretical work.

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CHAPTER 1

INTRODUCTION

The system of segmental alternations that are found both regularly and
productively word-initially in verbs, nouns, and adjectives in the Celtic languages is a
recurrent object for description for phonologists, morphologists, and syntacticians. The
reasons that these alternations, most often called *mutations*, have been of more than
passing interest are several. This synchronic study treats modern Scottish Gaelic (SG)
only, in the interest of describing a unified system, rather than trying to capture all of
Celtic mutation in a single work, a task which would entail either simplificatory fictions
and the ingenuous avoidance of discrepancies between and among the constituent
languages, or making constant asides to mention how Welsh differs on point A, Irish on
point B, etc. The latter method of presentation becomes rapidly cumbersome for both
author and reader.

The two major mutation types found in SG, Lenition and Nasalization, are
exemplified in (1):

(1)   Scottish Gaelic (SG) initial mutation types

Radical (unmutated)	*baile*	/pal'ə/[1]	'(a) village'
Lenited	(*anns a'*) *bhaile*	/val'ə/	'(in the) village'
Nasalized	(*am*) *baile*	/mal'ə/	'(the) village'

Such alternations are often described as phonological in nature, but there are reasons for reframing the analysis in terms of grammatical conditioning instead.

First, if the mutations are taken to involve sound-structural rules, they can be described in large part with the formalism of generative phonology, but only at the cost of introducing diacritic features, e.g., [+Lenition] (Rogers 1972, Lieber 1983), and/or permitting fairly liberal access to syntactic information in phonological rules (Pullum & Zwicky 1988a,b). Phonological analyses of this sort may be observationally adequate, but they are questionable for their reference to grammatical conditioning and the *ad hoc* quality of the diacritic features. The rules may "take you from point A to point B", so to speak, but they offer no insight into any possible grammatical function of the alternation(s), what the alternations "do".

Second, when a mutation occurs phrase-initially, the conditioning environment often, but not always, includes an overt trigger element (such as the parenthetical material in (1)). There are instances, however, of phrase-internal mutation on the one hand, and of mutation with no overt trigger at all on the other. This variability in conditioning has led some to posit so-called *contagious* mutation, describable via autosegment-like spreading for the former cases and via phonetically null triggering elements for the latter. The "contagion" analysis misses the generalization that a grammatical relationship exists between mutated lexical heads and mutated phrase-internal dependents in the cases in question. Thus "spreading" a mutation to a post-nominal adjective can be handled morphologically, rather than phonologically, as an instance of agreement marking. It also fails to predict a principled endpoint to spreading (the domain is NP for nouns, for example), or any categories that may be "immune" to the spreading contagion.[2]

Alternatively, a phonetically null trigger analysis entails all of the well-rehearsed objections that "phantom" elements of "inaudibilia" face, and specifically in the case of SG, the suspicious fact that they are invoked just in case something happens where it wouldn't ordinarily be expected, e.g., where no overt triggering element appears before a mutated word. This type of analysis misses the point that certain mutations correlate directly with certain inflectional categories, that is, that mutation can in some cases be analyzed as non-concatenative inflectional marking, morphophonologically realizing morphosyntactic or morpholexical properties. Although contagion and null trigger analyses (e.g., Pyatt 1997) make explicit mention of inflectional categories, it is particularly troubling that they may nevertheless insist that all mutation is triggered in domains larger than the word, and furthermore implemented in a post-morphological readjustment component.

The present dissertation proposes an analysis of mutation in SG that involves the assumption of a four-way split of the mutations according to the nature of the conditioning environment:

(1)   stem alternations which are sole or partial exponents of inflectional categories (Stump 2001, Anderson 1992);

(2)   base alternations required as part of particular rules of lexeme-formation (derivation and compounding);

(3)   shape alternations conditioned by particular syntactic constructions (Zwicky 1990, 1992); and

(4)   shape alternations conditioned by particular grammatical modifiers (e.g., Hamp 1951, Oftedal 1962, Rotenberg 1978).

It should be noted that the present analysis does not depend on a synchronic phonetic motivation for the mutations in modern SG. This takes seriously the proposal that the automatic consignment of rules that manipulate sound to the domain of phonology is mistaken (Janda 1987). Although the genesis of many of the Celtic initial mutations is to be found in more explicitly phonological processes of external sandhi, these processes have become morphologized in SG (Rotenberg 1978), and a statement of the alternants is the bare beginning of an account of the mutations. It is, of course, necessary to state the alternation patterns, and it would be willful ignorance to fail to acknowledge that many of the alternations show the residue of their former status as phonological processes, as the usual names of some of the mutations indicate (e.g., Lenition, Nasalization, Spirantization). These correspondences can instead be captured in rules of base-, stem-, and shape-formation, which need not invoke stepwise generative phonological derivations.

An interesting claim in the literature about the phonology of mutation is the putative ability of Lexical Phonology (LP, Kiparsky 1982, Mohanan 1986) to account for the alternations within a level-ordered model of rule application. Kibre (1997) proposes that LP is the most adequate framework in which to address the facts of mutation in Welsh, whereas Pyatt (1997) claims that the component architecture of LP is inherently unable to handle mutations that are conditioned by lexical or clitic triggers. Since the present analysis involves multiple components and their interfaces, there are opportunities to explore theoretical claims related to modularity and interactivity in the architecture of grammar.

Borgstrøm (1941, also 1968) in his dialect survey of the SG of the Outer Hebrides analyzed a number of the so-called triggering elements as fully prefixal rather than as separate units, in light of their phonological weakness or prosodic dependence, but to date this analysis has not caught on. Although SG is not primarily a literary language, the orthographic tradition represents the triggering elements as separate units or particles, perhaps prejudicing their linguistic categorization in parsing. It is suggested here that Borgstrøm was on the right track with the more affixal analysis.

Morphological theories over the years have tended to take either a (syntax-style) radically morphemic-concatenative perspective or a (phonology-style) processual perspective on morphological implementation. A morphemic-concatenative approach has difficulties with SG mutations on two fronts:

(1) the multi-functionality of the SG mutations, if these are construed as morphemes (Oftedal 1962), leads to the positing of three fully parallel and homophonous morphemes—one for use with verbs, one with nouns, and one with adjectives; and

(2) the apparent non-segmentability of the mutations, especially where there is no overt trigger, opens the way for phonetically null morphemes, floating autosegmental feature(-bundle)s, and the conclusion that non-concatenative processes are qualitatively different morphologically from the processes that add affixes to bases and stems.

Phonology-style approaches to mutation, on the other hand, tend to assume a unitary underlying phonemic form for morphological units that is altered through the application of processes (Hockett 1958). These approaches are predictably concerned with getting the surface facts right, but there is often a tolerance for abstract representations. The role of meaning or grammatical relationships tends to be

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deemphasized, and there is a common practice of diachronic recapitulation in synchronic derivations based on anachronistic underlying representations. The result of this lack of concern with meaning and learnability is a theory of morphology that has a narrow focus and nevertheless places a heavy burden on the computation of surface forms.

A phonological analysis that does not make systematic use of information about constituent edges and juncture, in particular, is of very little explanatory value in the study of mutation. Work on the so-called syntax-phonology interface (e.g., Selkirk 1972, 1984; Kaisse 1985; Rotenberg 1978; Pullum & Zwicky 1988; Hayes 1990; and Zwicky 1990) has given some indication, directly or indirectly, that initial mutations, especially at the edges of syntactic constituents, are amenable to an analysis in terms of boundary conditions and domains of rule application.

For these reasons, an unabashedly morphological theory of (SG) mutation seems to be called for. Morphology interfaces with both syntax and phonology, but it need not be formally identical to either. The *Separation Hypothesis* (Beard 1995), according to which morphosyntactic properties are in principle separate from and independent of their formal inflectional exponents (if any), permits the modeling of inflection (and perhaps more general morphological expression) as a mapping between the properties present in a representation, both inherent and contextually assigned, and the exponents that may mark those properties on words (and perhaps phrases). This perspective is called a *realizational* approach to morphology, and whether one prefers to posit an autonomous morphological component in the grammar or to see morphology as simply the interface between syntax and phonology, the connection and the directionality of determination remain clear.[3]

Without reifying morphemes as (minimal) linguistic signs on (or near) a par with lexical roots, a realizational approach of the sort assumed and developed here allows the same or similar formal alternations to be deployed multiply in the marking of potentially a number of morphological relations in SG (or in any other language, mutatis mutandis). This avoids a pseudo-problem raised in morpheme-based analyses—since the mutations are taken to be morphological operations, but not to be classical morphemes, homophony and formal parallelism of markers are not troubling. Rather, this sort of "redeployment" is not at all exceptional cross-linguistically.[4]

In the parlance of Natural Morphology, morphotactic transparency is to be preferred in morphological expression for purposes of parsing complex forms (e.g., Dressler 1987:102-03). Forms in which morphological boundaries are obscured (like *goose~geese*) or fully indeterminable, i.e. suppletive forms (like *bad~worse*), are less diagrammatic than clear, segmentable affixation (like *dog~dogs*). Nevertheless, the Celtic languages, and SG as a case in point, make regular and productive use of putatively sub-optimal morphological expression in the mutations.

On cognitive processing grounds, segmental alternation or reordering is predicted to be dispreferred root- and word-initially, since this seems to interfere with word recognition, slowing lexical access in empirical tests (Marslen-Wilson et al. (1994), Hawkins & Gilligan (1988), Hall (1988), Mielke & Hume 2001). Initial mutation would therefore seem to fly in the face of this intuitively reasonable psycholinguistic hypothesis. In order not to be a hindrance to lexical access then, it might be supposed that initial mutation must be at least regular, and perhaps productive as well, so that hearers can readily associate a mutated form by inference with an unmutated (*radical*) correlate form.

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To the degree that radical~mutated correspondences are not sets of biunique relations, lexical access may be inhibited, but this potential indeterminacy has clearly not reached "critical mass", as it were, judging by the continued robustness and vitality of mutation within SG and Celtic generally.

This dissertation is intended to provide an account of SG initial mutation (SGIM, henceforth) that emphasizes the logic and regularity of the system, on the one hand, and that fits into a theory of grammar of which the architecture is integrated and independently motivated and supportable, on the other. There are thus both theoretical and empirical issues at stake in the characterization of SGIM, and an understanding of these issues constitutes a contribution to the field of SG studies, and to the articulation and exploration of morphological theory.

Notes to Chapter 1

1. The representation of oral stops in SG is an occasionally controversial matter. In a few

    SG dialects (and most Irish dialects), the phonemic contrast is one of voicing

    (e.g., /p/ vs. /b/), but in most modern SG dialects the contrast is one of aspiration

    (e.g., /pʰ/ vs. /p/). I prefer the latter representation and thus use it throughout the

    present work.

2. Post-nominal deictics, for instance, do not show agreement with head nouns, although

    the same strings (*sin* and *seo*, 'that (one)' and 'this (one)', respectively) are

    lenitable when functioning as demonstrative pronouns, *sin ~ shin* and *seo ~ sheo*.

3. See Anderson's (1992:Ch. 2) arguments that principles governing morphology are not

    identical to those governing syntax or phonology.

4. Cf. the various –*s* /z/ suffixes in English and their largely parallel allomorphy; see for

    example Janda & Joseph 1986 on formally similar yet uncollapsible processes in

    Sanskrit, German, Greek, and elsewhere.

CHAPTER 2:

CONTEXT FOR THE DISCUSSION OF
SCOTTISH GAELIC INITIAL MUTATIONS (*SGIMs*)

2.1

In order to present the relevant data concerning SGIM, it is advisable to first

situate SG genetically and typologically. Much more has been written about mutation in

other Celtic languages than about SGIM in particular, so in preparation for the literature

review in the chapters to follow, a brief orientation concerning SG's place in the

languages of the world is à propos. In anticipation of the crucial role that word order

typology will have in the correct characterization of SGIM, a brief sketch of the major

tendencies in the order of elements within phrases and clauses is instructive.

2.1.1

Scottish Gaelic is a member of the Goidelic (Q-Celtic) sub-branch of the Celtic

branch of Indo-European. Its nearest living relative is Modern Irish. The now-defunct

Manx language (Isle of Man) was equally a sister Goidelic language. The other sub-

branch of Celtic, the Brythonic (P-Celtic) branch, includes Modern Welsh and Breton,

and the defunct Cornish language.[1] Although the first settlement by which SG came to

what is now Scotland from Ireland is uncertain, a major event in settlement history took

place in the 4th-5th centuries CE, when a group of settlers called the *Dál Ríata* (or *Dál Ríada*) tribe landed in Argyll, in the southwest part of mainland Scotland and branched out from there. The Dál Ríata came from among the northern tribes in Ireland (around Antrim), and as a result, the version of Gaelic that was transported to the settled lands shares more structural kinship with present-day northern (Ulster) dialects of Irish than with southern (Connacht, Munster) (MacAulay 1992:137-39; Gillies 1993:145).

2.1.2

Like all of the Celtic languages, SG is a VSO language from the point of basic word-order typology. This head-initial patterning allows for some broad syntactic generalizations:

(1) Declarative sentences are typically V-first,

(a) *Chaidh Iain do'n sgoil*. (lit. 'Went Iain to-the school', i.e. 'Iain went to (the) school.')

(b) *Chunnaic mi Màiri*. (lit. 'Saw I Màiri', i.e. 'I saw Màiri.')

(2) N-modifiers (As, possessive NPs, demonstratives, and relative clauses) are nearly all post-nominal,

(a) *bliadhna mhath ùr* (lit. 'year good new', i.e. 'good (happy) new year')

(b) *taigh Chaluim* (lit. 'house Calum's {genitive}', i.e. 'Calum's house

(c) *an duine sin* (lit. 'the man that', i.e. 'that man')

(d) *an leabhar a leugh mi an-dè* (lit. 'the book that read I yesterday', i.e. 'the book that I read yesterday')

(3) adpositions are all prepositions in SG.

(a) *anns a'bhaile* 'in the town'

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(b) *le cù* 'with/by (a) dog'

Morphologically, SG is poor with respect to affixes (e.g., verbs in most of their uses show no agreement morphology for the person and number of their subject, a large number of nouns show no affix to mark plurality), but the language shows significant morphophonological alternations. Among these alternations are the two broad categories of *initial (consonant) mutation* (IM) mentioned in Ch. 1, known traditionally as *Lenition* and *Nasalization*. Other terms that may be found in the literature for these IMs are *aspiration* and *eclipsis* (the latter particularly for Irish), respectively. In the Celtic languages generally, IMs have attracted considerable descriptive linguistic attention, both for their intrinsic interest, and for the ways they interact with other aspects of grammar. Subsequent chapters review phonological, syntactic, and morphological approaches to Celtic ICM, but the goal of the present chapter is to present the distribution of lenition and nasalization in SG in as pre-theoretical a manner as possible.

2.2

Before a meaningful discussion of alternation can proceed, however, a basic phonemic inventory for SG is necessary.

2.2.1

Table 2.1 presents consonant phonemes of SG, organized by place, manner, aspiration[2], and palatality.

		Labial	Dental	Palatal		Velar	Glottal
Stops:	Aspirated	/pʰ/	/tʰ/	/tʃ/	/kʼʰ/	/kʰ/	
	Plain	/p/	/t/	/dʒ/	/gʼ/	/g/	
Fricatives:	Voiceless	/f/	/s/	/ʃ/	/ç/	/x/	/h/
	Voiced	/v/				/ɣ/	
Nasals		/m/	/n/	/ñ/		/ŋ/	
Liquids			/l, r/	/lʼ, ɾ̥/			
Glides				/j/			

Table 2.1: Consonant phonemes of modern Scottish Gaelic

Some points open for debate include:

(1) The placement of the post-alveolar affricates with stops, although they are claimed to

contrast in voicing, rather than aspiration. Nothing crucial hinges on the phonetic

nature of this particular contrast, and so the affricates could just as easily be

placed among the fricatives. Phonologically, however, the affricates seem to

pattern more with the stops than with the fricatives.

(2) Dental fricatives, i.e. /s/, do not show a contrast with respect to voicing.

(3) The voiced counterpart of palatal fricative /ç/ is the glide /j/. Phonologically, however,

/j/ and /ɣ/ are more closely associated.

2.2.2

The SG vowels show a single major bifurcation into "broad" (back) vowels versus

"slender" (front) vowels[3]:

(2)   Broad: <a, o, u>   Slender: <i, e>

One other vowel sound, represented orthographically as the digraph <ao>, is rendered differently in various phonological descriptions, either as back unrounded high /ɯ/ or as front rounded mid /ø/. In either case, the vowel behaves as a member of the broad group. A general rule in SG spelling (and roughly in phonology as well) is "broad against broad and slender against slender." This rule captures the nearly exceptionless tendency, within words, for vowels on either side of a consonant or consonant cluster to match in this respect, e.g., *dìreach* 'just, straight' with slender i_e on either side of the [+palatal] /ɾ̥/, and *gàradh* 'garden' with broad a_a on either side of [-palatal] /r/.

Orthographic vowels do not, therefore, correspond one-to-one to syllabic nuclei in all cases. Rather, many instances of broad and slender vowel combinations serve to indicate the [±palatal] value of adjacent consonants.

(3)   *dùrachd* = 'request, wish' /duraxk/

        Diùrach = 'someone (m.) from Jura' /dʒurax/

Broad and slender vowels, together with consonant palatality, are relevant in the domain of SG morphology in two areas: (1) stem-final palatalization, which is always reflected in orthography, generally by the stem-internal addition of orthographic <i>, *bual-adh* 'striking' vs. *buail* 'strike!'; and (2) certain suffixes show broad and slender allomorphs, the choice depending on the palatality of the stem's final consonant. e.g., -(*a*)*idh*, exponents of {TNS:fut}; *buailidh* 'will strike' versus *òlaidh* 'will drink' (*òl* 'drink!').

2.3

The correspondence between SG phonemes and their orthographic representation is perhaps somewhat notorious. Irish, by comparison, instituted a thoroughgoing spelling reform in the 1950s, losing a large volume of etymological traces in the process, but more closely approaching a phonemic orthography. SG has not undergone such a reform, so there is a measure of spelling residue in the form of silent letters or idiosyncratic pronunciation in certain words, e.g., *leabhar* /l'oːr/ 'book'. In initial position, however, allowing for the palatality distinction that may be read directly off the first vowel in the word, the grapheme-phoneme correspondence is quite straightforward.

p - /p^h/   b - /p/   m - /m/
ph - /f/   bh - /v/   mh - /v/[a]
f - /f/   fh - Ø[b]
t - /t^h/, /tʃ/   d - /t/, /dʒ/
th - /h/, /ç/   dh - /ɣ/, /j/
s - /s/, /ʃ/
sh - /h/, /ç/
n - /n/, /ñ/   l - /l/, /l'/   r - /r/, /ɍ̥/[c]
c - /k^h/, /k'^h/   g - /k/, /k'/

Table 2.2: Grapheme-phoneme correspondences

Notes:

(a) Orthographic <mh> corresponds to phonemic /v/, but is generally distinct from <bh> in that vowels adjacent to <mh> show assimilatory nasalization as they would next to <m> alone.

(b) Orthographic <fh> is without any phonemic value, and words beginning with <fh> are treated as though they simply began with the following segment in the determination of the allomorphy of preceding grammatical elements, where applicable, e.g., definite article *an* (vs. *a'*), negative element *chan* (vs. *cha*).

(c) Palatalized ("slender") <r> is in general dialectally /ð/ in Lewis and Nova Scotia.

Given the language-specific idiosyncrasies of phoneme-grapheme correspondences, it is interesting to note that morphophonological generalizations are very readily captured in terms of orthography. The following sound classes have clear descriptive value for SG for initial position (cf. Calder 1923, Blacklaw 1989):

(1) Vowels   a, o, u and e, i

(2) Velars   c, g

(3) Dentals   t, d

(4) Sonorants   l, n, r

(5) Labials   p, b, m

(6) "F"   f

(7) s+[sonorant]   s(+Vowel), sl, sn, sr

(8) s+[obstruent]   sg, sm, sp, st

These eight classes allow for a concise summary of mutation, both for mutable and immutable initials, and for the allomorphy of certain determiners such as the definite article and a variety of pre-verb markers, e.g., the negator *cha*(*n*). Treating the basics of Lenition first, however, we may summarize as follows:

Under Lenition,

(1) a, o, u, e, i -> a, o, u, e, i (no change)

 (2) c, g, -> ch, gh

(3) t, d -> th, dh

(4) l, n, r -> l, n, r (no change)[4]

(5) p, b, m -> ph, bh, mh

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(6) f -> fh

(7) s, sl, sn, sr -> sh, shl, shn, shr

(8) sg, sm, sp, st -> sg, sm, sp, st (no change)

Therefore, with respect to Lenition, the following opposition of patterning emerges:

	After initial <S>	Otherwise
Obstruent	(no change)	Lenition
Sonorant	Lenition	(no change)

Table 2.3. Lenition patterns.

It is not the task of the present study to recapitulate the rise of the differential patterning.[5] What is important in this context is that the initial grapheme classes permit a compact and adequate description of SG Lenition on a formal level.

With respect to Nasalization, on the other hand, we observe the following pattern:

(1) a, o, u, e, i -> a, o, u, e, i (no change)

(2) c, g, -> c /g/, g /ŋ/

(3) t, d -> t /d/, d /n/

(4) l, n, r -> l, n, r (no change)

(5) p, b, m -> p /b/, b /m/, m /m/

(6) f -> f (no change)

(7) s, sl, sn, sr -> s, sl, sn, sr (no change)

(8) sg, sm, sp, st -> sg, sm, sp, st (no change)

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Thus the obstruent classes (2, 3, 5) pattern together, with aspirated stops becoming voiced and plain stops becoming nasal.[6] Note that this alternation is <u>not</u> reflected in the orthography, in clear contrast to the Eclipsis spelling conventions of Irish, whereby a graphic representation of the nasalized sound is orthographically prefixed to the canonical base, e.g., Irish *mbó* /mo:/ ~ *bó* /bo:/ 'cow', vs. SG *bò* for both nasalized and non-nasalized instantiations. Brythonic Celtic languages, by contrast, opt for outright orthographic replacement in mutated forms, rather than indirect or diacritic indications of mutation. In this way, it seems that SG orthography is the most clearly morphophonemic among the modern Celtic orthographies.[7]

2.4

With the utility of SG orthography in representing the phonemic contrasts of the language established, and further with a summary of the sound-structural patterns known as SGIM presented, it remains only to discuss the various conditions under which the SGIM types and their permutations obtain.

2.4.1

The traditional way to discuss mutation (e.g., Oftedal 1962) is in terms of triggering elements (*triggers*) inducing or *projecting* mutations onto some adjacent element (a *target*). Historically, it seems clear that the mutations arose as automatic phonological juncture phenomena. In the course of regular sound change, however, the phonetically motivated conditioning environments that made the alternations part of live synchronic phonology broke down, although more clearly so in the case of Lenition than in Nasalization, since most, but not all, Nasalization triggers in SG end in an orthographic nasal. A final nasal is not sufficient for determining Nasalization, however, as a purely

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phonological analysis would presumably require, e.g., _chan fhaod_ _thu smocadh_ 'you may not smoke').

As a result, a synchronic description of SGIM that incorporates the notion of mutations projected from triggers to targets portrays the triggering elements as the "causes" of mutation. "A projected mutation is an initial mutation conditioned by a mutating quality in the morpheme which immediately precedes the mutated form. The mutation is part of the mutating morpheme [i.e., the trigger], but manifests itself phonemically in the mutated [i.e. target] form" (Oftedal 1962:97). In the remainder of section 2.4.1, a brief catalog of presumed mutation triggers is given, together with details and examples of the mutation type projected. Mutation types that seem to have a more conventionally morphological function in the synchronic SG grammar, however, follow in §2.4.2.

It is a frequent observation that most triggering elements are prosodically short and light, grammatical (rather than contentful), and members of closed lexical classes (cf. Rotenberg 1979, Duffield 1996). Although these properties are neither necessary nor sufficient for the projection of mutations,[8] the SG facts nevertheless fall broadly in line with these expectations. Words subject to mutation (i.e. potential targets) are members of the major lexical categories N, V, and A. Triggers in SG include tense, polarity, and modality markers before V, determiners and prepositions before N (and sometimes A), and intensifiers or other modifiers before A. On a trigger analysis, projected SGIMs apply uniformly rightward.

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2.4.1.1

Verb-related triggers that project mutations onto adjacent targets include the following (cf. *Buail e!* 'Hit him!' /**p**ual'e/):

(4)   Interrogative modality   *an ~ am*   (Nasalizing)

        Am buail thu e?   'Will you hit him?'   /a**m**ual'ue/

        Negative polarity   *cha ~ chan*   (Leniting)

        Cha bhuail thu e.   'You will not hit him.'   /xa**v**ual'ue/

        Subordinate modality   *gun ~ gum ~ gur*   (Nasalizing)

        ...gum buail thu e.   '...that you will hit him.'   /gʊ**m**ual'ue/

        Interrogative, negative   *nach*   (Leniting)

        Nach bhuail thu e?   'Won't you hit him?'   /nax**v**ual'ue/

        Subordinate, negative   *nach*   (Leniting)

        ...nach bhuail thu e.   '...that you won't hit him.'   /nax**v**ual'ue/

        Past tense   *do ~ d'*   (Leniting)

        An do bhuail thu e?   'Did you hit him?'   /...**v**ual'.../

        Cha do bhuail thu e.   'You didn't hit him.'

        ...gun do bhuail thu e.   '...that you hit him.'

        Nach do bhuail thu e?   'Didn't you hit him?'

        ...nach do bhuail thu e.   '...that you didn't hit him.'

        Relative pronoun   *a*   (Leniting)

        an taigh a <u>thog</u> iad   'the house that they built'   /...**h**ok.../

The past tense marker *do* appears only in conjunction with and following the

modality and polarity markers above (not the relative pronoun), projecting Lenition onto

an adjacent target and pre-empting any mutation that the preceding element may project (vacuously, where both project Lenition). *Do* does not appear in the affirmative, indicative, active past, although Lenition nevertheless is found (*Bhuail thu e.* 'You hit him.'; see §2.4.2 below).

2.4.1.2

Noun-related triggers that project mutations onto adjacent targets include the following:

Definite articles	(Variable)
Possessive adjectives (Genitive pronouns)	(Variable)
Prepositions	(Variable)
Numerals *aon* '1' and *dhà* '2'	(Leniting)

The form and projected mutation of the definite article (*an*, *am*, *a'*, *na*, *nan*, *nam*) depend on local values for {GEN, NUM, CASE} and on the sound class of the target's initial. The following allow for generalizations within gender, on the one hand, and within case, on the other to be highlighted in graphic form[9]:

	NS	GS	DS	NP	GP	DP
(1m)	*an t-*	*an*	*an*	*na h-*	*nan*	*na h-*
(1f)	*an*	*na h-*	*an*	*na h-*	*nan*	*na h-*
(2m)	*an*^{N}	*a* $^{\prime L}$	*a* $^{\prime L}$	*na*	*nan*^{N}	*na*
(2f)	*a* $^{\prime L}$	*na*	*a* $^{\prime L}$	*na*	*nan*^{N}	*na*
(3m)	*an*^{N}	*an*^{N}	*an*^{N}	*na*	*nan*^{N}	*na*
(3f)	*an*^{N}	*na*	*an*^{N}	*na*	*nan*^{N}	*na*
(4m)	*an*	*an*	*an*	*na*	*nan*	*na*
(4f)	*an*	*na*	*an*	*na*	*nan*	*na*
(5m)	*am*	*a* $^{\prime L}$	*a* $^{\prime L}$	*na*	*nam*^{N}	*na*
(5f)	*a* $^{\prime L}$	*na*	*a* $^{\prime L}$	*na*	*nam*^{N}	*na*
(6m)	*am*	*an*^{L}	*an*^{L}	*na*	*nam*	*na*
(6f)	*an*^{L}	*na*	*an*^{L}	*na*	*nam*	*na*
(7m)	*an*	*an t-*	*an t-*	*na*	*nan*	*na*
(7f)	*an t-*	*na*	*an t-*	*na*	*nan*	*na*
(8m)	*an*	*an*	*an*	*na*	*nan*	*na*
(8f)	*an*	*na*	*an*	*na*	*nan*	*na*

Table 2.4. Definite articles.

The rather complicated interaction in the allomorphy of not only the target of the definite article's projected mutation (if any) but also the definite article itself leads to the conclusion that the definite article in SG is a single unit only at a quite abstract level.[10]

Possessive adjectives project a variety of mutations as well, but these depend on their own properties, rather than on those of the N possessed.

mo	'my'	(Leniting)
do	'your (sg.)'	(Leniting)
a	'his'	(Leniting)
a	'her'	(Prefix *h-* to vowels)
ar	'our'	(Prefix *n-* to vowels)
ur	'your (pl.)'	(Prefix *n-* to vowels)
an~am	'their'	(Nasalizing)

Table 2.5. Possessive adjectives.

It is important, especially in the case of *ar* and *ur,* to distinguish *n*-prefixation from

Nasalization proper. *N*-prefixation is limited to vowel-initial following contexts, e.g., *ar*

n-athair 'our father' (cf. *athair* '(a) father'). The Nasalization mutation, on the other

hand, is a systematic alternation found in consonant-initial following contexts. The two

actually do not go together, although they are not always clearly distinguished in the

literature. Although *ar* and *ur* both prefix *n-* to vowel-initial following contexts, they do

not trigger nasalization in following consonants. *An*, 'their', by contrast, correlates

directly with the Nasalization mutation on following consonants susceptible to it.

The *h*-prefixation mentioned in the case of *a* 'her' is similarly limited to vowel-

initial following contexts, e.g., *a h-each* 'her horse' (cf. *each* '(a) horse'). This <h> is not

the same as the <h> used to indicate Lenition, because *a* 'her' has no further formal

concomitant effects. In fact, it is exactly in cases where the contrast between (Leniting)

'his' and (*h*-prefixing) 'her' would be neutralized, i.e. before vowels, that the

distinguishing feature of *a* 'her' makes itself known, thereby maintaining the contrast.

Only certain prepositions trigger mutations, strictly speaking. It is important in

this connection to distinguish between *case government* and *mutation projection*. Some

mutation on N and A follows from inflection class and {NUM, CASE} specifications.

Independent of these specifications, however, certain prepositions categorically impose

Lenition, even where it is not predicted, all else being equal. In this section, only the

projected instances of Lenition are addressed (see §2.4.2 below for inflectional mutation).

Prepositions analyzed as projecting Lenition in this way (onto an NP already in the

Dative case, via case government) include the following:

bho ~ o	'from'	*bho <u>dhorus</u>*	'from a door' /ɣɔrəs/ (cf. *dorus* /tɔrəs/)
de	'of'	*de dhorus*	
gun	'without'	*gun dhorus*	
fo	'under'	*fo dhorus*	
mu	'about'	*mu dhorus*	
ro	'before'	*ro dhorus*	
tro	'through'	*tro dhorus*	
do ~ a	'to'	*do dhorus*	
mar	'like'	*mar dhorus*	

Table 2.6. Leniting prepositions.

Historically, Lenition was tied to a trigger ending in a vowel. *Gun* and *mar* above show that that is no longer a necessary condition. Non-mutating prepositions like *le* 'with' show that it is not a sufficient condition, either. Other prepositions, while also governing the (so-called) Dative case, do not make any additional formal demands of the initial segment of their object NPs, e.g., *air dorus* 'on a door'.

2.4.1.3

Adjective-related grammatical triggers seem to number but three: the intensifiers, *glè* 'very', *ro* 'too, overly, excessively', and *fior* 'truly'.[11]

2.4.2

Mutations that Oftedal (1962:97) termed *incorporated* include "all those mutations which are not projected; they are part of the form in which they are manifested and not of any preceding morpheme."

2.4.2.1

Oftedal lists as paradigm example the SG preterite verb *chuir* 'put' /xuɾ̥/, for which the root form is seen in the 2sg. imperative *cuir* 'put' /kuɾ̥/. Since SG is

canonically a V-initial language, in the absence of any tense, mood, aspect, or modality pre-verb, the past tense verb is sentence-initial, and therefore potentially utterance-initial.

As mentioned in §2.4.1.2 above, it is for the analyst to decide whether he or she prefers to countenance a covert triggering particle that disappears just in case it would be the first element in a sentence, but not before leaving a trace that it had been there, in the mutation that it would be presumed to cause. On the evidence of other past tense forms in SG, one might assume that the *do* marker is present underlyingly in all past tense constructions, but with the peculiar attribute that it can only survive to be pronounced if it has something on the left to lean on, i.e. that despite its mutating effect to the right, it is actually enclitic on a proclitic *an*, *cha*, *gun*, or the *nach*s. Alternatively, one might consider that *do* is indeed proclitic, but that it has the restriction that it cannot be the *only* proclitic in a clitic group. In those cases where it would be the only proclitic, it contributes {TNS:past}, triggers Lenition, and itself deletes. Other descriptions are of course available.

This sort of analysis is challenged by the fact that there are, among the 10 irregular SG verbs, individual verb lexemes that do not use *do* at all in the past portion (*slab*, in the terminology of Carstairs (1988)) of the paradigm. In each of these verbs, however, the affirmative past form respects the initial Lenition condition, even where the base for the form is suppletive with respect to the verbal noun (Blacklaw 1989:21-22, 77-78):

Verbal Noun		**Past**		**Past Interrogative**
a'cluintinn	'hearing'	*chuala mi*	'I heard'	*an cuala?*
a'dol	'going'	*chaidh mi*	'I went'	*an dean?*
a'faicinn	'seeing'	*chunnaic mi*	'I saw'	*am faca?*
ag radh	'saying'	*thuirt mi*	'I said'	*an tuirt?*
a'tighinn	'coming'	*thàinig mi*	'I came'	*an tàinig?*
a'toirt	'giving'	*thug mi*	'I gave'	*an tug?*

Table 2.7. Irregular verbs.

Without *do* in place to project Lenition, other pre-verbs are free to project their own mutation, e.g., interrogative *an* Nasalizes, so *an cuala* is pronounced /aŋ(g)uala/, *an tuirt* /anduɾʃt/.

Incorporated Lenition is also found in the conditional forms, affirmative, e.g., *chluininn*, 'I would/used to hear', *dh'òladh e* 'he would/used to drink'. Again, lenition is respected categorically in the affirmative, and the formal pattern is analogous to the past forms, with the prefixation of *dh'* to vowel-initial verbs (and lenited <f>-initial-vowel-second (< fV >) verbs, e.g., *dh'fhàgainn* 'I would/used to leave'). In all conditional constructions other than the affirmative, there is no incorporated mutation, and the verb form is subject to any applicable triggered mutations, e.g., *an cluininn* /aŋ(g)luiñiñ/ 'I would hear', *gun òladh e* 'that he would drink'.

2.4.2.2

SG nouns and adjectives are easily analyzed in terms of morphological case paradigms with up to four formal distinctions, allowing for syncretism in certain lexemes or lexical classes.[12] Although a different, more classical set of case-names is found in the

literature (Nominative, Genitive, Dative, Vocative), there is a functional discrepancy in the case of Nominative, which is used for both subject and direct object terms, and the Dative, which has no Dative 'to, for' semantics in its own right, but rather stands as the form used after most (simple) prepositions. In the interest of clearing up the untoward connotations of the traditional case-naming system, and in anticipation of the treatment found in Chapter 5 below, I adopt the following case system henceforth in this dissertation (*craobh* (f.), 'tree'):

(5)   Singular   Plural
         Direct   *craobh*   *craobhan*   (replacing "Nominative")
         Genitive   *craoibhe*   *chraobh*
         Oblique   *craoibh*   *craobhan*   (replacing "Dative")
         Vocative   *(a) chraobh*   *(a) chraobhan*

and for *balach* (m.) 'boy':

(6)   Singular   Plural
         Direct   *balach*   *balaich*
         Genitive   *balaich*   *bhalach*
         Oblique   *balach*   *balaich*
         Vocative   *(a) bhalaich*   *(a) bhalaich*

It should be noted that the only clear case for an incorporated mutation here is the Genitive plural, which is lenited whenever possible (but without any prefixation on vowel-initial nouns, *dh'*, *h-*, or otherwise). An important condition to note here is that just as the incorporated mutation in past and conditional verbs is found only in the affirmative, so is this Genitive plural Lenition found only in the indefinite: cf. definite *nan craobh* 'of the trees', *nam balach* 'of the boys'.[13]

The syntactic status of Vocative NPs is potentially controversial, because they stand outside of predications. Vocative case is included as a morphological case here, however, because, although it is rare outside of a poetic context for words other than

names or titles, in principle any noun can be put into the Vocative (Robertson & Taylor 1993:76-77).

The Vocative prefix *a* can be seen as projecting Lenition, and if one is so disposed, as projecting final Palatalization, too, but only in the case of masculine nouns. Whether a proclitic element may project a stem-final mutation seems phonologically questionable on standard assumptions (perhaps also on morphological grounds, cf. Hoeksema & Janda 1988), so the question of the nature of the proper relationship of Vocative *a*, initial Lenition (both genders), and final Palatalization (masc. only) remains open.

2.4.2.3

Adjectives have a paradigm of forms as well, consistent with noun lexemes, but doubled in size, so as to allow for both masculine and feminine forms (e.g., *mòr* 'big, great'):

	Masculine		Feminine	
(7)	Singular	Plural	Singular	Plural
Direct	*mòr*	*mòra*	*mhòr*	*mòra*
Genitive	*mhòir*	*mòra*	*mòire*	*mòra*
Oblique	*mòr*	*mòra*	*mhòir*	*mòra*

The forms above are found in attributive use only; in predicative constructions, the masculine Direct singular (citation, or default) form is used in all cases, irrespective of the gender or number of the subject, e.g. *Tha na cearcan mòr*. 'The hens (f.) are big', vs. *Tha na cearcan mòra donn* 'The big hens are brown'.

Just as Lenition in Genitive plural depends on whether the NP is definite or not, there is a definiteness reflex in adjectives as well. Oblique (Dative) singular masculine

adjectives are not lenited in the indefinite, but they <u>are</u> lenited in definite NPs, e.g., *aig taigh mòr* 'at a big house' vs. *aig an taigh mhòr* 'at the big house'.[14]

There is one instance of Lenition in adjectives that is unique, synchronically. An attributive adjective is lenited immediately following a feminine noun whose last vowel is <i>, e.g., *na caora<u>i</u>ch dhubha* 'the black sheep (pl.)', cf. *na cearcan dubha* 'the black hens' (Blacklaw 1989:55-56). A similar, but not identical, condition is found in masculine plurals. The generalization here is to be made in paradigmatic terms rather than phonological ones: "[w]hen the plural [Direct (and Oblique)] of a noun is the same as the genitive singular, the adjective is also aspirated [=lenited]" (ibid.). Thus there is the contrast for even two close synonyms, *balaich* and *gillean*, both meaning 'boys': *balaich mhòra*, but *gillean mòra* (ibid.). What makes this type of Lenition special is that although it is not incorporated, since it does not follow from particular inflectional properties, neither is it projected in the usual sense, since the conditioning factor is to be found in the preceding noun or its paradigm, not in some triggering grammatical morpheme. This Lenition would seem, therefore, to be more closely related to the traditional notion of external sandhi, with a construction-based condition, i.e. that the adjective is an attribute or a phrasal co-constituent (sister) of the noun.

2.4.3

Initial Lenition is found frequently in the right-hand members of SG compounds, e.g., *ceanna-bhaile* 'capital' (lit. 'head-town' (*baile*)), *brù-dhearg* 'robin' (lit. 'stomach-red' (*dearg*)), *cearc-fhraoich* 'grouse' (lit. 'hen-heather' (*fraoch*)), *cas-chrom* 'plow' (lit. 'leg-bent' (*crom*)), *dealbh-chluich* 'play (theatrical)' (lit. 'picture-play (as a game)' (*cluich*)), *iùl-chairt* 'map, chart' (lit. 'guidance-chart' (*cairt*)).

It is clearly not a necessary part of lexical compounding, however, as at least as many examples with potentially lenitable, but nonetheless radical, second members can be enumerated, e.g., *aran-coirce* 'oat-cake(s)' (lit. 'bread-oats'), *làithean-saora* 'holidays' (lit. 'days-free'), *taigh-solais* 'lighthouse' (lit. 'house-light'), *snodha-gàire* 'smile' (lit. 'smile, smirk-laugh').

2.4.4

Certain (but far from all) derivational prefixes apparently require a lenited base (when available) for their application, including the following:

àrd- 'high' (cf. English *arch*- in both etymology and semantics): *àrd-bhreitheamh* 'chief justice' (*breithamh* 'judge, umpire'), *àrd-shagart* 'high priest' (*sagart*).

ath- 'again, re-, next': *ath-bheachd* 'after-thought, retrospect' (*beachd* 'thought, opinion'), *ath-cheannaich* 're-purchase' (*ceannaich*), *ath-thuit* 'fall again, relapse' (*tuit* 'fall').

comh- 'similar, together' (cf. Latinate *con-*, *com-*, *co-* in both etymology and semantics): *comh-sheinn* 'harmony' (*seinn* 'sing'), *comh-ghairdeachas* 'congratulation, mutual joy' (*gairdeachas* 'joy, gladness').

do- 'ill-': *do-bhròn* 'deep sorrow' (*bròn* 'sadness, mourning'), *do-chreidsinn* 'incredible, unbelievable' (*creidsinn* 'believing'), *do-dhèanamh* 'impossible' (*dèanamh* 'doing').

fo(i)r- 'super-, over-': *foir-briathar* 'adverb' (briathar 'word, verb'), *foir-dhealbh* 'scheme' (*dealbh* 'picture'), *for-sheòmar* 'hall, vestibule' (*seòmar* 'room').

mì- 'mis-': *mì-chùramach* 'careless' (*cùramach* 'careful'), *mì-bhlasda* 'insipid' (*blasda* 'delicious, sweet; agreeable; eloquent'), *mì-thlusar* 'cold (of affection); uncomfortable (of clothing)' (*tlusar* 'affectionate, kind; agreeable to the touch').

neo- 'un-': *neo-chronail* 'harmless' (*cronail* 'offensive, hurtful'), *neo-fhurasda* 'difficult, tough work' (*furasda* 'easy'), *neo-shalach* 'unpolluted' (*salach* 'dirty, nasty, foul').

so- 'well' (cf. *do*- above): *so-dhèanta* 'possible, practicable' (*dèanta* 'done'), so-mharbhta 'mortal; easily killed' (*marbhta* 'killed'), *so-thuigsinn* 'very intelligible' (*tuigsinn* 'understanding').

Not all derivational prefixes in SG in fact require a lenited base (e.g., *ana*- 'un-': *ana-ceart* 'unjust'), but many, and among them a number of productive ones, do.

2.5

Given the variety of conditioning environment types that must be considered for one (more or less standardized) variety of one Celtic language (SG) on a purely synchronic view, it might not be surprising that some researchers have cordoned off a subsection of mutation to treat in print. On the other hand, there are some more ambitious projects that have tried to handle all of Celtic mutation in a single descriptive framework (Hamp 1951, Pyatt 1997).

The former treatments are important, as far as they go, for initial mutation is a recurring puzzle in the face of much mainstream linguistic theorizing. A number of these works are treated in Chapters 3 (phonological approaches) and Chapter 4 (syntactic approaches) below. The latter pan-Celtic studies entail a measure of abstraction from surface phonological facts, and a glossing over of details that are actually not

homologous among the Celtic languages. There is also a temptation, in this pan-Celtic view, to import facts from diachrony into the synchronic description, or at least to use certain facts, say, of Old Irish or Middle Welsh, as justification for certain analytical choices, including underlying or intermediate representations to which a naive contemporary speaker could have no access. It is with this rich literature in mind, including certain descriptive "red herrings" of the sort just mentioned, that Chapter 5 below presents a morphological, interface-based approach to SG mutation only, but including all of the mutation types and conditioning environments addressed in this chapter.

Notes to Chapter 2:

1. But note current (contentious and even adversarial) efforts to resurrect Cornish based on texts and old grammatical and phonological descriptions. See George (1993) for an extended description of the historical stages of Cornish and its linguistic structure at all levels, and then compare the brief notice of Thomas (1992), which is both agnostic on many points of grammar and pronunciation and fairly dismissive of revivalist efforts. Thomas has the scantest of bibliographies, lacking any mention of George's body of work dating back a decade earlier.

2. SG contrasts aspiration in stops, voicing in (only some) fricative consonants.

3. Orthographic symbols are indicated in angle brackets < > where they might otherwise be ambiguous in the text.

4. Some SG dialects do distinguish lenited variants phonetically, and thus for such dialects, the pattern follows the dentals with respect to the distribution of the lenited variants.

5. Although for a proposal on the rise of the s+[obstruent] clusters in SG, see Stewart (in press).

6. There is dialectal variation in the realization of plain stops under Nasalization, from a prenasalized voiced stop to a fully nasal segment. I opt for the latter for ease of exposition.

7. The behavior of /m/ in SG (in Goidelic generally) (Rogers 1980) would seem perhaps to be a remarkable deviation from cross-linguistic expectations, whereby one would expect patterning with sonorants (classes 4 and 7), although stop-like behavior of /m/ is not without precedent. For example, in Sanskrit, the initial

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clusters /br, dr, gr, mr/ are all acceptable, but */lr, nr/. The presence of /m/ induces marked nasality in adjacent vowels, especially if stressed, a property shared with the sonorant nasal /n/. Otherwise, however, SG /m/ patterns phonologically as an obstruent, neutralizing with /b/ under mutation (except for the differential nasal assimilation in the neighboring vowels for <mh> as opposed to <bh>. Even though, at the segmental level, <mh> and <bh> correspond to [v], the nasal assimilation of adjacent vowels regrounds the contrast in context.

8. E.g., *cho* 'so (much)' is a likely candidate to trigger Lenition, given that it is short, closed-class, and vowel-final, yet it triggers no mutation whatsoever in SG. Further, *eadar* can mean either 'between' or 'both', but it only correlates with Lenition when it has the meaning 'both' (Calder 1923:296).

9. Prefixed segments are written as they appear in standard orthography, *t-* and *h-*, in distinction to the projected mutations, represented as superscripts (following the practice of Oftedal 1962).

10. Note especially that there allomorphic distinctions before one and the same initial segment, e.g., /f/ (class 6), and the existence there of a leniting nasal-final allomorph *an*^{L}, as in *an fheosag* (f.) 'the beard'. Further theoretical analysis or speculation is deferred until chapter 5 below, where definiteness in SG NPs is taken up as a phrase-level inflectional category, with the form of both the initial of the N' and the definite article itself standing as co-exponents of the definite feature, taken realizationally in paradigmatic terms, rather than incrementally in syntagmatic terms, via the projection metaphor.

11. A quasi-derivational element *gu*, which marks an adjective as serving an adverbial function (e.g., *math* 'good', *gu math* 'well') would seem to stand in a positionally exclusive relation with these and other intensifiers (*glè mhath* 'very good' or 'very well').

12. Not all modern Celtic languages are as easily described in terms of morphological cases, including a descriptive indeterminacy in the logical subjects of Welsh non-finite verbs (Ch. 4).

13. Since the definite article here projects Nasalization (/naŋ(g)rɯɪv/, /namalax/), it would seem that we have a pattern developing, i.e. that projected mutation trumps (precedes disjunctively) an incorporated grammatical mutation. This idea is pursued further in Chapter 5 below.

14. Although it is the case that definite Oblique singular masculine nouns lenite when possible, e.g. *leis a'bhalach mhòr*, and the Lenition then could be treated phonologically as spreading. Where Lenition does not take place, e.g., with the definite article and a noun beginning in <t> or <d> as *an taigh* above, it would perhaps be theoretically challenging to motivate the persistence of the spread beyond its failure at the first initial. See Ch. 5 below on the treatment of definiteness in NPs as a phrase level morphosyntactic (inflectional) property.

CHAPTER 3:

CELTIC MUTATIONS, PHONOLOGICAL THEORY, AND
CHRONIC ANACHRONISM

3.1

In this chapter, I present and discuss synchronic phonological analyses of Celtic

initial mutations. While it is true that (1) most if not all of the initial mutations were at

one time phonetically motivated phonological generalizations, and (2) significant

generalizations within and across alternant pairs may be captured in terms of standard

distinctive features, this does not mean that the most adequate synchronic description of

mutation is *ipso facto* phonological at its core.

There is a common assumption alive in linguistics that anything that affects or

manipulates sound in language belongs rightfully to the domain of phonology. This

assumption has a rich and varied history, no doubt, but it fails to the degree that many

such effects and manipulations require reference to conditioning beyond the concerns and

classifications of speech sounds per se, and that such analyses treated phonologically

entail the postulation of phantom/zero elements and/or underlying representations that are

synchronically untenable.

There is no disputing the fact that initial mutations relate elements of sound

structure in the synchronic grammar. What is subject to debate, however, is whether this

entails a wholly or even primarily phonological account of the phenomena. The answer to

this question has everything to do with one's definition of phonology. An important distinction to be made with respect to speech sounds is between the <u>range</u> (inventory) and the <u>domain</u> (contexts for instantiation) of particular sounds. It is useful for the purpose of distinguishing these aspects systematically to refer to the *sound structure* of language, a term that comprises both the range and the domain, yet remains neutral with respect to the conditioning of any particular pattern or generalization. Sound structure is therefore the preferred general term. Phonology is restricted to automatic (synchronically wholly phonetically motivated) phenomena (=allophonics) and phonemics. While SGIM has a phonological aspect, i.e. its range is defined phonemically, it cannot be reduced to phonology so defined.

Generative phonology has shown a marked propensity for expanding the territory of phonology at the expense of morphology, or to phrase matters differently, to countenance grammatical and even lexical conditioning in the formulation of putatively phonological rules. Janda (1987:3-6) points to the absurd logical conclusion of permitting anything that touches sound structure to be categorized as phonology, for indeed all of spoken natural human language involves sound structure in its articulation, and thus from that perspective, semantics, for example, is just as tied to sounds as any other aspect of language. Are semantic generalizations therefore phonological? If the reader answers "yes" at this point, there may not be much else of interest in what follows. I take rather the opposite position, that grammatically- or morphologically-conditioned phonological rules are an incoherent construct. Such rules are rather morphological rules of sound structure.

I distinguish among types of sound structural rules following definitional criteria laid out by Janda (1987), wherein phonetic/allophonic rules constitute the first and most automatic level. Phonetic/allophonic rules show motivation in terms of acoustic, articulatory, or perceptual phonetics, and thus may be formalized without reference to any other aspects of linguistic structure. Phonetic/allophonic rules are the most general, the most elemental sort of sound-structural rule, and as such, they are automatic by definition. Phonological rules, by contrast, are not necessarily[1] automatic in the synchronic grammar, and while their formulation may resist attempts to find (recapitulate historically) phonetic motivation, such rules must be free of reference to morphological or syntactic categories. They may refer to syllable and word boundaries[2], but their sensitivity should be no more fine-grained than that. That is, reference to lexical classes or particular affixes should be ruled out of phonological generalizations.

Much of what has passed for phonological analysis in the modern era is therefore, by these definitions, not properly phonological, in that its generalizations depend on morpholexical or other grammatical conditioning, and does not serve to rid surface phonological structures of illegitimate sequences of sounds. Instead, such rules serve to realize morpholexical or morphosyntactic categories, either as sole exponents (and therefore as morphemes, at some level of analysis) or as concomitants of morphological operations. These generalizations therefore depend on non-phonology for their existence and thus their proper description, and so it makes little sense to pretend that this is not so, that as long as the rule "looks more or less like a phonological rule," it is fair game for phonology.

It is the purpose of this chapter to look at much of what has been said in the generative phonological literature about mutation, specifically about SGIM, but also going farther afield into Celtic and non-Celtic mutations, certain other edge effects, and internal alternations, e.g., Umlaut. With the criteria above, i.e. no morpholexical conditioning, in mind throughout, there is very little in the synchrony of SGIM that can be salvaged as properly phonological. There are simple alternation characterizations that may be made in terms of phonological classes, but their distribution is not fully predictable, and thus not adequately describable, from the concerns of sound alone. The analysis in Chapter 5 below demonstrates that a morphological description is required for an insightful and adequate characterization of SGIM. First, however, we must examine the phonological literature.

3.2

Hamp's (1951) "Morphophonemes of the Keltic Mutations" posits quasi-segmental morphophonemes in phonemic strings, positioned *post hoc* based on the distribution of lenited or nasalized segments. So-called trigger elements are assumed to end in a morphophonemic element, and thus their effect is transmitted across word boundaries to the initial of an immediately following word, e.g., *mo* 'my', which correlates with Lenition in a following word, is represented as /moL/. That only word boundaries are involved in the characterization of the environment allows this to be considered a phonological process by the criteria above, but the fact that trigger-final morphophonemes are presumed to be part of the lexical entries of the triggering elements calls the segmental-phonological basis of the representations into question. Further, the apparent existence of mutations that are not attributable to an adjacent trigger (or to any

overt formative, for that matter) force the presence of morphophonemes in the lexical

entries of content words. This is problematic, of course because it breaks up the unity of

the lexical entries for inflectionally related words. Once this is countenanced and the

distribution described, it becomes clear that the correlation with inflectional distinctions

is not coincidental, i.e. that the morphophoneme is morphologized, and thus not strictly

speaking phonological. Some morphophonemes belong to the lexical entries of triggers,

and they are thence projected onto adjacent initials, effecting a sandhi-like mutation.

Other morphophonemes are distributed as inflectional categories, and cannot plausibly be

reduced to sandhi synchronically. Hamp, however, goes one more step and chooses to

attribute the distribution of all lenited segments, alternating or not, initial or not, to the

presence of morphophonemes in the underlying representations of content words

(lexemes). Thus the impulse to unify lenition and nasalization actually serves to obscure

the lines between and among sandhi phonology, morphological alternation, and lexically

idiosyncratic phonemic composition. To be fair, this approach to the reduction of

underlying phonemic contrasts is exactly in keeping with American Structuralist theory

and practice. In the interest of reducing the phonemic inventory, however, an enterprise

that quickly meets the law of diminishing returns, Hamp (1951) overextends an initially

insightful descriptive conceit.

Although Oftedal (1962) admits great admiration for the work of Hamp in this

context, he steps back from Hamp's segmental representations, preferring to view the

morphophonemic symbols as diacritics and clearly not as segments on a par with the

constituent phonemes, e.g., Oftedal proposes /mo^L/ for Hamp's /moL/, so as to signal the

different status of ^{L} with respect to clearly phonemic /mo/. Oftedal also questions the

appropriateness of using morphophonemes in non-alternating cases, stating that the invariant outcomes of diachronic processes, regardless of phonetic identity with respect to modern alternating segments, are mutations "only in the diachronical sense of the word and [do] not belong to synchronical morphophonemics" (95).

In making morphophonemes clearly non-segmental and in disqualifying segments that do not alternate on the surface in the synchronic grammar, Oftedal effectively takes away most of what was plausibly phonological from the analysis. What remains is the mutating segments only, and Oftedal's four-way typology of conditioning environment:

A. **Projected** – "They are projected to the mutated form from some mutating morpheme. They…are part of the mutating morpheme, but they manifest themselves phonemically in the initial of an immediately following form" (96);

B. **Incorporated** – "Incorporated are all those mutations which are not projected; they are part of the form in which they are manifested and not of any preceding morpheme" (97), of which there are two subtypes:

1. **Free** – "They may occur initially in an utterance and are accordingly not conditioned by any preceding forms" (98) e.g., e.g., SG independent past *chuir* 'put (past)', vs. *cuir* 'put! (imperative)';

2. **Bound** – "[They] are not conditioned by special mutating qualities of preceding morphemes but by purely syntactic government" (100), of which there are two subtypes:

(a) **Inherent** – "[They consist] of mutations which are always found in certain grammatical forms' (100), e.g., genitive Lenition

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of masculine proper names in Isle of Lewis SG, *Chaileain*

'Colin's' vs. *Cailean* 'Colin';

(b) **Retrospective** – "Here the mutation itself is the expression of a

syntactic relationship" (101), e.g., Early Welsh titles or

appositives, *Llud* **v***renhin* 'King Llud', vs. *brenhin* 'king'.

Oftedal's typology of mutation is somewhat confounded by the failure to separate strict

linear adjacency from fortuitous linear adjacency, and so even the example *Llud vrenhin*

is superficially ambiguous between projected and incorporated-bound-retrospective.

Oftedal's analysis does, however, serve to point out that local conditioning is not always

necessary for initial mutation to occur, and thus he separates potential phonology from

clear non-phonology.

3.3

Rogers (1972) was both fleshing out and reacting against the theoretical

framework promulgated by Chomsky and Halle in the *Sound Pattern of English* (SPE,

1968). Whereas American Structuralist theory had explicitly distinguished analytical

levels, and further outlawed the mixing of such levels (Hamp 1951 being both an

example and a blurrer of the line between phonemics and morphophonemics), the

generative phonological enterprise, fostered in large part by SPE and related works, tried

to collect both automatic and non-automatic phonology together with clearly

morphologically conditioned phenomena. It is exactly this sort of conglomeration of

analytically distinct phenomena under the purview of a single putative component that

motivates the objections that begin this chapter, i.e. an appeal to a typology of sound

structural rules.

Rogers (1972) seeks to integrate all of mutation into a synchronic system of phonological rules. These rules require *ad hoc* devices, including fully extrinsic rule ordering, a morphological diacritic feature [+Lnt] that some function words possess intrinsically (functionally equivalent to the morphophonemes of Oftedal, if not to all of Hamp's), and in the case of the Nasalization mutation, an underlying velarized dental nasal /N/ that serves to trigger mutation in a following initial, requiring an intervening morpheme boundary (+)[3]. Grammatical words that end in nasals but do not trigger Nasalization are ignored. The fact that Rogers folds the Nasalization rules in between automatic rules of aspiration in voiceless stops[4] is meant to imply that Nasalization, if not mutation in general, is just an ordinary and integral part of the general workings of SG phonology.

Rogers puts forth a set of Lenition rules that can in fact cover the alternations, but which is powerful enough that it allows for two-stage changes within one and the same rule in order to account for the fact that lenited /s/ merges with lenited /t/ as /h/ on the one hand, and that lenited /d/ merges with lenited /g/ as /ɣ/ on the other, via a [z] stage that is unattested on the surface in SG (/s/ does not alternate with [z] under Nasalization). A single straightforward purely phonological rule cannot capture this unnatural-class behavior[5], and even to the degree that it does succeed, it cannot describe the conditioning environment without reference to morpholexical information (the [+Lnt] feature) and a morpheme boundary (+) (Rogers 1972:70-71).

(8)

$$
\begin{bmatrix}
-\text{sonorant} \\
+\text{coronal} \\
+\text{continuant} \\
\langle-\text{voice}\rangle
\end{bmatrix}
\longrightarrow
\begin{bmatrix}
-\text{coronal} \\
-\text{anterior} \\
+\text{sonorant} \\
\left\langle\begin{matrix}-\text{consonantal} \\ +\text{low} \\ +\text{tense}\end{matrix}\right\rangle
\end{bmatrix}
\ / \ [+\text{Lnt}] + \underline{\quad}
$$
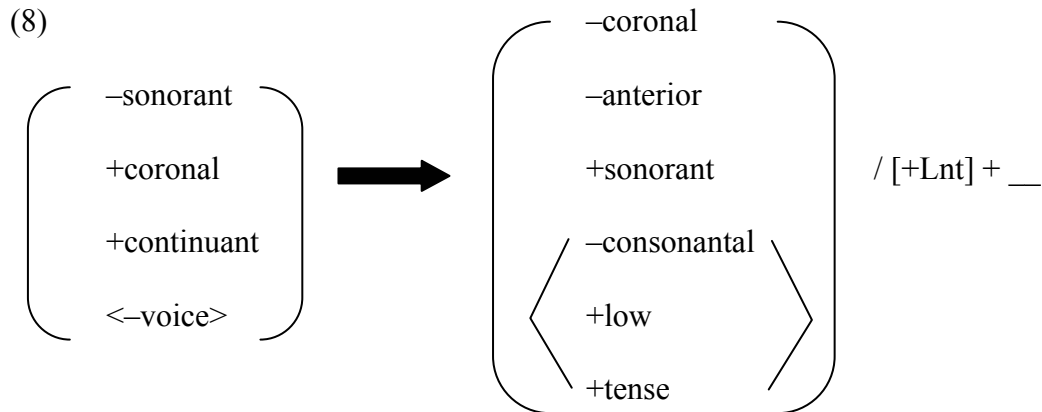
Cram (1975) claims that although Lenition is irreducibly grammatically conditioned, Nasalization is synchronically phonologically conditioned. Building on the work of Hamp, Oftedal, and Rogers, Cram delineates the conditioning distinction as follows:

> Briefly, an alternation is said to be phonologically conditioned if the rules relating the alternating segments can be stated without reference to any specific set of syntactic categories; otherwise the alternation is said to be grammatically conditioned (366).

Cram assumes with Rogers (1972) that Nasalization triggers end in phonemic unit /N/, and that the contrast in the stop series is based on voicing, rather than aspiration. Thus Cram proposes a sequence of ordered rules (367):

(9)   Ø → h / Tense stop ___

        N → Homorganic nasal / ___ + stop

        Stop → Ø / Nasal + ___

There are methodological and empirical problems for this account, however. Distributing aspiration after all tense stops fails to predict the well-known phenomenon of pre-aspiration of the stops in his tense series when stressed-syllable final, e.g., *cat* 'cat',

used for several examples in Chapter 2 above, is represented phonemically as /kʰatʰ/, but is realized phonetically as [kʰaʰt], or using Cram's analysis, /kat/ → [khath], and presumably entailing a (repair) rule metathesizing the final [h] and [t]. That much is not a serious analytical problem. More difficult, however, is the prediction that final /N/ is categorically a Nasalization trigger, given words like *moran* 'many, a great deal' that do not correlate with initial Nasalization of a following word, e.g., *moran taing* 'many thanks' [moraNtʰaŋ].

Cram (368) addresses this point by referring back to the '+' notation in the second and third rules above, as opposed to the presumed '#' word boundary that would be found between *moran* and *taing*. Given the SPE assumptions (Chomsky & Halle 1968) that underlie Cram's analysis, the distribution of boundaries are part of the phonology in general, and independently required for stress assignment, so they are not an *ad hoc* device specific to the determination of Nasalization in SG. Furthermore with the shift away from American Structuralist separation of phonemics and morphophonemics, boundaries that function on a par with phonemic segments are not uncommon. Distinctions like automatic versus non-automatic alternation (Hockett 1958:279) are less important in SPE-style phonology.

In terms of the phonological cycle, Cram identifies Lenition rules as cyclic, in particular because they seem to apply on multiple iterations, at the lexical, inflectional, and phrasal level (pp. 372; cf. Oftedal's (1962:95) criticism of Hamp (1951) on the assumption that word internal appearance of sounds that are identical to the outcome of Lenition, e.g., are properly analyzed as alternation at all in the synchronic phonology). Nasalization, according to Cram is non-cyclic, because it does not apply word internally

and its distribution can be predicted phonologically, given his hypotheses about the nature and function of boundaries (cf. Rotenberg (1978:105ff.) on the legitimacy of phonologically active boundary elements as opposed to non-segmental, constituent-defined junctures; discussed further in Chapter 4 below).

3.4

Ó Dochartaigh (1979) offers an account of the alternant correspondences in terms of Dependency Phonology. He goes so far as to say that the morphological conditions behind the distribution of the alternations is not of concern to him in this study. What remains therefore is to capture the mutation relations in terms of manners of articulation as given by the C and V gestures that Dependency Phonology uses, either singly or in combination, to represent natural classes of sounds. The breakdown is as follows:

(10)   C   V   C,V   V,C   ...

This does allow for an indication of consonant classes, and further for the systematic summary of the alternations, where these do correspond to a coherent operation. Where they do not, however, a different rule must be proposed, and thus the mutations are shown not to be unitary, but rather to have an internal complexity, a structural inconsistency which demonstrates that although the rule may be described in terms of speech sounds and phonological classes, the mutations themselves are not automatic and are not synchronically phonetically driven. The further fact that Ó Dochartaigh readily sets aside the contextual aspect of the structural description of the rule(s) makes it questionable whether this description offers any real insight that was not already available with Rogers's (1972) generative rules. The Dependency representations

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serve to abbreviate sets of distinctive features, rendering rules more elegant, in a sense, but the spirit and effect of the rules remain ambiguously synchronic.

3.5

Lieber (1983) builds on McCarthy's (1981, 1982) framework of Autosegmental Morphology that was established at least initially to bring non-concatenative morphological operations under the umbrella of abstract concatenation. Morphemes in this framework are all about getting the right segments into the right positions with respect to one another, without violating basic autosegmental structural conditions and following association conventions.

Mutations are performed by way of floating autosegments that belong to triggering function words. From the right edge of these function words, the autosegment associates to the right, causing a phonological alteration to the initial segment of the next word. This sort of association is conceived of as strictly local, if not linear, and so it is proposed that in one way or another, all mutations, Celtic and otherwise, must be projected (in Oftedal's (1962) sense) from a trigger to an adjacent target.

Where there is no clear overt trigger, Lieber proposes that phonetically (and semantically) null elements are inserted in the syntax, their only form being the mutating autosegment. Lieber likens these empty elements to *of*-insertion in English, whereby a semantically empty element is inserted between meaningful constituents under particular syntactic conditions. This method of inserting structural phantoms always and only where an explanation for an otherwise unprojected (i.e. *inherent*) mutation is needed would seem to be an *ad hoc* solution of the most blatant kind.

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3.6

      Ní Chiosáin (1991) employs Feature Geometry to a similar effect as all the above.

Again there is little concern for the details of mutation distribution in terms of

grammatical conditioning, adopting a featural diacritic along the lines of that found in

Rogers ([+Lnt], 1972). The focus is on the attachment, specification, and alteration of

phonological features, given the presence of a particular diacritic. That the mutation

effects are not fully phonologically parallel and that a diacritic feature in and of itself has

no direct phonetic expression are of no concern in Ní Chiosáin's analysis.

      Ní Chiosáin does, however, identify the striking generalization alluded to in

Chapter 2 above, that coronals tend not to show Lenition after other coronals.[6] For

example, feminine nouns in SG beginning with either /d/ or /t/ will not show Lenition

after the definite article, *an duileag* 'the page' vs. non-coronal-initial *a'chaileag* 'the

girl'. Ní Chiosáin attributes this resistance to Lenition to a shared place specification

between the final /n/ and the initial /d/ or /t/ (30-46). The assumption that the Place node

of each segment shares a single Coronal specification[7] means that the Coronal node

"straddles" a word boundary, if you will, and thus that the word-initial /d/ or /t/ is no

longer strictly word-initial in every respect (41). If the rules effecting Lenition and

Nasalization refer to word-initial position explicitly, as Ní Chiosáin's rules do, then so-

called "Coronal Blocking" can follow from the assumption of the shared Coronal node.

This would imply, however, that /d/ and /t/ never show Lenition after a final coronal, and

this is not the case in SG at least, e.g., *gad thaigh* 'at-your (sg.) house'. The linking

analysis may capture certain diachronic residual patterns, but it is not the case that

coronals meeting over a word boundary categorically block Lenition in SG.

3.7

  Grijzenhout (1995) uses Aperture Theory with an effect that is apparently very similar to that found in Ó Dochartaigh's Dependency analysis, with the added descriptive power of basic feature geometry. The labels are different here, with closure apertures and release apertures that can be specified separately or as linked, and rules may be stated over classes that refer to particular aperture combinations or feature combinations. Grijzenhout walks the reader through diachronic stages of Irish, showing how the patterns have changed, and she is up front about noting the role of grammatical conditioning on the distribution of mutation.

  There are, however, some unfortunate omissions from Grijzenhout's data which, although they permit a more concise description, misrepresent the facts of lenition as following natural class behavior more than they actually do. Not only is the strange behavior of /m/ largely ignored, but the fact that /d/ originally lenited to /ð/, and then later merged with /g/ to /ɣ/ is left unnoticed. Grijzenhout instead claims that /d/ lenited to /θ/, merging with /t/ even in Old Irish (Grijzenhout 1995:101-102). This is a difficult case to make, given the fact that they later followed separate paths, meaning that the merger would have to have been undone, so to speak. For this to happen, one would seem to have to appeal to the conservative influence of the written language in the reassertion of the distinction of lenited /t/ versus /d/. The problem here is that most Irish speakers would seem not to have been literate, and that the modern Gaelic languages are not predominantly literary languages (not to underestimate the quality, significance, or volume of Gaelic writing, just merely to note that the literacy rate for speakers of the Gaelic languages is not on a par with other European languages). For this reason, it is not

plausible to base an argument for the resurrection of a systematic morphophonemic split on a condition that would only hold in a minority written tradition. Far more likely is that the merger did not occur as Grijzenhout suggests, but rather that the alternants were held separate, and that the lenited alternant of /d/, /ð/ or some equivalent, later merged with /ɣ/, where it remains to this day.

3.8

Hayes (1990) takes an ingenious tack in proposing a theory of Precompiled Phrasal Phonology that abstracts syntactic constructions and represents them as *phonological instantiation frames* (PIFs; 93), e.g, for Hausa Vowel Shortening the frame is given as the following (93)[8]:

(11)   *Frame 1*: / [$_{VP}$ ___ NP…], NP non-pronominal

Building on an architecture that distinguishes lexical (i.e. lexicon internal) rules from (post-syntactic and) post-lexical rules of phonology (as found in, e.g., Lexical Morphology and Phonology (Kiparsky 1982, 1985; Mohanan 1986), Hayes adds a mechanism whereby "whole classes of words [are allowed] to acquire precompiled alternants" (91). Hayes assumes that inflectional morphology as well as derivational morphology takes place in the lexicon, and thus special alternants of inflected forms may be precompiled outside of the operation of general lexical phonological rules and tagged with diacritics that are indexed to PIFs, abstract syntactic constructions that permit stipulated forms to be inserted in place of what might be expected by rule. In this way, PIFs are given a quasi-lexical status of their own, and syntactic trees are evaluated with respect to them. Where a lexical insertion site matches one of the language's PIFs, the precompiled alternant is inserted, pre-empting the ordinary inflected form.

Hayes considers a variety of Consonant Mutation facts in terms of precompilation. He gives extended attention to Mende (99-100), but only briefly touches on Celtic matters, referring to Rotenberg (1978, see Chapter 4 below) for Modern Irish and Thomas-Flinders (1981) for SG. Hayes describes the non-triggered past tense Lenition, e.g., as a reanalyzed, or "restructured", formerly phonological rule.[9] Morphologization of formerly phonological rules releases processes from the strict locality conditions Hayes assumes for even precompiled phonological rules (106):

> [T]he Irish mutations have been reanalyzed as inflection (hence as potentially non-local) in just those cases in which the data were amenable to syntactic reinterpretation as agreement or other inflectional processes. In the remaining contexts, mutation persists as a local process—in my terms, as precompiled phonology.

From the argument overall, it would seem that Hayes intends that the independence of a process from some trigger is not a necessary condition for diagnosing a rule as non-phonological, but rather it is a sufficient condition.[10] Given the wording of this statement just above, however, Hayes opens the door to treating both obligatorily adjacent and fortuitously adjacent contexts in terms of precompilation. It should be reaffirmed, therefore, that it is inflectional function rather than linear adjacency that should determine whether a rule is morphological or (precompiled-)phonological.

3.9

Zwicky (1990) sketches the concept of *shape properties* as part of a theory of phrasal phonology. Whereas phonological shape can be determined indirectly through inflectional/grammatical categories, Zwicky proposes that certain syntactic rules can

distribute shape properties that may be spelled out as formal concomitants of the constructions they define. Shape properties may stipulate (1) "that certain anaphoric constituents are phonologically empty", (2) that syntactic constituents bear some prosodic pattern of stress, tone, etc., or (3) that a specific position of a certain distinguished element within a construction be, or at least be compatible with, certain phonological features (387). Here Zwicky mentions Welsh mutations, and in particular those that do not suggest a clearly inflectional analysis, e.g., Lenition of a feminine singular nominal after a determiner.[11]

3.10

Pyatt (1997) presents an extended and quite comprehensive survey of Celtic initial mutations in the framework of Distributed Morphology (DM, Halle & Marantz 1993). I treat Pyatt's analysis in this chapter on phonology because one of the principles of DM is that there is no discrete morphological component of the grammar, but rather the various forms and functions that may be referred to as "morphology" are better seen as "distributed" among the other independently motivated parts of the grammar and the lexicon. Inflectional features are distributed as functional heads in the syntax, licensing the introduction of morphemes from the lexicon, and various morphologically-conditioned phonological rules and readjustment rules early in the phonological component prepare the string for interpretation at Phonological Form (PF).

Pyatt offers an admirable survey of phonemic inventories and the diachronic source of mutations across the modern Celtic languages. In the interest of talking about rule evolution, this would seem a logical preliminary step. In a putatively synchronic study, however, there is some question as to the need for this depth of coverage of the

historical details. In the historical exposition, Pyatt twice commits what has been called

Twaddell's Fallacy (Janda 2003:410-12), i.e. the claim that a certain process

morphologized after its original phonological conditioning environment was lost:

> Even after apocope [in some Proto-Celtic state] though, the sandhi rules somehow
>
> remained active and became grammaticalized as mutations (47),

and

> When the final /θ/ was lost in Middle Breton, the surface outputs were
>
> grammaticalized as the complex Mixed Mutation (72-73).

The qualifier "somehow" in the first quote is telling, because there is no logical way that

a rule could be part of the synchronic phonology after its conditioning environment has

been lost. Rather the sandhi rules must have been moving toward grammatical status even

before the losses in question took place, and the losses closed the matter, as it were.

Pyatt's synchronic analysis makes reference to the DM version of the Y-model of

syntax, which adds a level of Morphological Structure (MS), subsequent to surface

syntactic (S-) structure. Within MS, the morphosyntactic properties distributed by the

syntax proper are subject to morphological operations that can fuse, merge, fission,

and/or copy features from one node to another.[12] These operations can "change the

structure of terminal nodes, but not their content" (93).

Pyatt's version of DM also includes Morphological Readjustment rules that "can

insert, delete or change features depending on the structure of the language" (93). These

rules are used to assign diacritics to nodes with particular morphosyntactic feature

specifications (120). For example in Old Irish:

(12) $[\ ] \rightarrow [\{N\}] / [ACC, -pl]$

$[\ ] \rightarrow [\{L\}] / [DAT, -pl]$

Note that these diacritics enable the word so marked to serve as a trigger, not to mutate themselves, thus an Old Irish accusative singular triggers Nasalization in a following word, a dative singular triggers Lenition, independent of the quality of their own initial mutation or lack thereof.

Not all diacritics are assigned by rule, however. The grammatical words that are more commonly identified as mutation triggers bear diacritics in their lexical entries, as in the following (p. 115):

(13) Breton Mutation Triggers

/he/ – [HER, D^0, {S}]   ({S} = Spirantization trigger)

/mil/ – [1,000, $Nmrl^0$, {L}]   ({L} = Lenition trigger)

Pyatt assumes that all mutations take effect subsequent to MS and vocabulary insertion, in the first stage of the phonological component, by means of Phonological Readjustment rules, sensitive to the morphosyntactic diacritics.[13] Where no overt trigger is found, Pyatt assumes a phonetically null morpheme that bears the appropriate mutation diacritic in its lexical entry. Note on methodological grounds that these null morphemes are posited on the assumption that all morphological operations and vocabulary insertion is in the form of concatenation. Phonological null morphemes that do not bear mutation diacritics are in principle available in infinite number, but are empirically undetectable.

Mutations in Pyatt's analysis are all projected in Oftedal's (1962) sense, since concatenation with a trigger is the definition. Oftedal did not, however, conceive of affixes as triggers, but instead assumed a more word-based morphology, despite his

titular reference to a "morphemic evaluation" of the Celtic mutations. In this way, there are no "incorporated" mutations, but rather those that are triggered by phonetically null affix triggers. Another motivation for making mutations "early" phonological rules is that this allows for the triggering of mutations by triggering elements that optionally, sometimes, or even always (!) delete, thus saving the trigger analysis and reducing the number of phonetically null affixes or allomorphs that one must assume otherwise (171).

Phonological readjustment rules are triggered by particular diacritics, but their structural change is defined with respect to contrastive features only. Since these rules work in terms of phonological features, however, the simpler the formulation of the structural change, the more one must rely on additional repair rules to "fix ungrammatical output" (252). Pyatt's choices with respect to phonemic inventories are informed by normalized, pan-dialectal (read historically earlier) stages (250-252), so there are representations that require repair that might not under a more surface-oriented phonemic analysis of particular dialect mutation facts, e.g., the claim that Connemara Irish has an underlying phoneme /ɯː/ that never surfaces but rather is always repaired, late in the derivation, to /iː/.

The recurrent issue of whether a trigger must be immediately string adjacent to its target arises here, since because Pyatt places mutation in the phonological component, "Target Adjacency falls out naturally" (113). The "naturalness" here is called into question in the more extreme cases of apparent long-distance mutation, e.g., Irish Lenition triggered by a preposition "over" a definite article (329-420). Given the imperative of locality for phonological mutation, Pyatt proposes a morphological merger of P and D under the P node during MS, and the merged P-D unit being assigned a

diacritic {L} by a Morphological Readjustment defined with respect to P-D. This misses the connection of P with {L}, but in merging the nodes, Pyatt does save Target Adjacency (334). Justification for the merger can be found in the fact that there are a few prepositions that have a combined (univerbated) form with the definite article, e.g., SG *don* (*do'n*) 'to-the'.

Pyatt extends the merger analysis to constructions involving a possessive adjective and the numeral two, *dhá*. The possessive adjective apparently triggers its own mutation, pre-empting the expected Lenition from *dhá*, e.g., *dhá chrann* 'two trees (*crann*)' vs. *a gcrann* 'their tree' vs. *a dhá gcrann* 'their two trees' (336). In the merger analysis, the numeral merges with the possessive adjective at MS, and the merged "constituent" is assigned a diacritic that (not coincidentally) is exactly the same as that triggered by the possessive adjective independently. Further, there is no univerbated alternant as can be found for the P-D merger seen above. The power of DM's MS operations and rules can be seen very clearly here in the service of maintaining the Trigger Adjacency constraint despite questionable independent support.

In Pyatt's favor, by adopting a diacritic approach in the tradition of Hamp's (1951) morphophonemes Pyatt allows for the collection of phonological "sub-rules" to stand as instantiations of a single abstract process. By arguing directly for this approach in favor of floating features, as advocated by Lieber (1983) and Ní Chiosáin (1991), Pyatt demonstrates the empirical problems of floating features for mutations that effect different processes on different classes of initials, and that do not occur as generally as a true autosegmental spreading analysis would predict.

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3.11

Kibre (1997) argues that mutations in Welsh are best handled in a hybrid

phonological fashion, in the first instance via Lexical Phonology & Morphology (LP)[14]

(Kiparsky 1982, Mohanan 1986), and the result then being subject to Optimality

Theoretic (OT, McCarthy & Prince 1993) constraints. In his own words, Kibre "argues

for a purely phonological approach to mutation[15]; that is, that mutations should be

considered part of the phonological representations of morphemes—an abstract part, but

no less a part of their phonological makeup than their segmental content" (iii). This is

reminiscent of Oftedal's (1962:94) statement that "a morpheme is not exhaustively

described unless its mutating qualities are accounted for."

Kibre assumes Mohanan's (1986) version of LP that incorporates a bifurcated

post-lexical rule component, with a "Syntactic Stratum" and a "Postsyntactic (Allphonic)

Stratum" (15ff.). The Syntactic Stratum is an interesting hybrid component in the context

of LP, because although it is represented as (part of) a post-lexical component, it is

governed by the principles of the lexical component, including Structure Preservation

(only phonemic segments) in its representations, sensitivity to non-phonological

information, and cyclic application (15). For phonological purposes, Syntactic Stratum

rules apply as syntactic constituents are built, from the head outward[16], and such rules are

sensitive to syntactic boundaries, morphosyntactic categories, and morpholexical and

morphomic diacritics (the last including mutation diacritics in the case of Welsh). The

syntactic string becomes available to the Syntactic Stratum phonological rules in strict

linear sequence, i.e. in "bottom-up" fashion, accounting for the Target Adjacency/Trigger

Constraint effects found in the majority of mutation contexts.

Triggering elements are thus specified in their lexical entries with mutation diacritics as apparently privative properties, rather than as binary features (cf. Rotenberg (1978:78) for the latter alternative in a description of Irish)(60). Mutation rules are thus sensitive to the presence of mutation diacritics and syntactic junctures, e.g.:

(14)   "Aspiration" Rule[17] $[-\text{voice}] \rightarrow [+\text{continuant}] /_{\text{ASP}}]\underline{\quad}$ (60)

        Nasalization Rule $C \rightarrow [+\text{nasal}] /_{\text{NAS}}]\underline{\quad}$ (61)

In the interest of capturing the functional unity of the phonological sub-rules that together compose Lenition, Nasalization, etc.[18], Kibre proposes the creation of rule blocks, "set[s] of lexical rules which have the status of a single rule with respect to the rest of the grammar. In particular they have the following formal properties:

> Environments trigger the application of a rule block, but do not specify which (if any) of its member rules is actually applied.

> The precedence of rules within a block may either be established by extrinsic ordering or by universal conventions, but is not controlled by the rule which invokes the block" (62).

This method has the desirable implication that instances of any particular mutation are blind to the phonemic content or lexical identity of the trigger, i.e., the rule is sensitive to a morphological diacritic, not to particular triggers (ibid). It has the unintentional implication, however, that this can all described with a minimum of reference to the exigencies of sound structure per se.

As for the involvement of OT in this analysis, Kibre notes instances where phonological contexts that, all else being equal, might be expected to neutralize into morphological ambiguity, but through the operation of something like a rule conspiracy,

the homophony is avoided. Rather than resort to a conspiracy theory, Kibre suggests that a morphologically-oriented constraint system can evaluate candidate outputs of mutation, using constraints including the following:

(15)   EXPRESS(m): Morphological category m must be overtly expressed.

NOHOMOPH(m_1, m_2): Morpheme m_1 must have an expression which is not homophonous with an expression of m_2.

Constraints of this sort are by definition exploded, since they include variables. The putative constraint EXPRESS has as many instantiations as there are morphological categories in Welsh. Matters are considerably more daunting for NOHOMOPH, because the variables here range over all the morphemes in the language, and since there are two variables, the number of instantiations of the constraint is equal to $n(n-1)$ pair-wise combinations of non-identical morphemes. The constraint schemata could in principle be conceived of as universal (a conventional expectation of OT constraints), but the exploded subtypes are fraught with the arbitrariness of the sign. Truly phonological constraints are at least limited to the finite sets like phonemic inventories, distinctive features, prosodic domain categories, etc.

Indeed, although developed apparently entirely independently, Kibre (1997) and Pyatt (1997) make many parallel assumptions in the interest of maintaining target adjacency. Like Pyatt, Kibre wishes to maintain trigger adjacency for all instances of mutation, even the various apparent "long-distance" and "incorporated" mutations. Kibre "accredit[s] the observed mutation to unobserved, segmentally empty morphemes" (68). Kibre assumes lexical diacritics, mutation sub-rules, null morphemes, and even an analogue to morphological merger *à la* Distributed Morphology (fn. 5, 68).

In the case of apparent agreement of adjectives with feminine nouns in Welsh, Kibre posits a reanalysis of earlier sandhi into a synchronic null trigger morpheme [+fem] that precedes every AP governed by a [+fem] N. Mutation is mediated by a trigger on this analysis, rather than being a direct exponent of gender agreement, even where the head noun is at a distance, elided, or understood from context. Kibre attempts to justify the null morph on analogy with Morin & Kaye's (1982) analysis of French liaison as a plural nominal suffix /-z/ reanalyzed plural agreement prefix on post-nominal adjectives, e.g., *des découvertes* /z/*inquiétantes* '(some) worrisome discoveries' (Kibre 1997:72).

It is one thing, however, to claim that an overt suffix is reanalyzed as a prefix on an adjacent word, but it is another to claim that an automatic rule of external sandhi is reanalyzed as a null affix whose presence is determinable only in an alternation on a different morpheme. The former is quite concrete, and the migrating /z/ reanalysis is phonologically motivated by a universal tendency for syllables to have onsets. The latter involves the creation of an abstract morpheme to satisfy theory-internal pressures that (1) all mutations are triggered from without and (2) only concatenated, i.e. segmentable, affixes are potential morphemes in their own right.

The assumption of null mutation triggers on an *ad hoc* basis (aside from further multiplying the range of the variables in the putative constraints EXPRESS and NOHOMOPH) is only justifiable to the extent that all morphological properties correspond to structural exponents. It is far from clear, however, that all grammatical properties require some piece of structural "real estate", as it were, in every instance.

3.12

Green (2004) takes the admirable position of a phonologist who wishes to delineate where phonology ends and morphology begins.[19] This search for boundaries presupposes, of course, that there is a domain of sound structural rules that are not by their phonic nature phonological, i.e. that there is morphology that is not just about concatenation of classical morphemes.

Green presses the stated position of OT that phonological processes are predicted to result from the interaction of markedness and faithfulness. Since the Celtic mutations are morphosyntactically conditioned, however, they do not result from the interaction of markedness and faithfulness, and therefore they cannot be phonological (1-2).

Since Green's data are strictly surface-oriented, there is no role for null triggers. Some mutations are proclitic-triggered, and others are syntax-triggered. In neither case is the mutation phonologically conditioned in the OT sense. If mutations are presumed to be phonological, however, then the analysis "would have to show that there are circumstances under which the unfaithful correspondence relationships[20] /b/ ℜ [v], /k/ ℜ [x], /p/ ℜ [f], /d/ ℜ [ɣ], /m/ ℜ [v], etc., are more harmonic than the faithful relationships /b/ ℜ [b], etc. as well as other possible unfaithful relationships including /d/ ℜ [ð] and /t/ ℜ [θ]" (7). Green notes that an independent and only partially parallel process of allophonic spirantization in Manx makes it very difficult to maintain that the more complex correspondence relations found in morphological Lenition are simultaneously more harmonic (ibid).

The fact that the mutations neither target natural classes nor effect unified feature-filling or feature-changing operations mitigates the appeal of a phonological analysis (12). Green assumes a surface-oriented syntactic input to morphology and phonology, and so there is no covert merger of nodes as proposed by Pyatt (1997; §10.0 above) to make distant triggers virtually adjacent to targets. The null trigger analysis (of Kibre 1997, Pyatt 1997, Lieber 1983, et al.) suffers from a lack of independent motivation for the null elements themselves, and arguments that they are not *ad hoc* inventions are inevitably circular (14).

Green catalogs (17-30) a wide range of exceptional behavior of both triggers and targets in Irish and Welsh. Some elements trigger only a subset of the alternations associated with a particular mutation, including certain Irish numerals (3 through 6) and the Ulster Irish negative particle *cha* (cf. the homologous element in SG). Both of these elements are variable in their mutation effects, which are unexpected if mutation is truly phonological. Some lexical items resist the ordinary effects of mutation, including borrowings into Welsh, which may not be too surprising, but also the single native Welsh word *braf* 'fine' in at least the literary language. Again, phonological phenomena in an OT perspective ought not to have lexical exceptions such as these.

Green states that the "phonological element [of the mutations] can be explained only historically, not synchronically" (30). Assuming a fully redundant word-based lexicon, the mutated forms are listed alongside the radical forms, and the grammar need only determine which form is used where, rather than having the additional onus of deriving the mutated form from the radical base. Form selection (i.e. mutation

distribution) therefore becomes a matter of government, which, analogously to case, may be assigned via syntactic and/or lexical criteria (33).

So as not to miss the point that radical/mutated alternant pairs are sound structural relationships, Green proposes static "statements of behavior in the…lexicon which have the status of tendencies. During the acquisition process, speakers pick up on alternations like p~f and k~x in the same morphosyntactic environments and can spread them analogically to new forms without either adding phonological rules or setting up phonological constraint interactions to handle these alternations" (35). Statements of these sort would seem to qualify as *lexical redundancy rules* in the sense of Jackendoff (1975) and Janda & Joseph (1986, 1991)(cf. Chapter 5 below for a development of this mechanism).

3.13

The question that really provokes me to take this contrarian position to the phonological description of SGIM is that once it is admitted that the mutations are not subject to natural class behavior and that their distribution crucially must make reference to non-phonological information (even allowing boundary markers as part of phonology), it seems evident that what we are dealing with is not live synchronic phonology, but rather the residue of something that was once interesting phonology, but is now a set of surface correspondences that has been quite fully morphologized, i.e. come to have morphological significance, and further, that these same sorts of alternations have been redeployed into multiple grammatical contexts, marking morphological categories on Nouns, Verbs, and Adjectives.

In the interest of a strong and predictive phonological theory, I second Green's (2004:36) assessment, "To allow phonology to be powerful enough to account for the quirkiest phoneme alternations is to weaken phonological theory to the point of being unfalsifiable." In the next chapter, a similar survey of syntactic analyses of Celtic mutation brings us back to this same point, *mutatis mutandis*. Morphology mediates between syntax and phonology.

Notes to Chapter 3

1. Although synchronic phonological rules certainly may be automatic, i.e. phonetically

   motivatable or "natural," there is no requirement that this be so (Anderson 1981).

   Thus we are not talking about a coextensive phonetics and phonology.

2. Although these boundaries have no direct phonetic interpretation, there is often in

   certain phonological processes a parallel with the behavior of certain consonants.

   These boundary types are independent of lexical category or the segmental

   content of particular syllables. Naming particular lexical categories, or worse yet

   naming particular words or morphemes clearly marks a rule as non-phonological,

   even if some aspects of the rule may be characterized in (crypto-) phonological

   formalism.

3. The status of the boundary between definite articles and nouns, between negators and

   verbs, and so on is not uncontroversial. Sandhi assimilations and alternations

   occur in these cases that do not occur automatically between any two words (e.g.

   ceann beag 'little head' does not show nasalization in the /b/ of *beag*, at least not

   to the degree or with the cross-dialectal regularity of the comparable nasalizing

   mutation. Rogers ascribes the difference to a boundary distinction, '+' where

   mutation may be observed, and '#' where it may not. There is a certain circularity

   to this assignment, however.

4. This is only on the assumption that they are not underlyingly aspirated. It has been

   remarked that the phonemic distinction between the so-called voiced and

   voiceless series of stops in SG is more properly characterized as a contrast in

   aspiration (cf. Icelandic), rather than voicing proper. This is in distinction to Irish,

for example, where the distinction is clearly one of voicing and the phenomenon of stop preaspiration is largely if not entirely unknown (Ní Chasaide & Ó Dochartaigh 1984).

5. Zwicky 1970 uses the resources of SPE phonological rule formalism to describe the notorious collection of sounds that participate in the Sanskrit *ruki* rule of *s*-retroflexion. Rather than considering the job done, however, Zwicky considers whether the ability to unite unnatural classes with just two distinctive features might not "count as a defect, not an advantage, of this system of notation" (554).

6. This may be summarized (and more accurately, at that) for pedagogical purposes as "/n/ protects /d/ and /t/ from aspiration [i.e. Lenition]".

7. Because non-coronals do not seem to enter into such sharing relationships, the sharing has to be at the level of the Coronal node, rather than having the segments simply share the primary Place node (Ní Chiosáin 1991:37).

8. See Crysmann 2004 for an extended critique of both the data and the analysis in Hayes's account of Hausa.

9. See Anderson 1985, Janda 1987 for considered studies of rule-type evolution.

10. Hayes (106) explicitly rejects the suggested suggestion of Selkirk (p.c., presumably) that all precompiled phonology could be treated as inflection. Hayes offers the following as counterarguments: (1) "inflectional morphology seems not to be influenced by the phonological form of nearby words in the string" (2) "inflectional morphology is based on a fairly restricted set of syntactic structural relations…" whereas PIFs include relatively haphazard environments, and (3) "precompiled phonology appears to be subject to a strict locality requirement".

11. In Chapter 5 below, I adopt Zwicky's shape analysis in just such cases, i.e., those mutation instances that are not prototypical word-level inflectional exponents, but I split the distribution of shape properties into (1) *configurational shape conditions*, i.e. those that follow from syntactic constructions and phrase-level inflectional properties (e.g., definiteness), and (2) *linear-local shape conditions* those that from collocation with small, closed, and idiosyncratic set of grammatical words (e.g., certain intensifiers, numerals).

12. These operations are assumed to take place between "surface" syntax and PF and have no principled upper limit to their application in a given representation. The combination of these operations and Morphological Readjustment rules permits one a remarkable degree of descriptive latitude, something approaching the power of traditional transformations.

13. This assignment of mutation to the phonological entails that mutations are qualitatively different from affixal morphology, despite their functional equivalence. In a similar vein, Pyatt derives stem-internal vowel alternations via null suffixes bearing a {P} (palatalizing) diacritic.

14. This choice provides an interesting challenge to the claim of Pyatt (1997:167) that "…because Lexical Morphology crucially restricts the lexical rules to the word-internal domains, the model incorrectly predicts that rules such as Celtic mutations cannot exist. Clearly, either the model of Lexical Phonology must be significantly modified or another model must be used."

15. Kibre vacillates between a unified conception of mutation: "Mutation is a process in the phonology of Welsh, shared with its Celtic siblings, in which once

phonetically-motivated sandhi processes have grammaticized into an opaque set of alternations in the initial consonants of most lexical and some functional words" (1) and full separation of the different mutation types into disjunctive rule blocks (61-65).

16. This concept is troublingly ambiguous, since there are a number of non-equivalent ways of conceiving of the sequence of syntactic string concatenation.

17. "Aspiration" is a misnomer that has been established in traditional accounts of Celtic mutation as the term now replaced by "Lenition". A better word for this aspect of Lenition, i.e. adding [+continuant], would be Spirantization, but that term is already taken for a separate mutation in Welsh. Hamp (1951) identifies Pedersen's (1897) *Aspirationen i Irsk* as the likely source of the term's popularity in this context.

18. Kibre also hopes to avoid combining the sub-rules into a "single monster formalism" (61-62), and then produces, presumably to demonstrate the unthinkably cumbersome, a semi-formal rule that nearly matches the generative rule presented in the discussion of Rogers (1972), §3.3 above.

19. It is remarkable to note how rare it is to see a willingness to put a phenomenon outside the scope of one's favorite component, as opposed to proposing an "extended" or "generalized" version of an existing theory, allowing marginal phenomena in, but at the cost of relaxing some of the basic assumptions that might make a framework falsifiable.

20. ℜ stands between input and output members of a correspondence relationship in OT (McCarthy & Prince 1999).

CHAPTER 4

MUTATIONS IN SYNTAX:
SOME OF THE *WHERE*, NONE OF THE *WHY*, AND FORGET ABOUT THE *HOW*

4.1

To propose that the initial mutations have nothing to do with synchronic syntax is
to paint oneself into a corner, for it obliges one to lose clear generalizations about the
distribution of mutation phenomena. On the other hand, however, to attempt to reduce the
mutations to fully determined, and therefore fully redundant, syntactic "effects" in
phonology (the domain of the so-called 'Syntax-Phonology Interface' (e.g., Inkelas &
Zec 1990)) glosses over the nature of the morpholexical properties that the mutations
regularly realize.

Categories that correlate with the appearance of SGIM tokens include, but are not
limited to, syntactic categories. Syntax defines the relative configurations of word-forms
in a clause, but the gender of noun lexemes, e.g., is to be found in the lexicon. Similarly,
definiteness is generally a discourse property, albeit one with syntactic ramifications. The
syntax allows for the mapping of extra-syntactic properties (lexical, discourse-pragmatic,
semantic) onto the terminal string. To attribute to syntax the origin of everything that
must pass through it is to commit an error analogous to that discussed at length in the

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previous chapter with regard to the confusion between "sound structure" and "phonology."

Ray Jackendoff, in his 2004 presidential address to the Linguistic Society of America, highlighted the well-established but poorly motivated "syntactico-centric" tradition in theoretical linguistics. With syntax being only a conduit for connections between sound and supralexical meaning, but neither sound nor meaning itself, the decision to focus all linguistic theorizing on the domain of syntax yields a perspective that only an arch-Chomskyan linguist could love, divorced as it is from form and function. This is by no means to say that linguistics ought to be entirely about lexical semantics and phonetic implementation. On the contrary, the intention here is to represent the syntactic configuration of words as potentially meaningful and constrained, but at the same time, as independent of the (derivational and inflectional) morphological nature and the phonological content of the words so arranged.

Gender, for example, is an inflectionally relevant, but syntactically inconsequential, feature in SG (if not in language generally). Syntax deals with such phenomena as the linear sequence and the government relations that hold between distinct words in a given sentence, and thus has at least something to do with the distribution of initial mutation effects. Segmental profiles in which no mutation distinction obtains at the phonetic level (e.g., with initial /l, n, r/ or /s/+[stop] clusters), however, have no impact whatsoever on the above-mentioned aspects of syntactic rules or generalizations. Nevertheless, much of the syntactic literature addressing Celtic initial mutations crucially attempts to make the mutations an intrinsic part of the syntax.

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If we understand syntax to be that aspect of grammar that has as its responsibility the arrangement of words into hierarchical relationships, and consequently into structures eventuating as terminal strings, there is no obvious reason for syntax to be seen as *causing* or *requiring* different formal realization of words. Since rules or principles of syntax need not be sensitive to the morphological constituency or composition of the words they arrange, so much less should they show any sensitivity to the phonological character of those words (cf. Zwicky & Pullum 1988, e.g., on two putatively universal principles of grammatical architecture, the Principle of Phonology-Free Syntax (PPFS) and the Principle of Morphology-Free Syntax (PMFS)). Language use dealing with other than natural linguistic expression (e.g., poetic diction) may indeed be sensitive to segmental or prosodic aspects of words, but such (contrived) hyper-reflective examples of expression are outside the realm of consideration here. A descriptive grammar should not be held accountable for atypical and artistic expression, and therefore it is assumed here that syntax neither causes, nor is subject to, differences in the segmental identity of constituent words.[1]

Syntactic theorists who have written on Celtic syntax and initial mutation have typically used the distribution of initial mutation to support one or another views on broader constituent structure: e.g., whether VSO order is base-generated or is derived (cf. Sproat 1985, Tallerman 1990, Duffield 1996, Roberts 1997), whether Celtic languages actually have a constituent corresponding to a VP, despite the intervention of S[ubject] between V and O in unmarked word order (cf. McCloskey 1983, Sproat 1985). A number of syntactic accounts are at pains to demonstrate that mutation triggers and mutation targets respect some notion of (syntactic) adjacency (cf. Lieber 1983, Zwicky 1984,

Harlow 1986, Stump 1988, Tallerman 1990). Now, strict adjacency is a concern

originating in phonological analyses of mutation (recall ch. 3 above, and see Lieber

(1983) as revisited, below), but even those who do not assume that the surface details of

Celtic initial mutations are to be handled in the synchronic phonology (such as Zwicky

1984, Stump 1988) seek to enshrine as strict an adjacency condition on triggers and

targets as may be empirically justified, presumably as an acknowledgement of the

phonetically motivated diachronic origins of the mutations.

4.2

Awbery (1976) is a major book-length transformational treatment of Welsh

syntax, focusing primarily on passive-voice phenomena but incorporating an analysis of

initial mutation in the process. As a broad characterization of the mutation process(es)

within the framework of Standard Theory, Awbery observes:

"In certain lexical and syntactic environments the initial sound is changed

systematically to give one of three different mutation forms" (p. 8), and so "…words

should be marked with the feature [+α mutation] late in the syntactic derivation. In the

phonological component this feature will trigger the correct phonological changes" (p. 9).

Awbery (1976:9, 22) formalizes this process with a feature-changing (strictly

speaking, feature-adding) transformation as follows:

(16)   T[ransformation] Soft Mutation of Direct Object (obligatory)

SD.   ($_S$ V   NP   NP   X)

[+tense]

1   2   3   4   5

SC.   Add the feature [+soft mutation] onto 4.

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In this way, constructions to which this rule has applied will undergo soft mutation (at point 4) as a phonological rule, as simply triggered by the presence of the feature [+soft mutation]. Although this approach is not necessarily deeply explanatory, it does manage to capture the Direct Object Mutation (DOM) facts, and it foreshadows the flat, linear approach to this question that runs through the works of Harlow (1989), Tallerman (1990), and Borsley & Tallerman (1996), which is referred to as the XP-trigger analysis (see below for details).

In addition to the DOM rule, Awbery proposes similar rules for mutation for non-finite verbs with preposed pronominal objects:

(17)   T. Preposed Pronoun Mutation (obligatory) (p. 27)

SD.   ($_{NP}$ ($_{Det}$ NP   ) $\left\{\begin{matrix}<(_sV>\ X\qquad <)> \\ N \end{matrix}\right\}$)

[+pro, +αmut]

       1   2   3   4   5

SC.   Add the feature [+α mutation] onto 4;

for the objects of prepositions:

(18)   T. Prepositional Object Mutation (obligatory) (28)

SD.   ($_{PP}$ P   NP)

        [+αmut]

     1   2   3

SC.   Add the feature [+α mutation] onto 3;

and for embedded verbs (with some very specific assumptions about the syntactic-category membership of certain constituent types):

(19)   T. Mutation of Embedded Verb (obligatory) (36)

SD.   ($_S$ X   PP   ($_{NP}$ ($_S$ V   Y)))

1   2   3   4   5   6   7

SC.   Add the feature [+soft mutation] onto 6.

There is perhaps little more to say about this analysis, because, on the one hand, it makes fairly concrete assumptions about constituent structure, and, on the other hand, both the features and the transformations are completely language-specific. The description stands, although much of the syntactic theorizing that has followed has had different assumptions and different concerns—e.g., about the universality of representations, the expressive power of the Standard Theory transformational formalism, etc. Lieber (1983) and Zwicky (1984) both took Awbery as a point of departure, and so the importance of this description is not to be underestimated.

4.3

As part of a larger dissertation project arguing for the legitimacy of permitting non-terminal-node information to influence sound-patterning, Rotenberg (1978) suggested that the two Irish initial mutations, Lenition and Nasalization, may be reduced from independent binary diacritic ("abstract morphological") features [+L] and [+N] respectively, to opposite values of a binary feature [±IM], with [+IM] = [+L] and [−IM] = [+N]. This move is motivated by the fact that, although some possible triggers are in reality not triggers (and thus are [−L, −N]), no element triggers both, *[+L, +N]. Non-triggers, then, are simply unspecified [uIM] (76). Rotenberg distinguishes between mutations induced by a preceding trigger, and the other kind, which doesn't have "anything at all to do with the preceding word[; r]ather, it is part and parcel of the

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number-, gender-, case-, definiteness-, and tense-marking systems" (80) (cf. Oftedal's 1962 *projected* vs. *incorporated* mutations in Chs. 2 and 3 above, and Duffield's 1996, 1997 *L-mutation* vs. *F-mutation* below).

Rotenberg finds little of interest in the latter for his syntactic thesis, however, because the "preceding word is irrelevant". Thus he states: "To suggest, as investigators usually do, that lenition occurs 'after' a possessee noun, or 'after' a genitive article, and so on, is in my opinion missing the point of the thing. This point is that the bundle of features [+GEN, +M, +SG, +DEF] is morphologically signaled by a lenited initial" (p. 82). These conditions aside, Rotenberg returns to the projected sort of mutation, noting that "every single one of the words which we must conclude are inducing mutations across w[ord]-juncture is non-lexical" (87).[2] A trigger word's specification for [IM], in Rotenberg's estimation, is not "word-sized, but rather segment-sized, occurring at word-edge". This is tantamount to representing Hamp's (1951) morphophonemes in terms of features, e.g., *mo* 'my' is /moL/ for Hamp, /mo^L/ for Oftedal (1962), and now [mo[+IM]] for Rotenberg. Although these features are "segment-sized", they are explicitly not segments per se, and so they are not (easily) extendable to word-internal positions, and thus they remain ontologically distinct from phonemes. As noted in Ch. 3, Hamp's morphophonemes are realized as phonemes, or at least as part of complex phonemes. In the latter portion of Hamp's article (1951), the various instances of Lenition, regardless of whether they are diachronic and invariable or synchronic and morphologically contrastive, are representable via morphophonemes.

One of Rotenberg's chief targets is the SPE-style practice of allowing different boundary symbols to stand in phonological rules and representations, when in fact they

are not segmental in nature. Rotenberg prefers the notion of *juncture* to boundary (+, #, or ##) in characterizing the distribution of selective *sandhi* (i.e. sandhi that has other-than-phonetic conditions on its application, including the Irish mutations). For Rotenberg, "tree geometry [can] condition…phonological rules at [non-terminal levels] of structure precisely as it does at the level of the syllable" (111).

At the same time, although wanting to make certain non-terminal information available for phonological-rule-conditioning purposes, Rotenberg distinguishes between writing syntactic conditions directly into individual rules and factoring the information out in order for potentially several rules to be able to refer to it (so as not to characterize multiple rules subject to the same conditioning as accidentally similar)[ibid]. Indeed, Rotenberg predicts that, for a given language, if one rule is sensitive to a particular type of syntactic conditioning, then more than one rule will be, because "[i]f phonological and syntactic conditions cannot be mixed, the syntactic conditions <u>cannot</u> be specific to each phonological rule" (112). Since any phrase edge presumably defines a word edge, it would miss a generalization to cast a phrase-juncture (*f-juncture*, in Rotenberg's system) phenomenon as a w[ord]-juncture phenomenon, necessitating additional mechanisms to explain why only the words at phrase edges participate in the patterning. Thus, selective sandhi rules that apply at f-junctures are defined with respect to syntactic constituents.[3] One other juncture level that Rotenberg defines, between the word level and the phrase level, is that of the clitic group *c*, "a sequence of non-lexical item(s) plus lexical item **[–N, –V]*-w**, separated by w-juncture(s)" (154). Assuming that mutation triggers are proclitics[4], and assuming that one can then reliably define clitic groups with respect to these, and can consequently identify c-juncture sites, then Irish projected mutation should

affect the left edge of whatever follows a proclitic that is specified for [IM]. From this

perspective, then, "processes usually thought to be diagnostic of an operation of

cliticization are really rules at level c" (157). Rotenberg allows a vague and informal (and

therefore convenient) definition of clitic elements, but he does refrain from creating a

syntactic category "clitic" devoid of any larger grammatical cohesion. Whatever

grammatical mechanism places clitics, then, clitic groups are defined at the same time for

the purpose of the operation of putatively phonological rules of level c.

4.4

Lieber's (1983) analysis of Welsh must come up again (see ch. 3 above) in this

context, because, in the interest of maintaining the strictest possible adjacency condition

on the implementation of a putatively phonological mutation system (p. 169, in order to

avoid the crossing of autosegmental lines), Lieber posits the use of a "semantically

empty" preposition whose only phonological content is the autosegment [+voice] that

attaches to the right and triggers the appropriate mutation (173).[5] Lieber seeks an

analogy here to the status of the "semantically null" case assigning preposition *of* in

English, which is claimed to assign case to NPs that otherwise would lack case. Whether

of is semantically empty or not, there is no denying that *of* in English actually surfaces

phonetically (reduced frequently to schwa, but seldom deleted altogether) and behaves

syntactically as a preposition, i.e. *of* may be pied-piped or stranded, and, in many

analyses, with pronoun complements *of* takes non-subject forms (*him*/*her*, etc.). Lieber's

autosegmental preposition, on the other hand, seems not to have the syntax of a

preposition in Welsh, because, in a language that otherwise does not permit true

preposition stranding (if object NPs are fronted in Welsh, a preposition thus left behind

obligatorily uses a combined form incorporating a (resumptive) pronominal element), a

fronted putative PP of this sort does not carry the mutation. In other words, Lieber's

analysis involves a structural near-zero that has: (1) no semantics, (2) extremely limited

syntax, and (3) sub-segmental phonological content. Such an element requires great faith

while inspiring very little of it on empirical grounds.

4.5

McCloskey (1983) is not interested in mutation for its own sake, but rather as it

bears on the issue of determining the category of so-called "verbal-noun constructions" in

Irish. There is, however, a point at which he relates the distribution of a leniting particle *a*

to the absence of an object for the verbal-noun (V-N)—or, in other words, to the presence

of a trace. That is, he concludes that "…all constructions that can be argued to involve

long-distance gap-binding (relative clauses, constituent questions, clefts, free relatives,

certain kinds of adverbial clauses) as well as at least one rightward movement, trigger the

[±mutation] alternation…"(p. 30). The lowest trace (foot of the movement chain, as it

were) would be post V-N (object position at D-structure), but there would likely be an

intermediate trace before the V-N, given standard movement assumptions. In this way,

the point could be pressed that at least some mutations may correspond to traces. This

implication, although not pursued by McCloskey (1983), foreshadows GB and

Minimalist analyses by Roberts (1997) and especially Duffield (1996, 1997); see below.

4.6

Zwicky (1984) returned general discussion to Welsh, and to what is known as

direct object mutation (DOM) or, somewhat misleadingly, as "soft mutation". Although

DOM is soft in form, there are many instances of soft mutation in Welsh that are not

DOM. Since the syntactic discussion ought to be more concerned with the distribution of words than with the sound-structural character of particular mutations, it follows that syntactic or functionally-based mnemonic labels of convenience are to be preferred.

Zwicky takes Awbery (1976) as his point of departure, and although many instance of mutation can be reduced to a Trigger Conddition (Zwicky's adaptation of Lieber's (1983) *adjacency condition*):

> The trigger determining a rule feature for a morphophonemic rule must be
>
> adjacent to the affected word and c-command it (Zwicky 1984:389).

DOM seems not to be analyzable in terms of an adjacent c-commanding trigger particle (without positing abstract triggers, *à la* Lieber 1983). Zwicky preliminarily claims that DOM is the morphological realization of accusative case {CASE:acc}. It is not true, however, that all and only DOs mutate in the expected fashion, given a case analysis. DOs of V[erbal]-N[oun]s, for example, do not exhibit DOM. Zwicky claims that non-finite verbs assign {CASE:gen} instead of {CASE:acc}, and thus mutation is not triggered there. This is not simply a convenient diversion, since in the case of personal pronouns (ordinary nouns lack morphologically distinct possessive forms), it is clearly the possessive form that appears as an object of V-N.

Zwicky's case analysis would seem to face the same problem as Lieber's (1983) prepositional analysis with respected to unmutated fronted DO constituents, however, since case, once assigned, should be conserved under movement. Rather than allowing case to change, however, Zwicky proposes a separate condition that mutation is systematically banned in sentence-initial position in Welsh (pp. 398-99). This is an apparently exceptionless generalization, but, lacking any particular explanation from

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syntax or morphology, it stands more as a stipulation. An appeal to phonological prominence in left edges (for purposes of word recognition, etc.; cf. e.g., Mielke & Hume 2001) seems less than compelling, given the very fact of the location of mutation effects on left edges in Welsh (and indeed throughout Celtic). If we take generalizations where we can get them, however, it is better to note a generalization and trust that some deeper explanation may become clearer in the fullness of theoretical time and cross-linguistic space. If one wishes to see here an Optimality-style (McCarthy & Prince 1993) constraint *INITIALMUTATION$_S$ that systematically outranks faithfulness constraints realizing a mutation distributed by other means, one at least has a formalization, if not any greater explanation.

4.7

Sproat (1985:183) proposes, independently of Zwicky (1984), an analysis where V-Ns assign {CASE:gen} to their objects and not {CASE:acc}, also based on the pronominal evidence. Sproat, like McCloskey (1983), is interested primarily in larger issues in the constituent structure of Welsh, and only incidentally alludes to mutation in order to help readers parse his examples (Sproat 1985:176). In addition, his examples of mutation are all readily covered under an adjacent trigger analysis (few examples of DOM are presented (ex. 3a, 176), and none receive comment), with the descriptive metaphor that the prepositions in question "induce" particular mutations (180).

4.8

Stump's (1988) analysis of mutation in Breton focuses on an apparently intractable example of non-local mutation triggering, challenging Zwicky's (1984) Trigger Constraint. Although most instances of Breton initial mutation respect a strict

condition on trigger/target adjacency, there is a systematic exception in the apparent "invisibility" of the quantifying adjective *holl* 'all/whole' in a number of Breton dialects. After the possessive adjectives/determiners *va* 'my', *he* 'her', and *o* 'their', each of which correlates with a spirantizing mutation, *holl* may intervene without blocking the spirantization on the following noun, but at the same time without undergoing the mutation itself. Further, *holl* itself, all else being equal, correlates with a separate Lenition mutation. When it follows *va*, *he*, or *o*, however, the Spirantization mutation applies, to the exclusion of the Lenition. Since the forms in question are all co-constituents of NP (or DP if you prefer), there is no standard movement assumption that would bring the head noun closer to the possessive adjective, even temporarily, long enough for adjacency to be satisfied. Of course, given enough NP-internal landing sites, a wide range of relative hierarchical configurations is possible before (or after) surface syntax, but one might question how much additional structure is reasonable if its only motivation is the solution of this very language-specific morphological quirk.

Stump entertains two solutions to the non-adjacent spirantization. If one weakens the adjacency condition on a language-specific basis, permitting the intervention of at most one specific *named* element between trigger and target, then adjacency can be maintained with one condition (477). On the other hand, with the assumption of a special rule type that Stump calls a *transfer rule*, a mutation triggering property M may be transferred from α to β only if:

(i) α must c-command β;

(ii) α must be adjacent to β;

(iii) β must be a named element in r[ule];

(iv) M cannot be further transferred from β. (479)

With these constraints on transfer rules, the stronger version of Zwicky's Trigger

Constraint may be maintained. Stump offers both alternatives without exclusively

preferring one to the other, closing with the remark that the Trigger Constraint which so

much effort is being taken to preserve does not follow from anything in the syntax or

morphology. This is perhaps a veiled reference to the phonological origin of the

mutations, and the blind refusal to admit that morphologization of sound structural

patterns can liberate an alternation from its diachronic local-phonetic conditioning

environments. This point resurfaces in chapter 5 below.

4.9

Harlow (1989) returned the discussion to Welsh DOM (albeit an "extended"

DOM that is not restricted to grammatical direct objects (cf. p. 292, fn. 5)), and made the

comment that he is "not committed to the position that there is a unitary account of the

triggering environments for soft mutation…[rather,]…whatever is responsible for

DOM…is a sufficient condition for mutation, but not a necessary one" (291, fn. 2). The

existence of a mutation contrast between attributive adjectives used with feminine nouns

as opposed to masculine nouns demonstrates that some instances of mutation are

synchronically an "inherent" part of certain words, rather than to be derived under

adjacency or some other syntactic condition (ibid). This precludes consideration of the

feminine noun itself as a trigger in such mutations (a position that is taken up in

morphological rather than syntactic terms in chapter 5 below).

Harlow states succinctly that the problematic apparent generalization is as

follows: "the initial consonant of an NP undergoes soft mutation if it follows and is not

adjacent to a finite verb" (292). Thus DOM constitutes a very direct violation of the very

Trigger Constraint that Zwicky (1984) and Lieber (1983) propose. Harlow indeed seems

puzzled that Lieber and Zwicky are satisfied with their analyses, which Harlow says both

entail *ad hoc* stipulations. His solution lies in revising the interpretation of just what is the

triggering element in DOM; i.e. the trigger is not the finite verb, after all, but rather the

NP intervening between the finite verb and the NP subject to DOM. This analysis

reestablishes the adjacency condition, and simply changes the generalization above as

something like the following: Given the structure V NP1 NP2, V {+fin}, NP1 triggers

soft mutation on the initial consonant of NP2 (if possible).

   This linearity-based statement, however, ignores the hierarchical c-command

relationship required by Zwicky's (1984) Trigger Constraint. One point suggests to

Harlow that perhaps restatement and expansion of the generalization are possible and

desirable. This is the case with a presentational or existential construction in which an

adverbial PP is the intervening constituent between finite V and an NP, e.g., *Mae yn yr*

ardd gi mawr. (lit., 'Is in the garden dog (*ci ~ gi*) big.' = 'There is a big dog in the

garden.'). In this case, the NP subject to DOM is perhaps a logical subject, but in no case

is it a DO.[6] Further the NP object within PP [*yr ardd*] does not c-command the NP [*gi*

mawr]. Perhaps, however, the generalization is not simply based on V NP1 NP2, but

rather V NP/PP NP, or perhaps even V XP NP, such that "[a]ll phrasal categories are soft

mutation triggers" (Harlow 1989:312). This step, presented tentatively in Harlow, but

seized upon subsequently by Tallerman (2004) and Borsley & Tallerman (1996), would

permit the return of c-command in the formalization of the description mutation generally

and save DOM as wholly non-exceptional to the strong version of the Trigger Constraint.

4.10

Borsley (1989), in an HPSG approach to Welsh that is loath to consider

morphological factors at all[7], dismisses mutation with one stroke. Thus: "Although I refer

to *bod* [= 'be'], what we actually have here is *fod*. This is a consequence of one [of] a

number of phonological processes known as mutations which affect the initial consonants

of words. Mutation is of no importance in the present context, so I will pass over

particular instances without comment" (337). Borsley's object in this article is an account

of sentence structure and lexical entries for different V, N, and P sub-categories.

Nevertheless, Borsley (1989:338) does provide the following intriguing additional

example of DOM:

(20)   *Mae ceffyl gan Emrys.* = 'Is (a) horse with Emrys.'

         Mae gan Emrys geffyl. = 'Is with Emrys (a) horse.'

         = 'Emrys has a horse.'

Thus it is not only purely presentational and existential readings that have the possible

linear order V PP NP; in this order, DOM is found on the NP constituent. It is perhaps

worth noting that it is only in the English translation[8], however, that "(a) horse" is a

structural DO.

4.11

Tallerman (1990, also 1987, 2004) uses evidence from Welsh initial mutation to

support, rather than to overturn, the claim that VSO order in Celtic is underlying, rather

than derived, despite GB arguments that strongly tend to propose an underlying, perhaps

universal, SVO configuration. Once Tallerman turns her attention toward mutation

(397ff.), she agrees with Zwicky (1984) and others that adjacency is a valid constraint for soft mutation, but that the c-command rider is "probably too strong for Welsh" (398).

Tallerman, like Harlow (1989), seeks to locate DOM triggering in XP, and not just NP, but she further seeks to extend (= exploit the formal unity of) soft mutation effects in the second XP constituent after a finite V (something Zwicky's (1984) {CASE:acc} cannot—and would not seek to—do (cf. Tallerman 1990:403). It is interesting that Tallerman chooses to place in an end-note (note 6, p. 415) the pertinent contrastive evidence for her XP-trigger analysis using a flat structure:

(21)   *Mi hoffwn i fynd* (~*mynd*). (PRT would-like I to-go = 'I would like to go.')

        Hoffwn i ddim (~*dim*) *mynd*. (would-like I NEG to-go = 'I wouldn't like to go.')

Following Tallerman's estimation of the scope of the negation (cf. 'I would like [not [to go]]'), and the consequent claim that "[i]t is not the case that *ddim* and *mynd*…form a constituent" (ibid), the pronoun *i* (an NP) ought either to trigger mutation on the V(P) *mynd* (not even potentially a relevant target of DOM in the context of Zwicky's 1984 analysis), or else trigger no mutation at all. The XP-trigger analysis, however, does predict the soft mutation of *dim* to *ddim*, though clearly not of *mynd* to *fynd*. If it is valid, then, to attempt to conflate the cases of soft mutation discussed in Zwicky (1984) with other instances beyond NPs, then Tallerman's account does indeed capture a linear-syntactic generalization, preserving adjacency, but naturally without the hierarchical notion of c-command.

4.12

Borsley & Tallerman (1996) stands as a counter-reaction to the comments of Ball & Müller (1992) on the NP-trigger and XP-trigger analyses in Tallerman (1990) and

Harlow (1989). Borsley & Tallerman first outline their arguments supporting the XP

trigger hypothesis in a clear and systematic manner. Where no XP can be motivated,

however, Borsley & Tallerman permit phonetically null trigger-prepositions (*à la* Lieber

(1983), although they do not cite her), e.g., in the case of mutating bare-NP adverbials

(15-17). With their own analysis thus laid out, Borsley & Tallerman then ably dismantle

the purported counterevidence offered by Ball & Müller from a more traditional approach

within Welsh descriptive linguistic practice (cf. pp. 29-41), and so I do not reiterate it

here.

4.13

Duffield (1996, see also 1997) is a book-length examination of Irish syntax from

both a GB and Minimalist perspective. Duffield (1996) makes the bold and classically

syntactico-centric claim that mutations in Irish (and by extension in Celtic) constitute "a

deeply systematic process, one which—when properly understood—provides a powerful

diagnostic of the form of syntactic representation" (p. 15). Indeed, Duffield claims that

the mutations are "nothing other than the phonological expression of functional heads"

(p. 41). Chomskyan syntax, from the Principles and Parameters (P & P) period onward, is

variably notable and notorious for the proliferation of functional as well as lexical heads

(and their attendant projections, not to mention instances of adjunction thereto). The

above claim, therefore, is either a triumphant instance of finding empirical content in the

often-silent world of functional heads, or an eyebrow-raising accretion of one more

attribute to an already questionable theory-internal construct.

Taking Duffield's (1996, 1997) analyses on their own terms, however, it is clear that, for him, initial consonant mutation is indeed a unitary process, the details of which are the responsibility of the PF component[9]

For Duffield, therefore, the syntactic dimension seeks only to establish that every Irish mutation is conditioned by a trigger in a functional head position. Since functional heads are assumed to be present in syntactic representations whether they actually contain any pronounceable content or not, the lack of an identifiable overt trigger is of little concern (whereas more surface-oriented or "flatter" syntactic representations are generally much more constrained by the identifiable, isolatable elements of the terminal string). Duffield (1996:32ff.) contrasts the *morphosyntactically-driven raising* (MDR) of GB, in which inflectional morphemes host functional projections and movement allows a lexical head to collect its affixes, with *feature-driven raising* (FDR), as in Minimalism, in which "inflectional morphemes…correspond to, but are not to be identified with, abstract grammatical features…[: e.g.,] verbs are inserted fully-inflected into the syntax and raise to check the features associated with their inflections" (32).

Duffield pursues the latter (FDR) approach to functional heads in syntax, because of the non-concatenative nature of mutation, i.e. its resistance to formal isolation into morphemes:

> [B]y admitting a separate morphological component, the FDR account
> immediately avoids most of the problems…. If inflectional morphology is
> handled independently of the grammar, then there is no expectation that
> morphological rules should be constrained by syntactic locality (34).

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Notwithstanding the biased equation of "the grammar" with syntax *tout court*, Duffield effectively releases the distribution of mutation from the anachronistic phonological adjacency constraints. Thus the argument shifts from linear adjacency to hierarchical relations such as (asymmetrical) c-command, a characteristic attribute of functional heads with respect to associated lexical heads that raise to them (whether temporarily or ultimately, overtly or covertly).

Duffield (1996:273ff.; 1997:75, 79ff.) identifies two types of mutation in Irish, F[unctional]-mutation and L[exical]-mutation. F-mutations are assumed to apply to the output of syntax, before lexical insertion. And, therefore, F-mutations:

(1) are subject to hierarchically-based locality conditions for their application (and potentially iterative within their domain),

(2) always target syntactic objects ("…the left bracket, as it were—of hierarchically subordinate domains" (274)), and

(3) are not sensitive to the phonology of the trigger (if any).

L-mutations, on the other hand, apply after lexical insertion, and therefore they:

(1) are subject to strictly linear locality conditions for their application (and thus are never iterative);

(2) always target words, and

(3) are frequently sensitive to the phonological makeup of the triggering element.

F-mutation triggers, because they target syntactic objects rather than individual words per se, are blind to the categorial properties of their ultimate "victims," the particular words that bear the mutation. Any word that happens to be at the left edge of the domain in question is marked for mutation (Duffield 1996:276). Since the Celtic

languages are typologically head-initial in phrases of all sorts, the left-most word in any

XP is likely, but not guaranteed, to be the head X. For this reason, there is the possibility

of confusing edge mutation with head mutation. The analysis provided in chapter 5 below

seeks to follow up on this aspect of Duffield's (1996, 1997) analyses, but with a more

explicitly morphological perspective.

Duffield extracts an Elsewhere Condition on F-mutation as follows:

(1) "Lexicalized Functional Heads trigger Lenition, unless otherwise specified"

[with a particular L-mutation diacritic], and

(2) "Lexicalized C^0 triggers Eclipsis" (89).

Duffield's sense of "lexicalized" is that "a functional head is lexicalized if it

contains 'phonetically realizable' functional features…" i.e., features for which at least

one lexical item exists that can express some value for that feature. This allows

considerable latitude, since by this definition a feature with five permissible values, e.g.,

need only realize one of those feature values overtly in order to be considered lexicalized

in all its values.

To the extent that these generalizations account for the distribution of mutation in

Irish, and Duffield estimates that about 80% of conditioning environment types are

covered under this analysis (102-03), his approach constitutes significant progress over

traditional treatments that stipulatively list environments without striving to maximize

generalizations.

4.14

Borsley (1997) argues in a somewhat unorthodox P & P framework that, contra

Zwicky (1984), DOM in Welsh cannot reduce to a case-based analysis, which—Borsley

claims—is simultaneously too strong and too weak. Borsley is careful to announce that

the fact that non-nominal elements may show soft mutation "is no real objection to a

Case-based approach to DOM", since "it is fairly clear that soft mutation is not a single

phenomenon" (p. 32). Case in Welsh, on the other hand, is extremely controversial for

Borsley: "Welsh has no clear examples of morphological case [in full NPs]" (p. 33).

Further, Borsley rejects evidence from distinct pronominal forms (pp. 33-34). After

giving a specious argument that the basic and contrastive/emphatic forms of pronouns do

not constitute a case difference, Borsley claims that pronouns in Welsh may be analyzed

as agreement markers, in which case it is "far from obvious that they should have any

Case" (34).

 If, on the other hand, genitive pronouns/possessive adjectives are more properly

analyzed as determiners, "one might expect them to have the same case as the DPs which

they head" (34). On syntactic grounds within P&P, of course, NPs will have abstract

Case, whether or not this status is reflected morphologically (small-*c* morphological

"case"). Since the marking of morphological case is assumed to depend on syntactic

Case, however, and because of the claim of Zwicky (1984; *inter alios*) that DOM realizes

{CASE:acc}, a morphosyntactic property, it is exactly the morphological generalization

that is in question.

 Since the arguments that not all soft mutations are instances of DOM, even those

that have a similar linear distribution but differ in hierarchical and/or categorial status, are

already discussed above, I do not review them here, as Borsley (1997:44-51) does.

 With respect to the argument that a case-based analysis of DOM is too strong,

however, Borsley notes that the objects of (1) negated verbs, (2) non-finite verbs, and (3)

impersonal verbs might all be expected to bear {CASE:acc} and they may be assumed not to involve exceptional movement operations (if they involve any particular movement at all). If the negator (*d*)*dim* is assumed to form a constituent with the object, the systematic appearance of the soft-mutated *ddim* may be the realization of the {CASE:acc} of the object, after all.

Rather than (somewhat idiosyncratically) allowing a language-specific rule that non-finite verbs assign {CASE:gen} to their objects instead of {CASE:acc}, and rather than admitting the evidence of the full and systematic phonological co-identity of pronominal DO forms for these cases with possessive adjectives, Borsley (1997:40) remarks (in familiar phrasing) that "[i]t is far from obvious, however, that this shows that objects of non-finite verbs and possessors have the same Case." Borsley assumes instead that syntactic genitive Case is to be assigned only to complements of NPs (parallel to canonical possessors), but he rejects a nominal analysis of V-Ns on a variety of syntactic grounds, and so finds the genitive Case analysis implausible for objects of non-finite Vs (40ff.).

In impersonal constructions, however, such as *Gwelwyd dafad*, 'A sheep was seen/Someone saw a sheep' (lit. 'saw-IMPS sheep'), *dafad* appears unmutated, although it would seem to be a DO at some level of analysis. This is of course no problem on the XP-trigger analysis of Tallerman (1990), Harlow (1989), and Borsley & Tallerman (1996), since no (overt) XP intervenes between the finite V and the DO NP, thus no triggered mutation is to be expected. Indeed, Borsley (1997:54) proposes that the XP-trigger analysis is superior to the Case-based analysis in accounting for the actual distribution of DOM, but adds further that a P&P syntactic analysis also faces

considerable descriptive challenges in this connection, specifically with respect to the incidence of empty structural positions and phonetically null items such as traces of movement. He concludes, as a result, that HPSG is more amenable to the XP-trigger approach.

4.15

Roberts (1997) begins his account of Welsh DOM with the naive and empirically indefensible statement (given SG past tense Lenition) that "Welsh is unique among [the Celtic] languages in showing a case of ICM which is apparently not triggered by a specific lexical item" (141). He has a very narrow definition of what counts as DOM (cf. Tallerman (1990), Borsley (1997)), summarizing the generalization in the following two-part rule:

(1) "DOM applies exactly where the finite main verb moves to pre-subject position", and

(2) "…where an auxiliary appears initially and the main verb is realised in a non-finite form known as the verbal noun [V-N] occupying a position in between the subject and the object, there is no DOM" (141). Roberts claims that DOM is a "phonological reflex of Agr_O, and hence—plausibly—of accusative Case" (Roberts 1997:142). This general analysis should sound familiar, since it formalizes in Minimalist terms the claim of Zwicky (1984).[10] Further, Roberts claims at that point that, "following Zwicky (1984), …non-mutation is a mark of genitive" (154). Within the broad guidelines of Minimalist syntax, Roberts argues for a language-specific diacritic convention that can assign something like strength to a particular functional head (or potentially more than one). The diacritics are a lexical matter, and so the evaluation of feature strength must follow

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lexical insertion. A feature so strengthened—formally an F*—must have a PF realization (in contrast to Chomsky's (1995:223) fundamental distinction between feature strength and (morpho-)phonological realization). Roberts claims (1997:145) that "certain mutations—including DOM—are the case of F* satisfied under Merge [as distinct from Move], where what is merged is a morpheme which consists wholly or partly of a floating phonological feature...", Roberts recognizes the precedence of Lieber (1993) in this analysis, and claims that two predictions follow from it under his syntactic assumptions:

(1) "…where there is a mutation, there can be no movement…", and

(2) "…mutation is sensitive to phonological constraints concerning linear adjacency, natural classes of sounds, etc." (145).

Roberts attributes mutations to lexical facts about triggering elements, such that the preposition *i* 'to' which induces soft mutation is represented with a mark of undefined ontological status, *L*, giving the lexical representation *iL*. Similarly the nasalizing preposition *yn* 'in' is represented as *ynN* and the spirantizing preposition *gyda* 'with' is *gydaH* (146). The debt that this formalism owes to Hamp (1951) should be obvious (see ch. 3 above), but it seems to have eluded Roberts (1997). Insertion of these prepositions is tantamount to strengthening the P head under which they are inserted, which requires that Roberts analyze P as a functional, rather than lexical head, contrary to standard Minimalist assumptions (p. 148). On this analysis, the re-association of the floating feature from the trigger to the linearly adjacent target is subject to phonological conditioning, and therefore "this operation is a PF-operation, part of the operation of spell-out of mutation triggers" (ibid).

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Roberts seeks to bring all mutation into the format of simple head-government, whereby a trigger Y c-commands a (right-hand sister—cf. Kayne 1994—target XP. Roberts acknowledges the observational adequacy of the XP-trigger analysis of Harlow (1989), Tallerman (1990), and Borsley & Tallerman (1996), but claims, with some justification, that the account offers no explanation as to "why a phonological modification of a subclass of initial consonants of XP should take place exactly where XP is preceded and c-commanded by YP, where YP can be one of a range of categories" (151).

Further, Roberts complains that the XP-trigger version of the generalization is "unprecedented in terms of Case theory, checking theory, or any other theory of licensing…[, and it] fails to relate DOM to southern Italian /u/-propagation or French liaison, which appear to be configurationally similar phenomena" (151).[11] If Roberts is correct that all three phenomena are appropriately represented as head-government, then certainly an account that can apply cross-linguistically is of higher value. At the same time, however, recall that Roberts's solution relies on lexically stipulated morphophonemic elements that do not correlate with larger lexical categories and on the *ad hoc* construct of relatively stronger and weaker features. It still remains to be explained what these feature-strengtheners are doing in the operation of syntax.

Sequencing is a crucial issue, here, because a strengthened feature serves to block Move. Since the presence or absence of a mutation diacritic can be determined only in light of the trigger to be inserted, however, this determination must follow lexical insertion. Thus, Move may be blocked during the syntax only if lexical insertion occurs very early. Given Minimalism's assumption of FDR (in Duffield's 1996 terminology),

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fully inflected forms are inserted and then raised for feature-checking purposes.

Therefore, insertion does precede Move, and Roberts would seem to be vindicated. That

Roberts explicitly wishes to remove checking theory from his version of Minimalist

syntax (142, 165), however, may perhaps dampen some enthusiasm for the solution.[12]

4.16

Tallerman (2004) reacts to an analysis in Roberts (forthcoming). Roberts (cited in

Tallerman (2004:2) proposes that "Direct object mutation (DOM) applies exactly where

the finite main verb moves to the pre-subject position in a transitive clause". Tallerman

(ibid) summarizes the Minimalist movement analysis as follows:

- A DP in Spec, VP gets Accusative Case (ACC), triggered by the movement of

   the finite verb from V to v. Under these conditions, v contains a floating

   phonological feature L(enition).

- Any structural complement of v bears 'direct object mutation'.

Tallerman then presents a wide range of data that seem to indicate that Soft

Mutation is not reducible to {CASE:acc}. Based on the quote above from Roberts

(forthcoming), however, it seems not to be Roberts's position that soft mutation and

{CASE:acc} are fully co-extensive, and so Tallerman has taken on a straw man. For

Tallerman, the empirical difficulties for Roberts's DOM analysis (as she gives it) provide

evidence for preferring her (1990, 1997) XP-trigger hypothesis concerning the overall

distribution of soft mutation.

The data that Tallerman (2004:3-4) presents show the XP-trigger hypothesis to be

at best a necessary condition, but not sufficient. Her own example (12), however, seems

not to be consistent with the predictions of the XP-trigger hypothesis:

(22)　*Taflodd*　　　　*Aled*　[NP *y bêl*]　　　*ddwy droedfedd*　　　*tuag at Mair*

　　　　threw:3sg　　　Aled　the ball　　　two　foot　　　　　toward Mair

　　　　'Aled threw the ball two feet towards Mair.'

Not only is *y bêl* an XP, so that the mutation of *dwy* to *ddwy* is predicted, but, in addition,

Aled is an NP, and so *y bêl* is predicted to be subject to mutation, and yet it does not show

soft mutation.

4.17

　　　　Conspicuously absent from the literature is any direct syntactic treatment of

Scottish Gaelic ICM. Although one might wish to assume analogies from the discussion

of Welsh, or especially Irish, to the SG facts, this is a dangerous presupposition, because

Welsh DOM, for example, has no analog in SG. Whereas Irish nominal case involves a

contrast between Genitive and all else (so-called Common case), and whereas Welsh case

is never distinguished morphologically (except perhaps in pronouns), SG nominals

distinguish three (or, with Vocative, four) case forms, with different patterns of

syncretism from one declension class to another, and with some generalizations holding

within gender groups. The next chapter attempts to fill in some part of this gap, but

mutations are described explicitly there in the context of morphological realization, rather

than as originating as an inherent part of the syntax or fully constrained by standard

phonological concerns.

Notes to Chapter 4:

1. Putatively prosodically-based syntactic alternations such as so-called 'Heavy NP-shift' are therefore seen as stylistically governed, rather than as syntax for syntax's sake.

2. A logical problem that is not unique to Rotenberg's work in this area is that, even though a class of grammatical elements is defined as "non-lexical", they nevertheless have lexical entries and possess lexical attributes as part of those entries.

3. A prediction that also follows is that there should be no f-juncture-type applying from a trigger in one sentence to a target in a distinct sentence.

4. Rotenberg does assume this in a very direct—some might even say *ad hoc*—manner: "In English, French, and Irish... [a]ll non-lexical items are [+P[roclitic]]" (157).

5. Many of the syntactic works in the remainder of this chapter, in fact, flow from the same desire to bring all mutation under some notion of adjacency, although presumably for syntactic reasons rather than phonological ones.

6. There are languages, however, in which an existential construction consists of some diachronic reflex of 'have' plus a direct object (e.g., Albanian and Greek, and cf. Spanish *hay* and the French *il y a* constructions). Also in Relational Grammar, existentials are argued to be "unaccusatives"; i.e. intransitive predicates with a direct object as sole argument.

7. E.g., the non-discussion of subject-verb agreement on pp. 338-39. To be fair, standard HPSG methodology posits distinct lexical entries where a lexeme-based

morphologist might seek to unify morphologically related surface forms under a single lexemic entry.

8. In "extreme" Generative Semantic accounts, perhaps, this might be the preferred analysis.

9. E.g, p. 15 (cited above) mentions "…**a** deeply systematic **process**…"; fn. 3, p. 128 "…no phonological analysis of **the ICM process** is being proposed in this chapter; rather, the intention is to motivate a necessary syntactic context for **this process**"; on p. 40, we read about "…ICM in Irish, **a phenomenon** traditionally considered to be solely lexically or morphologically conditioned…[;] in spite of the many exceptions and idiosyncrasies in the expression of ICM, significant generalizations can be captured by adopting a syntactic approach to **the problem**." This last characterization is especially revealing of the syntactician's bias (emphasis added). Cf. Janda & Joseph 1986a, b on such distinction-ignoring unifications in general, as in Marantz (1982) on "the" Sanskrit Reduplication.

10. After first suggesting (erroneously, on p. 152) that this claim resembles the analysis of Lieber (1983), Roberts finally cites Zwicky (1984) on p. 154.

11. The facts of French liaison are rich with the effects of hypercorrection and stylistic conditioning, so that, even if there were a dialect "pure" enough to have a liaison process analogous to DOM, the parallel would not go through for the French in general. Perlmutter et al. (1996) tries to eliminate syntax from some of French liaison.

12. Although Roberts's (1997:165-68) bibliography has all the standard references on Welsh DOM (including many of those reviewed in this chapter), the

argumentation proceeds as a virtual reinvention of the wheel, so to speak, with relevant references entering the discussion only belatedly. Not only is Roberts's argument ultimately quite convergent with the claims of Zwicky (1984), but his discussion seems not to reflect the fact that almost every article written on the topic since then has been in some sense a reaction to Zwicky's analysis.

CHAPTER 5

MORPHOLOGICAL MUTATION

"Wherever we go we are impressed by the fact that pattern is one thing,

the utilization of pattern quite another." –Edward Sapir (1921:59)

5.1

Although syntacticians and phonologists have been complicit, knowingly or not,

in developing an area of study called the syntax-phonology interface that somehow

circumvents morphology, it is not at all clear that this move is legitimate. If one defines

morphology as 'the study of morphemes' or 'the study of words and their component

parts,' etc., then of course sound-structural reflections of syntactic constructions are only

incidentally word-internal, and thus would seem to be orthogonal to morphology. If, on

the other hand, morphology maps not only lexemes to inflected word-forms and lexemes

to related lexemes (the traditional morpheme-oriented domains of morphology), but also

lexemes in syntactic constructions and pragmatic contexts to phonemic shapes, then the

putative "syntax-phonology interface" is but one aspect of morphology, and neither

syntax nor phonology proper.

So as not to counter syntactic and phonological overreaching with agitation for a similarly imperialistic morphology, I define three morphological domains, all of which involve mapping functions, the conditions of which include information beyond phonotactics, but which take and return arguments of qualitatively different ontological status. In the interest of keeping syntax and phonology maximally simple, and therefore maximally general, the domain of the former involves the configuration and linear precedence of words in constructions, and the latter is constrained by formal-phonetic and functional-contrastive considerations only. These assumptions mean that syntax is not responsible for building words and phonological rules do not admit of grammatical (morphosyntactic or morpholexical) conditioning. The latter implication is in line with the Neogrammarian theory of sound change (Hock 1976, Joseph 1998). Although historical paths of development are sometimes adduced (Hamp 1951) or even grafted onto synchronic accounts as justification for particular less-than-obvious assumptions about underlying or intermediate representations (Pyatt 1997), a fully adequate and descriptively tractable synchronic account need not mirror the diachronic stages from which the synchronic state emerged. With these assumptions on the table, as it were, I claim that the SGIM are most appropriately a morphological issue or, better, a *constellation* (Janda & Joseph 1986, 1991, etc.) of morphological issues.[1]

5.2

As described in Ch. 2 above, Lenition and Nasalization are the two *mutation types* found in modern SG. I prefer to view them as types, and thus somewhat abstractly, because they cannot be reduced each to a single coherent sound-structural rule. Even if one or both of them could be so reduced, they are found in multiple morphological

functions and with all three lexemic classes: V, N, and A. The particular mutations, i.e.

mutations used for particular functions in particular contexts, do not always apply with

respect to the full range of initial alternations, e.g., some types of Lenition include

coronal obstruents, others do not.[2]

In §5.4 below, the SGIM phenomena catalogued in Ch. 2 are considered in the

context of a lexeme-based, realizational, Word-and-Paradigm model of morphology.

5.3

By way of populating the domain of discourse with concepts for the description of

the SGIMs, the domains of morphology assumed above and the rules and representations

relevant to each are defined.

5.3.1

Setting the stage first in terms of **intra-lexemic** (inflectional) **morphology**, we

define the *lexeme* as an abstract word-like unit according to which the lexicon is

organized (Matthews 1972:160ff.; 1974). Each lexeme has a *root*, which corresponds to

the absolute default phonological form associated with that lexeme. A root may, but need

not, be identical to one or more of the inflectional *word-forms* in the lexeme's *paradigm*.

The paradigm is a structured collection of inflectionally related word-forms. A

paradigm's structure is defined with respect to the relevant language's *inflectional*

properties, which are morphosyntactically and morpholexically relevant abstract features

paired with one of the feature's permissible values. Each *cell* in the paradigm corresponds

to a fully specified, well-formed inflectional property set appropriate to the inflection

class (declension (N, A) or conjugation (V)) of the lexeme in question. The cell itself is

populated by a phonemic string that realizes the cell's associated property set for that lexeme, i.e. one of the lexeme's word-forms.

Formally, word-forms are based on *stems* from a lexeme's *stem set* (Stump 2001:199-202; cf. Anderson 1992). Stems are purely formal elements formed generally by rule from the root or possibly another stem, and thus they have no intrinsic inflectional content.[3] In this way, *stem formation* is distinguished from the *selection* of particular stems for use in the realization of particular inflectional properties or property sets. In languages where stems formed in parallel ways are used in non-parallel, contrasting, or even totally unrelated functions from one lexeme or inflectional class to another, formation and selection must be mediated by the assignment of *stem indices* (Stump 2001:190ff.). The first, or equivalently innermost, layer of inflection is stem selection. Further rules licensing the presence of inflectional exponents (*realization rules*) apply as appropriate.[4]

The morphologization of formerly automatic juncture phonology (Janda 2003) has developed into what we now know as the Scottish Gaelic Initial Mutations (SGIM). These mutations are not capturable purely in terms of the synchronic sound structure of SG, although the sound structure is intimately involved.

All contemporary attempts to describe Celtic mutations as phonological resort to morphosyntactic, morpholexical, and morphophonological conditioning. In other words, whether the authors of such analyses admit it or not, initial mutations may show their effect in phonological structure, but their synchronic cause lies elsewhere, and thus, it can be argued, the description must lie elsewhere as well. Important though the identification of the phonological characteristics of the corresponding alternants may be, that part of the

description is a bare beginning. Indeed, for the purposes of the distribution of the mutations, the morphological status of a word or phrase need not make reference to the identity of the initial segments where the mutation will be made manifest. Word-level and phrase-level morphological rules may require a stem or shape of a certain abstract type, but this is not the same as saying that the rules perform the alterations to create the required bases. Stem types and shape types are purely morphological (*morphomic*, Aronoff 1994) entities. Systematic distinctions among stems from a given root are given by the stem-formation rules. Correspondingly, systematic distinctions among shapes of a given word-form are captured in rules of shape formation. Stem- and shape-<u>formation</u> rules do, of course, refer to those initial segments for their application, but stem- and shape-<u>selection</u> rules do not.

In cases like the SGIM, in which stems and shapes need not be phonologically unified, but merely regular (i.e. describable as a function), and because unrelated morphological rules can require one and the same base type, it is often an unnecessary and inaccurate practice to refer to stems or shapes by phonological or grammatical (functional) cover terms, e.g., "palatal stem", "past stem". In languages in which stems or shapes of a certain morphologically relevant type are neither uniform nor unifunctional, a description is better served by the coining of more or less arbitrary stem and shape indices.

Positing a largely parallel module of shape formation rules is otiose, however, when shapes are generally formally equivalent to some independently motivated root, base, or stem (e.g., Lenited bases, L-stems, and L-shapes). Shapes should be available by default through a stem-shape linkage, to the degree that this parallel may be maintained.

In cases where shapes and stems are similar but not identical, shape formation rules can select a stem or base, and then apply further modification(s) to describe the final shape. The point here is that assuming fully generative base-, stem-, and shape-formation and – selection components in morphology is a theory-internal issue, and it holds the negative potential for necessitating that formal generalizations may be missed. The N-shape, for example, has no nasalized base or stem correspondent, and thus must always (i.e. where Nasalization is actually apparent) invoke a nasalizing rule of shape-formation.

5.3.2

With respect to **inter-lexemic morphology**, particular rules of derivation and compounding may require that the *base* they use have certain formal (including sound-structural) properties. The base may be identical to the root of some lexeme, or to one of its stems, or to one of its word-forms. Such rules may, however, make formal requirements of a base such that the base is similar, but not identical, to any one of these independently motivated structures. For SG it is generally the case that a lenited base is formally identical to an independently motivated lenited (L-)stem.[5]

5.3.3

The third and final type of morphology, **supra-lexemic morphology**, involves systematic alterations of word forms (or potentially larger syntactic domains) subject to so-called *shape properties* (Zwicky 1990, 1992). *Shape conditions* describe the conditioning environments in which shape properties are distributed. The difference between properties and conditions correspond to the difference between the content and the distribution of the mutations (here the properties are the various instantiations of the mutation types, Lenition and Nasalization). There are two general types of shape

conditions, *configurational shape conditions* (construction-based marking) and *linear-local shape conditions* (lexical stipulations). The former depends on surface syntax (or just syntax, in monostratal accounts), and the latter depends on the identity of shape condition-bearing triggers, which one might alternatively term shape property assigners. I retain the traditional term "trigger" here, with the understanding that substantially many of the synchronic SGIMs are not triggered, in the sense of linear-local shape conditions.

5.4

In this section, the SGIM phenomena presented more or less pre-theoretically in Chapter 2, and described, albeit indirectly, with respect to phonological (Chapter 3) and syntactic (Chapter 4) treatments in the literature, are recast in terms of a realizational approach to morphology that comprises inter-lexemic, intra-lexemic, and supra-lexemic dimensions. Of the two mutation types in SG, Lenition and Nasalization, only Lenition is used in all three dimensions. Nasalization is used in supra-lexemic morphology only, but it is used in both linear-local and configurational shape conditions.

In the present case, I propose that N, V, and A lexemes have four indexed stems available, and that N, V, and A inflected word forms have three of four logically possible shapes available for selection by morphological rules.[6] For ease of reference, the mutation correspondence tables given in Ch. 2 are summarized here. Recall that unlike other modern Celtic traditions, Nasalization is not represented in the SG orthography.

Radical (Orthography)	Radical Phoneme(s)	Lenited (Orthography)	Lenited Phoneme(s)	Nasalized Phoneme(s)
<c>	/kʰ, k'ʰ/	<ch>	/x, ç/	/ɟ/
<g>	/k, k'/	<gh>	/ɣ, j/	/ɴ/
<t>	/tʰ, tʃ/	<th>	/h/	/d/
<d>	/t, dʒ/	<dh>	/ɣ, j/	/n/
<l>	/l, l'/	<l>	/l, l'/[a]	/l, l'/
<n>	/n, ñ/	<n>	/n, ñ/	/n, ñ/
<r>	/r, ɾ̥/	<r>	/r, ɾ̥/	/r, ɾ̥/
<p>	/pʰ/	<ph>	/f/	/b/
<b>	/p/	<bh>	/v/	/m/
<m>	/m/	<mh>	/v/	/m/
<f>	/f/	<fh>	Ø	/f/
<s>	/s, ʃ/	<sh>[b]	/h/	/s/
		<s>[c]	/s/	/s/

Table 5.1. Graphemes, phonemes, and mutation.

Notes:

(a) <l, n, r> have distinct lenited variants in some dialects, but these are frequently ignored in SG second language pedagogy, e.g., and thus are presumed not to feature in "standard" SG.

(b) before V, <l, n, r>

(c) before <g, m, p, t>

5.4.1

Beginning with the inflectional word-forms of particular lexemes, that is, in *intra-lexemic morphology*, SG nouns, verbs, and adjectives show distinct distributions of stems with radical or lenited initials. Certain inflectional properties are regularly associated with morphological exponents of the affixal (concatenative) and the apophonic (non-

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concatenative) varieties. Together with initial Lenition, which is quite regular, there is a more sporadic stem-final Palatalization that is equally morphologized (*cat* 'cat' /kʰatʰ/ {CASE:dir, NUM:sg} vs. *cait* /kʰatʃ/ {CASE:dir, NUM:pl}), although no one, to my knowledge, wishes to make the case that this Palatalization is "triggered". For lexemes that show Palatalization in some of their word-forms, the distribution is inflectionally predictable, and therefore inflectionally rule-governed. For me, stem mutation, whether Lenition or Palatalization, is to be captured in rules of stem formation.[7]

Palatalized stems sometimes show unpredictable vowel alternations when compared to the root, which must be handled by lexical stipulation, but this does not mean that the palatalization itself is not the stuff of rules. Roots that are already slender vowel-/palatal consonant-final satisfy Palatalization stem-formation vacuously. According to the broad/slender vowel-matching pattern in SG, suffixed inflectional exponents generally occur in one of two allomorphs, according to the character of the end of the stem, e.g., *òl-aidh* 'will drink' vs. *ruith-idh* 'will run', *cearc-an* 'hens' vs. *sgoil-ean* 'schools'.

Owing to the fact not only that the formation of stems is distinct depending on the root-initial onset, but also that their distribution varies from inflection class to inflection class (not to mention the fact that mutations are found in all lexeme classes, N, V, and A), the above-mentioned technique of assigning purely morphomic (neither phonological nor semantic; Aronoff 1994:25, Blevins 2003:737-39, 761) indices to stems is appropriate for the purposes of capturing generalizations. I therefore coin the following stem indices for SG: an SG lexeme has an *R-stem*, an *L-stem*, a *P-stem*, and an *X-stem*.

For the sake of discussion, I use examples from the stem sets of SG nouns. For some lexemes, all four stem-types are definable as segmentally distinguished from one another, e.g., the SG lexeme *cat* 'cat' has the following four stems (its *stem set*):

(23) R-stem[8]   *cat*   /kʰatʰ/

L-stem   *chat*   /xatʰ/

P-stem   *cait*   /kʰatʃ/

X-stem   *chait*   /xatʃ/

For other lexemes, one or more of these stems may be segmentally identical to the other stems, e.g., *làmh* 'hand' and *sgoil* 'school':

(24) R-stem   *làmh*   /lã:v/   *sgoil*   /skol'/

L-stem   *làmh*   /lã:v/   *sgoil*   /skol'/

P-stem   *làimh* /lãjv/   *sgoil*   /skol'/

X-stem   *làimh* /lãjv/   *sgoil*   /skol'/

So that rules of stem-selection need not be sensitive to whether a lexeme distinguishes its stems segmentally or not, such rules can select stems by morphomic index rather than by terms like "lenited stem" or "palatalized stem." This use of indices also allows for partially or even fully suppletive stems, and predicts that their distribution will be like one of the four stem types for the appropriate lexeme class (*madainn* 'morning' and *bòrd* 'table':

(25)	R-stem	*madainn*	/mãtɛñ/	*bòrd*	/borʃt/
	L-stem	*mhadainn*	/vãtɛñ/	*bhòrd*	/vorʃt/
	P-stem	*maidne*	/mɛ̃tñə/	*bùird*	/buɾ̥dʒ/
	X-stem	*mhaidne*	/vɛ̃tñə/	*bhùird*	/vuɾ̥dʒ/

The names of the indices are as language-specific as the rules of stem-formation and selection themselves. The device of indexation of elements, however, is of more general descriptive utility. Even just in SG, rules of inflection, derivation, and compounding may select any stem or base by its index in their structural description, and thus morphological rules do not cause mutation per se, nor do they select their bases on purely phonological characteristics.[9] Avoiding direct reference to the phonemic content of the base in the structural description of a stem- (or other base-) selection rule is therefore to be preferred. Stem indexation that is independent of the details of formation allows selection rules to be blind in this way. In a language where stems are clearly one-to-one with respect to both form and function, such indexation is otiose, of course. Fortunately (or unfortunately, depending on the value one places on having an "interesting" morphology to describe), few if any languages are so neatly isomorphic even at the stem level, let alone at the lexeme level.

5.4.1.1

In order to get a sense of the distribution of verb stems, it is necessary to control for the interfering influence of known projecting pre-verb grammatical triggers. Therefore, we should look at word-forms that can appear utterance initially or even in isolation. These forms include the imperative and the affirmative declarative versions of

verbs in all tenses, active and passive (*òl* 'drink', *cluich* 'play', *tog* 'lift, build', *leugh* 'read', *buail* 'strike, hit', *fàg* 'leave', *snàmh* 'swim', and *stad* 'stop').

	Imperative	Past	Future	Conditional
(1) Vowels	*òl*	*dh'òl*	*òlaidh*	*dh'òladh*
(2) Velars	*cluich*	*chluich*	*cluichidh*	*chluicheadh*
(3) Dentals	*tog*	*thog*	*togaidh*	*thogadh*
(4) Sonorants	*leugh*	*leugh*	*leughaidh*	*leughadh*
(5) Labials	*buail*	*bhuail*	*buailidh*	*bhuaileadh*
(6) "F"	*fàg*	*dh'fhàg*	*fàgaidh*	*dh'fhàgadh*
(7) s+[sonorant]	*snàmh*	*shnàmh*	*snàmhaidh*	*shnàmhadh*
(8) s+[obstruent]	*stad*	*stad*	*stadaidh*	*stadadh*

	Relative Future	Past Passive	Future Passive	Conditional Passive
(1) Vowels	*dh'òlas*	*dh'òladh*	*òlar*	*dh'òltadh*
(2) Velars	*chluicheas*	*chluicheadh*	*cluichear*	*chluichteadh*
(3) Dentals	*thogas*	*thogadh*	*togar*	*thogtadh*
(4) Sonorants	*leughas*	*leughadh*	*leughar*	*leughtadh*
(5) Labials	*bhuaileas*	*bhuaileadh*	*buailear*	*bhuailteadh*
(6) "F"	*dh'fhàgas*	*dh'fhàgadh*	*fàgar*	*dh'fhàgtadh*
(7) s+[sonorant]	*shnàmhas*	*shnàmhadh*	*snàmhar*	*snàmhtadh*
(8) s+[obstruent]	*stadas*	*stadadh*	*stadar*	*stadtadh*

Table 5.2. Verb inflection and initial consonant classes.

Recalling that stems are indexed independently of their formation, and that they are selected by inflectional rules based on their indices, not their phonemic content, the distribution of R-stem versus L-stem is quite clear:

R-stem in the Imperative, Future Active and Passive, L-stem elsewhere.

Initial groups 4 and 8 show no orthographic distinction under Lenition, and so their R-stems and L-stems are identical. In some dialects the phonetic distinction for group 4 is present, but not reflected in orthography. This is not a problem for this analysis, because even then the R/L patterning is exactly in keeping with general pattern, and does not depend on orthography.

Other verb forms are taken up in section 5.4.3.1 below, where shape conditions interact with stem selection.

5.4.1.2

Nouns in SG distinguish four cases in two numbers. In Chapter 2 above I proposed a novel but not unorthodox naming scheme for cases that more accurately relates to their grammatical function, namely Direct (for Nominative), Genitive, Oblique (for Dative), and Vocative. There are two grammatical genders in modern SG that interact with stem type distribution (*each* 'horse', *uinneag* 'window', *cat* 'cat', *caileag* 'girl', *doras* 'door', *tuagh* 'axe', *ràmh* 'oar', *làmh* 'hand', *balach* 'boy', *bròg* 'shoe', *feasgar* 'afternoon', *fras* 'shower', *seòl* 'sail', *slat* 'rod, stick', *sporan* 'pouch, purse', *sguab* 'broom').[10]

		Direct Sing.	Genitive Sing.	Oblique Sing.	Vocative Sing.
(1) Vowels	m.	*each*	*eich*	*each*	*eich*
	f.	*uinneag*	*uinneig*	*uinneig*	*uinneag*
(2) Velars	m.	*cat*	*cait*	*cat*	*chait*
	f.	*caileag*	*caileig*	*caileig*	*chaileag*
(3) Dentals	m.	*doras*	*dorais*	*doras*	*dhorais*
	f.	*tuagh*	*tuaighe*	*tuaigh*	*thuagh*
(4) Sonorants	m.	*ràmh*	*ràimh*	*ràmh*	*ràimh*
	f.	*làmh*	*làimhe*	*làimh*	*làmh*
(5) Labials	m.	*balach*	*balaich*	*balach*	*bhalaich*
	f.	*bròg*	*bròige*	*bròig*	*bhròg*
(6) "F"	m.	*feasgar*	*feasgair*	*feasgar*	*fheasgair*
	f.	*fras*	*froise*	*frois*	*fhras*
(7) s+[sonorant]	m.	*seòl*	*siùil*	*seòl*	*shiùil*
	f.	*slat*	*slaite*	*slait*	*shlat*
(8) s+[obstruent]	m.	*sporan*	*sporain*	*sporan*	*sporain*
	f.	*sguab*	*sguaibe*	*sguaib*	*sguab*

		Direct Plural	Genitive Plural	Oblique Plural	Vocative Plural
(1) Vowels	m.	*eich*	*each*	*eich*	*eacha*
	f.	*uinneagan*	*uinneag*	*uinneagan*	*uinneagan*
(2) Velars	m.	*cait*	*chat*	*cait*	*chata*
	f.	*caileagan*	*chaileag*	*caileagan*	*chaileagan*
(3) Dentals	m.	*dorais*	*dhoras*	*dorais*	*dhorasa*
	f.	*tuaghan*	*thuagh*	*tuaghan*	*thuaghan*
(4) Sonorants	m.	*ràimh*	*ràmh*	*ràimh*	*ràmha*
	f.	*làmhan*	*làmh*	*làmhan*	*làmhan*
(5) Labials	m.	*balaich*	*bhalach*	*balaich*	*bhalacha*
	f.	*bHrògan*	*bhròg*	*brògan*	*bhrògan*
(6) "F"	m.	*fiodhan*	*fhiodh*	*fiodhan*	*fhiodha*
	f.	*frasan*	*fhras*	*frasan*	*fhrasan*
(7) s+[sonorant]	m.	*siùil*	*sheòl*	*siùil*	*sheòla*
	f.	*slatan*	*shlat*	*slatan*	*shlatan*
(8) s+[obstruent]	m.	*sporain*	*sporan*	*sporain*	*sporana*
	f.	*sguaban*	*sguab*	*sguaban*	*sguaban*

Table 5.3. Noun inflection and initial consonant classes.

Clearly, case and number combined with initial segment are necessary but not sufficient for the full determination of stem selection. Leaving aside case and number suffixes, however, there are a number of generalizations with respect to apparent stem selection that may be identified (further refinement follows immediately below):

		DSg	**GSg**	**OSg**	**VSg**	**DPl**	**GPl**	**OPl**	**VPl**
(1) Vowels	m.	*R*	*P*	*R*	*P*	*P*	*R*	*P*	*R*
	f.	*R*	*P*	*P*	*R*	*R*	*R*	*R*	*R*
(2) Velars	m.	*R*	*P*	*R*	*X*	*P*	*L*	*P*	*L*
	f.	*R*	*P*	*P*	*L*	*R*	*L*	*R*	*L*
(3) Dentals	m.	*R*	*P*	*R*	*X*	*P*	*L*	*P*	*L*
	f.	*R*	*P*	*P*	*L*	*R*	*L*	*R*	*L*
(4) Sonorants	m.	*R*	*P*	*R*	*P*	*P*	*R*	*P*	*R*
	f.	*R*	*P*	*P*	*R*	*R*	*R*	*R*	*R*
(5) Labials	m.	*R*	*P*	*R*	*X*	*P*	*L*	*P*	*L*
	f.	*R*	*P*	*P*	*L*	*R*	*L*	*R*	*L*
(6) "F"	m.	*R*	*P*	*R*	*X*	*R*	*L*	*R*	*L*
	f.	*R*	*P*	*P*	*L*	*R*	*L*	*R*	*L*
(7) s+[sonorant]	m.	*R*	*P*	*R*	*X*	*P*	*L*	*P*	*L*
	f.	*R*	*P*	*P*	*L*	*R*	*L*	*R*	*L*
(8) s+[obstruent]	m.	*R*	*P*	*R*	*P*	*R*	*R*	*R*	*R*
	f.	*R*	*R*	*R*	*R*	*R*	*R*	*R*	*R*

Table 5.4. Stem indices and noun inflection.

Four patterns emerge from the above, two for masculine nouns (RPRX-PLPL, RPRP-PRPR) and two for feminine nouns (RPPL-RLRL, RPPR-RRRR). Noting that the second pattern in each pair is found only in initial classes that are not subject to lenition (vowels, sonorants, and s+[obstruent]), and noting further that the difference between a canonical X-stem (*chait*) and a canonical P-stem (*cait*) is the presence of a lenited initial (<ch>), both pairs can be collapsed into one masculine pattern (RPRP^X-PR^{L}PR^L) and one feminine pattern (RPPR^L-RR^{L}RR^L), respectively.

A further step that one may take, but only if stems are categorized by index, not by phonemic content, is that where Lenition represents an identity function (i.e. no change), then we may further collapse the patterns and do away with the superscripting altogether, RPRX-PLPL for masculine nouns and RPPL-RLRL for feminine nouns. At this point, stem formation and stem indexing are divorced, and the indices are truly

morphomic, whereas at first blush they seemed to be redundant with the identity of the initial segment.

Once this two-pattern generalization is captured, there are two observations that might be dispiriting or encouraging, depending on one's view. The first is that although a great majority of SG nouns conform to these patterns, there are a significant number of nouns that do not fit either of these patterns. The second observation is that this stem-based analysis effectively reinvents the traditional first and second declensions (Calder 1923:81-91).

There are five (5) conventional declension classes for nouns in SG, and each of these can be defined rather straightforwardly with respect to the distribution of stem types in the paradigm. The first two declensions are nearly homogeneous with respect to grammatical gender, the first masculine, and the second feminine. The other three declensions are less segregated with respect to gender, and so the gender aspect of the stem distribution is ultimately epiphenomenal within noun paradigms. Gender does, of course, remain relevant for agreement purposes, etc.

The third declension again involves stem final Palatalization, but somewhat inverts the patterning found in the first declension. For example, take the word *sùil* (f.) 'eye':

(26)

	Sg.		Pl.	
Dir.	*sùil*	P	*sùilean*	P
Gen.	*sùla*	R	*shùl*	L
Obl.	*sùil*	P	*sùilean*	P
Voc.	*shùil*	X	*shùla*	L

In the fourth declension, there is no Palatalization in stem formation, and thus only R and L stems are found. There is no reason in principle that Palatalization could not

be applicable in words of the fourth declension (e.g. *guith* is unattested, but it is a

possible SG word, cf. *ruith* 'run!', *sùith* 'soot'), and so the collapsing of patterns

proposed for the subtypes of the first and second declensions, defined by the possibility

of Lenition for the initial class, is not available for collapsing the third and fourth

declensions, despite the strong parallelism of stem selection otherwise. Take for example

guth (m.) 'voice':

(27)

	Sg.		Pl.	
Dir.	*guth*	R	*guthan*	R
Gen.	*gutha*	R	*ghuth*	L
Obl.	*guth*	R	*guthan*	R
Voc.	*ghuth*	L	*ghutha*	L

The so-called fifth declension corresponds to the collection of the various

consonantal stems that are familiar from elsewhere in Indo-European languages,

including stems ending in /r/, /n/, and /d/.

(28)   *cathair* (f.) 'chair'   *àra* (f.) 'kidney'   *gobhainn* (m.) 'smith'

	Singular	Plural	Singular	Plural	Singular	Plural
Direct	*cathair*	*cathraichean*	*àra*	*àirnean*	*gobhainn*	*goibhnean*
Genitive	*cathrach*	*chathraichean*	*àrann*	*àra*	*gobhann*	*ghobhann*
Oblique	*cathair*	*cathraichean*	*àrainn*	*àirnean*	*gobhainn*	*goibhnean*
Vocative	*chathair*	*chathraiche*	*àra*	*àirnean*	*ghobhainn*	*ghoibhnean*

There are some new issues here, including stem extensions at the right edge, and

apparent syncope. The source of the <ai> would seem to be the word-internal spelling

rule mentioned in Ch. 1 above, that the vowels on either side of any given consonant need

to match, either both slender <i, e> or both broad <a, o, u>, given its Old Irish source,

cathir. The spelling rule was not part of Old Irish, and syncope of /i/ between a consonant

and /r/ was quite common. Such syncope is clearly morpholexically conditioned in the

synchronic grammar of modern SG, rather than phonologically motivated, e.g.,

cathaireach, *catharach* are accidental gaps in SG, given *piob<u>air</u>* '(bag)piper' ~ *piob<u>aireachd</u>* 'bagpipe playing' and *fàbh<u>ar</u>* 'favor, interest, friendship' ~ *fàbh<u>arach</u>* 'favorable, kind'. Dialectal variants for *àra* and *gobhainn* (*àrainn* and *gobha*, respectively) suggest that there is some pressure among the *n*-roots of the fifth declension to analyze the /n/ as part of root, rather than as a stem extension.

Also included here are the nuclear family terms in <-a(i)r>, i.e. *athair* 'father' (O. Ir. *athir*), *mathair* 'mother' (O. Ir. *máthir*), *brathair* 'brother' (O. Ir. *bráthir*), *piuthar* 'sister' (O. Ir. *siur*, with the SG form presumably a back-formation, reanalyzed from the lenited form /fiur/ (cf. O. Ir. lenited *fiur*), MacLennan (1925/1979:257)).

(29)		Singular	Plural
Direct		*athair*	*athraichean*
		màthair	*màthraichean*
		bràthair	*bràthraichean*
		piuthar	*peathraichean*
Genitive		*athar*	*athraichean*
		màthar	*mhàthraichean*
		bràthar	*bhràithrean*
		peathar	*pheathraichean*
Oblique		*athair*	*athraichean*
		màthair	*màthraichean*
		bràthair	*bràthraichean*
		piuthar	*peathraichean*
Vocative		*athair*	*aithriche*
		mhàthair	*mhàthraichean*
		bhràthair	*bhràithre*
		phiuthair	*pheathraiche*

Variability in the Vocative plural and stem suppletion in the paradigm of PIUTHAR are idiosyncratic to this very ancient portion of the vocabulary. The unexpected plural *bràithrean* may show an influence from English *brethren*. A cross-declension rule for the formation of the Genitive plural is that lexemes whose {CASE:dir, NUM:pl} forms are in <-ichean> keep that ending in the Genitive, whereas lexemes that do not will tend not to

show a suffix realizing {Num:pl} in the Genitive (see the paradigms of SÙIL, GUTH above).

Returning the focus to consonant mutation in stem selection, however, the pattern of the fifth declension is quite simple, i.e. RRPX-PLPX.

5.4.1.3

Adjectives inflect to realize combinations of not only {CASE} and {NUM}, but also {GEN}. There is complete syncretism in the plural. Consider the following paradigms of MÒR 'large', BEAG 'small', and CÒIR 'just, fitting':

(30)

		Singular				Plural	
		Masc.		Fem.		Both	
	Direct	mòr	R	mhòr	L	mòra	R
		beag		bheag		beaga	
		còir		chòir		còire	
	Genitive	mhòir	X	mòire	P	mòra	R
		bhig		bige		beaga	
		chòir		còire		còire	
	Oblique	mòr	R	mhòir	X	mòra	R
		beag		bhig		beaga	
		còir		chòir		còire	
	Vocative	mhòir	X	mhòr	L	mòra	R
		bhig		bheag		beaga	
		chòir		chòir		còire	

Note that *còir* has a palatal-final root, and so it satisfies stem formation requirements for the P-stem and the X-stem without further alteration of the right edge. Adjective stem formation and indexation are fully parallel to that found in verbs and nouns, but significantly, the rules of stem selection are independent of the distribution of the stem types in nouns. For example, whereas X-stems are generally found only in vocative forms of nouns, they are also found in the Genitive singular masculine and the Oblique singular feminine.

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5.4.2

The domain of *lexeme formation* comprises the traditional domains of derivational morphology and compound morphology, which are functionally united in describing relations between source lexemes and derived lexemes. It is for this reason that I am calling lexeme formation of both sorts *inter-lexemic morphology*. Beard (1998) highlights some of the arguments for distinguishing derivation from compounding, and for distinguishing the two of them from inflection. It is not my purpose here to resolve the exact boundaries, but rather to offer a convenient definition in terms of functions:

Compounding relates two (or potentially more) lexemes and an intended semantic or functional modulation to a distinct complex lexeme built on the phonemic content of the constituent parts (*bases*) and the intended semantics incorporating the basic semantic of the constituent parts to a more or less compositional degree, e.g., f_{Cmpd}(<SCHOOL, HOUSE>, *used-for*) = SCHOOLHOUSE. Systematic morphological requirements or modulations of either or both constituent members may obtain in a given language, e.g., f_{Cmpd}(<***teeth***($\Leftarrow$TOOTH), MARK(s)>, *created-by*> = TOOTHMARK(s), %TEETHMARK(s).[11]

Derivation takes one lexeme and an intended semantic or functional modulation to a distinct complex lexeme. The derived lexeme is built on the phonology and the semantics of the lexical base, and the derivational function may impose formal requirements or modulations on that base, e.g., f_{Deriv}(BEAUTY, *characterized by*) = BEAUTIFUL; derivational bases can themselves be complex, even compound f_{Deriv}(DOG-TIRED, *state*) = DOG-TIREDNESS.

Some SG compounding rules require a lenited right-hand base, as do a number of derivational prefixation rules. For the compounding cases, it seems that some

compounding amounts to conventional, lexicalized noun-noun constructions, with the second noun being in the {CASE:gen} for ordinary morphosyntactic reasons. It seems, however, that Lenition has been generalized somewhat, presumably by analogy, from these cases to instances in which {CASE:gen} is not appropriate to the semantic-syntactic relation of the two components (e.g., *ceanna-bhaile* 'capital', lit. 'head-town', 'town' being an unlikely Genitive here), on the one hand, and/or the form of the right-hand member is not the anticipated indefinite genitive form, on the other. The study of compound types in SG is a rich topic in its own right, but for the present purposes, all that is relevant is the fact that some compounds are built on Lenited bases and others aren't (e.g., *beairt-fuaigheil* 'sewing machine'), motivating at least rules of base selection as part of larger rules of lexeme formation.

I suggest, following Zwicky (1987), that morphological rules may specify one or more operations in their formulation. The use of a lenited base, on that account, is one part of the various morphological rules that select such a base. Clearly it is not the rule that converts a radical root or other base into the lenited version by means of some pseudo-(morpho–)phonological derivation. Such an analysis is in the interest of capturing cross-rule or cross-morpheme generalizations, because base selection can be factored out of either the (lexical) representations of the prefixes (on a classical morpheme-as-sign analysis, not assumed here) or the morphological rules introducing the derivational marker (on a realizational analysis). Further, if alternant pairs are the matter of base formation rather than selection, there is no need to assume synchronically questionable intermediate phonological stages (Rogers 1972, Pyatt 1997).

5.4.2.1

Stump (2001) would presumably capture the lenited-base aspect of the relevant

derivational rules in terms of a *morphological metageneralization*, a rule about those

rules. Admittedly, this sets up an *ad hoc* class of rules in the absence of any independent

motivation for grouping the rules or prefixes together in the synchronic SG grammar.

Given the fact that there is ultimately no unifying phonological characteristic or

semantic-functional commonality among the prefixes that correlate with a lenited base,

however, if a verifiable abstract pattern can at least be recognized as a rule rather than

fragmented among separate representations, such a rule analysis is to be preferred.

5.4.2.2

In Vennemann (1972), *via rules* are proposed for the Natural Generative

Phonology framework in order to express lexical phonemic correspondences of limited

generalizability. These typically relate pairs and sets of named lexemes, rather than being

productive rules or meta-rules in their own right.

5.4.2.3

López (1979:6, 10; Janda 1987:137-38) introduces the *lexical correspondence*, a

"bidirectional lexical relationship...between underlying segments...[whose a]lternation is

non-governed—a given morpheme turns up with segment X in one form and the

corresponding segment Y in another in another form...[;] but it could just as well have

turned up with X in both. The forms may be related inflectionally...[or] derivationally or

as near synonyms.... [C]orrespondences form a set of phonological redundancy rules

parallel to morphological and semantic redundancy rules.... [They] exist whenever a set

of alternations exist...." This last seems to disallow productive and/or predictable

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alternations, but certainly there is at least a cline of productivity among alternations in various languages.

A helpful diagnostic of a correspondence, as opposed to a morphological rule proper, is that "[c]orrespondences are associated with phonological contexts...[which] are permissive, rather than determinatory" (López 1979:188; Janda 1987:138). For example, in Brazilian Portuguese, the related words *ambiguo* 'ambiguous' and *ambigüidade* 'ambiguity' share elements of both form and meaning, there is a systematic difference in form, a correspondence /u/~/w/ that is said to relate the words as a kind of lexical redundancy rule (190), but the pattern is clearly not automatic so that a productive synchronic phonological rule of glide deletion can be reliably formulated, given sets like *água* 'water', *aquoso* 'watery', and *aqüeo* 'aqueous', which show a glide in all forms, whether followed by a front vowel or a back vowel. López (1979:191-217) includes other putative phonological or morphophonological rules such as velar softening /k/~/s/, /g/~/ʒ/, and a rule of dental fricative voicing /s/~/z/, among many others. Since all of these have exceptions and counterexamples that cannot be either summarized as a rule or dismissed as borrowing phenomena, López suggests accounting for all of these as lexical correspondences.

López conceives of correspondences as being non-directional statements establishing relationships rather than deriving one from the other (233-34). In terms of usage, it is true that speakers can use patterns for parsing or generating by analogy, but in the characterization of rules in terms of functions, the SG mutations are fully predictable from radical member to lenited member, but not in the reverse direction, e.g., an initial /h/ may correspond to a radical in /t/ or /s/, and a vowel-initial stem may correspond to a

radical in the same vowel or the root may in fact be /f/-initial, because /f/ is deleted under lenition, despite its being retained in the orthography <fh>.

A correspondence may not be the ideal means of capturing the SG facts, however, since it implies too great a degree of unpredictability: "[c]orrespondences, by definition, are free to occur sporadically" (196). Even though one may not be able to predict *a priori* which derivational rules involve a Lenition requirement on the base, e.g., the rules that do have such a requirement have it exceptionlessly (given a base that is capable of showing a Lenition distinction, of course).

In general, I am sympathetic to the full-entry model of the lexicon that López assumes (234, citing Jackendoff 1975). López states that correspondences are "a type of phonological redundancy rule...they are 'rules' only in the extended sense of the term; they do not change anything into anything else but merely establish relationships" (237). López says that because correspondences take over where productive phonological rules leave off, this raises question of defining *productivity* (cf. Bauer 2001). López pursues the distinction between correspondences and outright suppletion, and asserts that this is actually a "non-question" (239). In assuming that correspondences subsume suppletion, López takes a step too far: "mere existence of an alternation, aside from frequency, is enough to qualify it as a correspondence. The lower limit on correspondences is set by cost accounting" (239-40). By this definition, not only suppletions but also indeed all alternations are correspondences by their "mere existence", regardless of phonetic motivation or productivity. Contrary to López's characterization of correspondences as operating on "fewer, much more abstract, underlying forms" than via-rules, her separation of alternations from their phonetic/phonological naturalness and systematic

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productivity fairly takes over the entire domain of segmental alternation, with automatic morphophonology being interpretable as simply very inexpensive correspondences. I don't pursue this infelicitous phrasing, because I believe the implication is unintended.

Lopez identifies four sources of the correspondences she finds in Brazilian Portuguese (p. 251):

(1) death of formerly active phonological rules,

(2) "borrowing back" from the parent language (i.e. Latin),

(3) borrowing from other languages in general, and

(4) dialect borrowing.

To these, I would add the possibility for residue transferred (*imposed*, Van Coetsem 1988, 2000; Stewart to appear) from the first language of populations shifting into the language in question.[12] These sources are plausible candidates for the genesis of minor or unexpected sound-structural patterns in a language. Of these five, the latter four are external to the language in question, and are therefore understandably sporadic in their distribution. The first source, the death of phonological rules, is a theory-dependent description of sound change. Since it is phrased in terms of rule death, it would seem to favor categorical change rather than a so-called Lexical Diffusion model (Chen & Wang 1975, Wang 1977).

5.4.2.4

Whereas Vennemann and López focus on how related forms are different, Janda & Joseph (1986, 1989, 1991, 2002; see note 1, this chapter, for further references) focus instead on formal commonalities between and among morphological formations, linking formally similar but descriptively uncollapsible morphological rules by means of *meta-*

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redundancy-rules or *meta-templates* (the terms are intended to be more or less interchangeable). Like the morphological meta-generalizations mentioned in §5.4.2.1 above (Stump 2001, citing Zwicky), meta-redundancy-rules or meta-templates are more descriptive than explanatory, but where Stump's metageneralizations are explicitly designed to relate rules in a linguist's formal grammar, the meta-redundancy-rules or meta-templates are less self-consciously formal descriptions of sub-patterns, and thus could more easily reflect generalizations that a naive speaker could plausibly perceive. The various reduplications (cf. Marantz 1982) in Sanskrit would be linked by such meta-rules acknowledging the sharing of a CV template, but each particular morphological rule of reduplication further specifies the precise details of the reduplicant as used for a particular purpose (Janda & Joseph 1991). Umlaut in German is similarly described not as one rule but as (literally) dozens of particular rules, linked by a meta-rule of vowel fronting (Janda 1982).

Hand in hand with the notion of a meta-redundancy-rule or a meta-template is the useful notion of a morphological *constellation*, the collection of rules which instantiate the meta-rule, so that one may speak of the reduplication constellation in Sanskrit or the Umlaut constellation in German, each showing considerable internal heterogeneity, but formal unity at a somewhat abstract level. Thus regularities across rules or formatives are captured, but without entailing that these be a special component of a generative grammar. Constellations exist for speakers to notice (or not) and to use (or not) in making on-line analogies or parsing inferences (Joseph 1997b).

In the case of SG, one can view the two mutation types, Lenition and Nasalization, as meta-redundancy-rules, and then in turn define a Lenition constellation

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and a Nasalization constellation in SG. It is the tendency to focus on the sound structural similarities of Lenition instances and Nasalization instances, respectively, at the expense of acknowledging the real variability in conditioning, etc., that has led to a muddled perception of SG mutation, and indeed of Celtic mutation generally. To the degree that the mutation types are not unified in their function or conditioning in even one Celtic language, so much more ill-advised is the simple (but seemingly popular) assumption that one can talk about, e.g., "the" (=pan-Celtic) Lenition mutation.[13]

5.4.3

Perhaps the most controversial aspect of the morphological proposals in this chapter is the proposal that we should assume a domain of morphology larger than the canonical word, i.e. *supra-lexemic morphology*. On the one hand, one can talk about the realization of phrase and/or construction-level morphosyntactic, and therefore inflectional, properties. These may correspond to *configurational shape conditions*. On the other, there is a residual, closed core of grammatical, or marginally lexical, formatives that assign shape properties to the immediately following word, i.e. *linear-local shape conditions*. In this section both sorts of shape conditions are presented, and for the first time in this chapter, the Nasalization mutation type becomes relevant.

5.4.3.1

Traditional SG grammars refer to "independent" and "dependent" finite verb forms. The independent form is used affirmative declarative sentence types, and the dependent for all others. This corresponds to those forms that can appear clause-initially and those that come with a pre-verb element that correlates with an initial mutation. Keeping the focus on the verb itself, it is clear that the so-called dependent form may be

instantiated in more than one shape even in the same tense. Before discussing shape conditions, let us first look at the independent word forms:

(31) *Bhuail am bàta a'chlach.*   'The boat struck the rock.'

      Buailidh am bàta a'chlach.   'The boat will strike the rock.'

      Bhuaileadh am bàta a'chlach.   'The boat would/used to strike the rock.'

      Bhuaileadh a'chlach.   'The rock was struck.'

      Buailear a'chlach.   'The rock will be struck.'

      Bhuailteadh a'chlach.   'The rock would/used to be struck.'

I would analyze each of these as inflected forms built on the R-stem (in the future active and passive) or the L-stem (elsewhere) of the lexeme BUAIL 'strike'.

5.4.3.1.1

Consider now the dependent forms of the same verb BUAIL, first in the past tense (the shape property assigned by the construction is given by the capital letter at right):

(32) *Cha do bhuail e…*   'He did not strike…'   /vuəl/ L

      An do bhuail e…   'Did he strike…?'   L

      Nach do bhuail e…(?)'That he did not strike…'/'Did he not strike…?'   L

      Gun do bhuail e…   'That he struck…'   L

In the future tense, some shape differentiation is found (recall that the independent future form is lenited and without a pre-verb, *Bhuailidh e…* 'He will strike…'):

(33) *Cha bhuail e…*   'He will not strike…'   /vuəl/ L*

      Am buail e…?   'Will he strike…?'   /muəl/ N

      Nach buail e…(?)   'That he won't strike'/'Won't he strike…?' /puəl/ L†

      Gum buail e…   'That he will strike…'   /muəl/ N

Other dependent forms show a distribution of shape properties as seen in the future forms. Note that the symbol L* represents the exemption of coronal stops to Lenition shape condition (e.g., *cha dusg e* 'he won't wake up'), whereas L† represents a special shape property assigned in constructions with *nach*, such that only dependent verb forms in /f/+Vowel are required to be in the L-shape (e.g., *nach fhàg e* 'Won't he leave?'/'That he won't leave' (cf. *nach freagair e* 'Won't he answer?'/'That he won't answer' as opposed to past *nach do fhreagair e* 'Didn't he answer?'/'That he didn't answer')). Other potentially lenitable verb forms appear in their L-shape, as above with *cha bhuail* and *nach buail*, respectively. Thus the Lenition alternation is not a unitary phenomenon in SG, and shape conditions may assign properties to a restricted subset of the full range of initials for which lenited alternants do exist.

It is a fair question to ask whether the shape properties are assigned by the constructions or by the pre-verbs as linear-local shape conditions. The fact that *nach* in both of its functions correlates with this unusual shape condition suggests that it is the pre-verb that conditions the shape. On the one hand, the fact that *cha* alternates with *chan* (before vowels), that *an* alternates with *am* (and covertly with [aŋ]) in assimilation to a following initial, and that *gun* alternates with *gum* (and [gʊŋ]) shows a surface-oriented phonological sensitivity that is very clearly a kind of automatic external sandhi, in that it is not determined by any inflectional properties of the verb they precede. On the other, however, the fact that *chan* appears before lenited < f > shows that the alternant of the negator is determined only after L-shape is assigned to the verb. In this way, there may be a principled separation between configurational assignment of shape properties and the insertion of items in the linear string.

A more clearly linear-local condition is assigned by the {TENSE:past} marking *do*, which correlates with Lenition in an immediately following initial, provided an alternant exists. An added concomitant of *do* is the prefixation of *dh'* to vowel-initial word-forms. Such word-forms may be lexically vowel-initial (e.g., *cha do dh'òl* 'didn't drink'), or may be vowel-initial as a result of leniting an initial < f > (e.g., *cha do dh'fhosgail* 'didn't open'). This interaction is evidence in favor of a stem selection approach, because in a rule-based approach, a grammatically conditioned <dh>-insertion process would have to follow a more general phonological process. That L-shape in past <u>dependent</u> forms is related to the presence of *do* in particular, however, is shown by the fact that irregular verbs do not form their past active or passive dependent with *do*, e.g. *cha tàinig* (**cha (do) thàinig*) 'didn't come'.

5.4.3.2

Nouns are a clear testing-ground for the distinction between stem-mutation and shape-mutation. Stem mutations are selected in rules realizing different sets of morphosyntactic properties involving combinations of {CASE, NUM}, and depend on declension class, rather than lexically specified gender. Shape mutations, by contrast, have several potential sources:

(1) realization of the phrasal morphosyntactic (inflectional) property {Definite},

(2) shape properties assigned configurationally with a small closed class of prenominal adjectives,[14]

(3) shape properties assigned linear-locally by possessive adjectives, and

(4) shape properties assigned linear-locally by certain number expressions, specifically *dà* 'two' and *a'chiad* 'the first'.[15]

Although some instances of shape property assignment can be seen as realizational/inflectional, one would be hard pressed to say that all supra-lexemic morphology is similarly realizational. The most stipulatively linear-local shape conditions do not correlate with an independently motivatable morpho-syntactic or morpho-pragmatic feature, e.g., some, but not all, intensifiers require a following adjective to be in its L-shape.

5.4.3.2.1

Definiteness has a significant effect on the supra-lexemic morphology of NPs. Recalling that not all initial sound classes are potentially subject to Lenition and/or Nasalization, definiteness is realized minimally by the introduction of a definite article at the left edge of an NP.[16] We cannot, however, reduce such marking to automatic sandhi because the effects are different depending on morphosyntactic properties of the NP.

Among masculine nouns (here lexical gender conditions shape distribution, and declension class is irrelevant), Lenition is found at the left edge of Genitive and Oblique Singular NPs that begin with classes 2 <c, g>, 5 <p, b, m>, and 6 < f >. Among feminine nouns, Lenition is found at the left edge of Direct and Oblique Singular NPs, again with classes 2, 5, and 6.

Definite Genitive Plurals offer the opportunity to test the interaction of shape-mutation and stem-mutation. Indefinite Genitive Plural nouns select L-stems in all declensions, but definiteness is marked for Genitive Plurals categorically by a definite article *nan~nam*, the latter before labials (classes 5 and 6), and Nasalization at the left edge of NP.

Whereas an analysis that takes such Nasalization as projected from the article to the first element within NP presupposes lexical insertion, which in turn presupposes inflection, the Nasalization should take as its input the output of inflection, i.e. the Genitive Plural built on the L-stem.[17] This is not the case, however. Definite Genitive Plurals would seem to "undo" the rule of L-stem formation, and then apply a rule of N-shape formation.

If we assume that definiteness is a discourse-level inflectional property of NP, rather than of the head N, then definiteness has a certain priority over properties like Case that are determined at the clause level. Based on this priority, it would make sense that the morphological exponents of properties competing for realization in the same position should be resolved in favor of the one assigned at the "higher", more abstract level. In this way, a more general theoretical prediction is that shape properties assigned by constructions precede, and potentially preempt, the operation of inflectional rules that refer to the same domain. In the case of the SG Genitive Plural, inflectional morphology selects an L-stem in the absence of any other prior condition on the shape of the word. Where definiteness assigns a shape condition within NP, its exponent or exponents are realized, even if it is at the expense of part of the operation of word-level inflection. This is not to say that a shape condition preempts the operation of inflection as a whole, but rather that where positive conditions of the shape and the stem would overlap, the shape condition takes precedence.

5.4.3.2.2

Linear-local phenomena tied to specific classes of words in SG require special attention. In this area, with respect to nouns, one must account for the behavior of initials

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immediately following the definite article, possessive adjectives, prenominal adjectives, *dà* 'two', and *a'chiad* '(the) first'.

The last are perhaps the most straightforward, because they are fairly irreducible lexical stipulations, and not part of a larger class of words. *A'chiad* simply requires the L-shape of the following word-form. Other ordinal expressions make no such requirements.

The behavior of *dà* is traceable diachronically to the Old Irish dual number category, which was distinguished inflectionally. *Dà* in modern SG is a shadow of the early systematic distinction, but there are two shape conditions that accompany *dà*:

(1) *dà* requires the L-shape of the following word, e.g., *dà chat* 'two cats', and

(2) *dà* requires that a noun that it modifies be in the Oblique Singular, regardless of the canonical case the noun would bear in context, and despite the fact that pronouns taking the *dà*-phrase as antecedent are Plural rather than Singular.

Whereas the first condition is an ordinary linear-local shape condition, the second would seem to be a special sort of shape determination on the order of a rule of referral (Pullum & Zwicky 1988; Zwicky 1992; Stump 1993, 2001), referring the realization of all cases to the Oblique in the context of *dà*. Alternatively, one could consider *dà* as actually governing the Oblique case, as prepositions do, and additionally requiring the L-shape of a word so governed. Note that in no declension does an indefinite {CASE:obl} noun select an L-stem, so the Lenition after *dà* is always the satisfaction of a shape condition.

There is a small class of frequent adjectives that have special syntax, i.e. they appear in prenominal position, in contradistinction to the vast majority of adjectives in the language. These adjectives are *seann* 'old', *deagh* 'good', *droch* 'bad', *fìor* 'real,

true', *sàr* 'excellent', and *ath* 'next' (Blacklaw 1989:56). Robertson & Taylor (1993:267-68) note that certain idiomatic or fixed expressions can use ordinarily postnominal adjectives in prenominal position, e.g., *cruaidh fheum* 'a crying need', and in such cases the noun appears in its L-shape. This would seem to indicate that the shape condition is part of the construction rather than of the adjective class, but the relative rarity of the construction outside of the adjectives specifically listed above, together with the possibility that the fixed expressions are candidates for a compound analysis (§4.2 above), makes the case for configurational assignment less than decisive.

This also raises the more general question of how many lexemes have to be in a class before an associated shape condition can be reanalyzed as part of an abstract construction, rather than a stipulative fact about each of a set of lexemes, or in other words and on a larger scale, when is a pattern a real generalization worthy of a grammatical rule? See López (1979, mentioned above) for one reply to this question.

Each of the possessive adjectives (e.g., 'my', 'your') has a special influence on the word that follows them.

mo	'my'	(L-shape)
do	'your (sg.)'	(L-shape)
a	'his'	(L-shape)
a	'her'	(Prefix *h-* to vowels)
ar	'our'	(Prefix *n-* to vowels)
ur	'your (pl.)'	(Prefix *n-* to vowels)
an~am	'their'	(N-shape)

Table 5.5. Possessive adjectives.

It is interesting that each of these words has an idiosyncratic concomitant effect on their neighbor to the right, and furthermore that the distribution of these effects need not refer to anything beyond the initial sound class of the next word, i.e. morphosyntactic properties of that word are irrelevant. If the initial of the word after *do*, for example, has a distinct lenited congener, that lenited alternant is used regardless of what stem the inflectional morphology would select, e.g., *aig do dhoras* 'at your (sg.) door' {CASE:obl} vs. *aig an doras* 'at the door' vs. *aig doras* 'at a door'. If the inflectional morphology has already selected the L-stem, then in general this satisfies an L-shape condition and no further alteration obtains, i.e. no "doubly" lenited forms, e.g., /p/ → / f / → Ø.

5.4.3.2.3

Aside from mutating shape conditions attributable to definiteness within NP, there are prothetic consonants attached to the left edge of NP, depending on the initial class of the first word.

	DirS	GenS	OblS	DirP	GenP	OblP
(1m)	*an t-*	*an*	*an*	*na h-*	*nan*	*na h-*
(2m)	*an*^{N}	*a* $^{\prime L}$	*a* $^{\prime L}$	*na*	*nan*^{N}	*na*
(3m)	*an*^{N}	*an*^{N}	*an*^{N}	*na*	*nan*^{N}	*na*
(4m)	*an*	*an*	*an*	*na*	*nan*	*na*
(5m)	*am*	*a* $^{\prime L}$	*a* $^{\prime L}$	*na*	*nam*^{N}	*na*
(6m)	*am*	*an*^{L}	*an*^{L}	*na*	*nam*	*na*
(7m)	*an*	*an t-*	*an t-*	*na*	*nan*	*na*
(8m)	*an*	*an*	*an*	*na*	*nan*	*na*

	DirS	GenS	OblS	DirP	GenP	OblP
(1f)	*an*	*na h-*	*an*	*na h-*	*nan*	*na h-*
(2f)	*a* $^{\prime L}$	*na*	*a* $^{\prime L}$	*na*	*nan*^{N}	*na*
(3f)	*an*^{N}	*na*	*an*^{N}	*na*	*nan*^{N}	*na*
(4f)	*an*	*na*	*an*	*na*	*nan*	*na*
(5f)	*a* $^{\prime L}$	*na*	*a* $^{\prime L}$	*na*	*nam*^{N}	*na*
(6f)	*an*^{L}	*na*	*an*^{L}	*na*	*nam*	*na*
(7f)	*an t-*	*na*	*an t-*	*na*	*nan*	*na*
(8f)	*an*	*na*	*an*	*na*	*nan*	*na*

Table 5.6. Definite articles.

For example, wherever the definite article *na* appears before a vowel, an *h-* is prefixed, e.g., *na h-eich* 'the horses', as was observed just above with the feminine possessive adjective *a* 'her'. Whereas the appearance of the *h-* need refer only to the initial class of the next word, the definite article *an* prefixes a *t-* under rather more specific grammatical conditions. Before vowels, *an* prefixes *t-* if and only if the NP realizes the property set {CASE:dir, NUM:sg, GEN:masc}. Before class 7 <sV, sl, sn, sr>, *an* prefixes *t-* in the Genitive and Oblique Singular, masculine, and in the Direct and Oblique Singular, feminine. This is an observationally adequate summary, but it is important to notice that definiteness selects the L-shape with exactly these inflectional property sets. Therefore, I propose, that this instance of *t-* prefixation is part of L-shape formation for nouns,

although *t-* prefixation before vowel-initial masculine nouns in the Direct case Singular is not.

I would suggest that "inter-word" consonants that require reference to initial sound class only are reasonably handled as underlying final segments of their respective determiner, in this case what is written <na h-> is better understood as /nah/, subject to /h/-deletion when a consonant follows. To cast this as a phonological rule of /h/-epenthesis would predict far many more instances of inter-word /h/ than actually appear, so a deletion analysis related specifically to the determiners *a* 'her' and *na* is motivated by the facts. The *n-* associated with *ar* 'our' and *ur* 'your (pl.)' is similarly sensitive only to the initial class of the following word, regardless of any other attributes.

Consonants like the *t-* after certain instances of *an*, as well as the *dh'* found in {TNS:past} verb forms require reference to inflectional properties for the accurate description of their distribution. Therefore they are better analyzed as exponents of morphosyntactic properties, i.e. as affixes rather than as the output of (very!) minor phonological rules.

5.4.3.3

Adjectives do not escape the purview of shape conditions of either sort. Definiteness has a subtle but clear influence on adjectives under certain conditions, and this demonstrates that definiteness is an inflectional property of the NP and not solely of the N, and therefore that configurational shape conditions can have an impact on the edge segments of non-phrase-edge constituents. At the same time, there are a handful of intensifiers that assign linear-local shape conditions on adjectives, although intensifiers do not do so as a category.

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5.4.3.3.1

Definiteness in NPs requires the L-shape of adjectives just in case they realize the property set {GEN:masc, CASE:obl, NUM:sg}, e.g., *leis a'bhalach mhòr* 'with the big boy', as opposed to *le balach mòr* 'with a big boy' (Blacklaw 1989:55). One might be tempted to analyze the definite form as a "spreading" of Lenition autosegment-style in the former case, and not in the latter case. This is a red herring, of course, given the frequent mismatch of stem-type in case paradigms, e.g., *bròg mhòr* 'a big shoe (f.)' with the R-stem in the noun and the L-stem in the adjective (see §4.1.2 and §4.1.3 above).

5.4.3.3.2

The intensifiers *glè* 'very', *ro* 'too', *fìor* 'truly, really, very' require the L-shape of a following word, almost invariably an adjective, e.g., *glè fhliuch* 'very wet', *ro chaol* 'too narrow, slender'. This is not true of intensifiers as a class, however, e.g., *uamhasach math* 'awfully good' cf. *glè mhath* 'very good'.

5.5

On the assumptions laid out at the beginning of this chapter, and given the rule and object types posited in the expanded variety of morphology espoused herein, it is clear that the SGIM are by no means a single phenomenon, nor are they all projected (in the sense of Oftedal 1962). They are not part of the "live" synchronic phonology (Oftedal 1962, Rotenberg 1978, Green 2004, but *pace* just about everyone else). They do, however, constitute two major morphological constellations, one for Lenition, the other for Nasalization. Each of these constellations corresponds to an array of morphological rules, and is instantiated in a variety of inflectional and other contexts.

This approach allows for a minimum of structural abstractness, by which I refer to covert triggers, either phonological in nature (e.g., Lieber 1983) or syntactic in nature (e.g., Duffield 1996). The question of abstractness in representation is an important and perennial issue, and since the assumption of inaudible elements increases descriptive power potentially *ad infinitum*, I prefer to start with as much reference to the surface facts as possible, admitting null elements only as absolutely necessary. To the degree that the present description adequately describes the facts of the SGIMs without relying on floating features, functional heads, and string-vacuous transformations, I submit that further enrichment of the descriptive arsenal is unnecessary and undesirable.

Notes to Chapter 5:

1. Janda & Joseph 1986, 1989, 1991, 2002; Joseph & Janda 1988; Joseph & Vasishth

    2003, Joseph 1997a, b.

2. The case of Lenition with *nach* is the most extreme, affecting only /f/-initial verbs, and

    then only if the /f/ is followed by a vowel, *nach fhaod mi* 'that I may not' cf. *nach*

    freagair mi 'that I won't answer', *nach buail mi* 'that I won't hit'.

3. Terms like "past stem" may be descriptively or mnemonically useful, but where a stem

    is selected for the (partial) realization of multiple inflectionally contrastive or

    semantically incompatible functions, this practice is misleading and can

    occasionally complicate analyses unnecessarily, e.g., the use of "feminine"

    adjective stems in the formation of gender-irrelevant adverbs in Romance (Morin

    1990, Stump 2001, Blevins 2003).

4. In Stump (1991; 2001:52, 58, Ch. 3) realization rules are subject to a positional slot-

    based Elsewhere-type condition (Anderson 1969, Kiparsky 1973, but see Janda

    1987:432-573), such that realization rules are indexed to rule blocks, which in

    turn correspond to abstract slots. The application of any rule in a block B serves to

    evaluate slot B, determining the default phonological content of that slot. The

    exponent, if any, is a default value in the sense that it may be altered due to

    phonotactic conditions that arise when the value of B comes into contact with the

    value of slot B–1 and/or slot B+1 (i.e. true morphophonology). Since SG

    inflection motivates very few positional slots, in fact doing a considerable amount

    of inflection through stem-selection, many of the issues of slot-calculus, including

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disjunctive ordering and other position-class conflict resolutions are hardly

relevant for SG.

5. Analogously to the discussion of stems above, one may wish to posit rules of base-

formation, independent of the derivational and compounding rules that may select

those bases. Given that these seem to be needed at least sometimes, it may be

simplest to assume them in all cases. The SG facts may not, however, give the

most compelling evidence for a separate set of base-formation rules. If it is

possible to have lenited structures via independently motivated rules of stem-

formation, however, this will allow for fewer missed formal generalizations

(*mutatis mutandis* for shapes vs. stems, but notably this is not available for the

unparalleled Nasalization mutation among the shapes; see pp. 104-05 above).

6. Of these, only the stems are claimed to be given in a lexical entry. This is on the

assumption, however, that the lexicon is organized by lexemes, not by stems (cf.

Anderson 1992:Ch. 5) or by word-forms (cf. Pollard & Sag 1994). In a lexicon

where each word-form has its own entry, one might be more apt to list shapes

within lexical entries. For SGIM at least, shape-formation is sufficiently regular

that I do not perceive the need to put shapes as entities in the lexicon proper, but

others may prefer to do so.

It is an open question whether speakers spontaneously generate full

paradigms in the lexicon based on their experience, or whether speakers tend to

"bank" only clearly irregular formations or those subject to relatively minor

morphological rules.

7. Note that palatal segments are both alternants under stem Palatalization as well as phonemes in their own right.

8. The mnemonic connection between the chosen system of stem indices and the mutation types is as follows: for those lexemes that do distinguish all four stem types, and for which no stem is suppletive, R=radical, L=lenited, P=palatalized, and X=combined, i.e. both lenited and palatalized.

9. It is important here to distinguish exponent allomorphy, which can be sensitive to the phonemic content of a base, from applicability of entire inflectional categories or derivational functions to bases on such grounds, e.g., this would allow in principle a rule that said that nouns beginning in /f/ have no plural form, whereas all other nouns do.

10. I hold the issue of definiteness until section 5.4.3, where I analyze it as a configurational shape condition.

11. The representation here is not intended to imply that there is a universal compounding function, or even that a single language is limited to one and only one compounding function (cf. German, Sanskrit). That is even less the case for derivational functions, of which there are considerably more types in most languages.

12. In Stewart (to appear) I discuss evidence of imposition from Old Norse into the SG lexicon, resulting in a disproportionate concentration of /s/+[stop]-initial words, as compared to Irish.

13. There undoubtedly was a period in prehistoric Celtic where the "seeds" of the modern SG Lenition and Nasalization (and Palatalization) were purely phonetically

conditioned, and thus "unified" in all its effects, but it is in the nature of historical developments that the purely phonetic phase gives way to higher-level generalizing along phonological, morphological, grammatical, etc., lines.

14. The vast majority of adjective in the head-initial SG are postnominal.

15. Irish numerals, by contrast, show several patterns of linear-local shape assignment, for which see any Irish grammar.

16. There is a syntactic construction that creates exceptions to this rule. In an NP-NP* construction in which the second (and later) NP(s) is interpreted in the Genitive case, definiteness is marked on the rightmost NP only, and all preceding NPs are formally {CASE:dir}, regardless of their grammatical role, providing evidence for the use of the {CASE:dir} form as a default, e.g., *iuchair doras an t-seòmair* = 'key' (Dir.) 'door' (Dir.) 'the room' (Gen.)' = 'the key of the door of the room'.

17. In a generative/incremental model of morphology, one that would presumably build phrases out of inflected words, a supra-lexical operation would work in a linear-local fashion and map inflected words into phrasal allomorphs. A practical problem here is that, in cases such as we saw above with, e.g., the fifth declension consonant stems, forms that realize {NUM:pl} partially by the suffixation of – (*a*)*ichean* show that suffix in the Genitive Plural as well. An "undo" operation would therefore have to look "inside" an inflected form to the stem selected to "get back to" the unlenited initial.

CHAPTER 6

CONCLUSIONS AND PROSPECT

6.1

The initial mutations in Scottish Gaelic, when analyzed as phonology, suffer from a lack of synchronic phonetic motivation. When they are analyzed as syntax, we find that they correlate with particular closed-class items and morphosyntactic features, and there remains completely unexplained the presence of mutation in derivational and compound word formation. If we take these descriptive difficulties not as encouragement to enrich the representations and relax the predictiveness of phonological and syntactic theory, but rather as an indication that they belong to the space between, to the independently motivated domain of morphology, a principled account can be had.

The commonly cited definition of morphology as "word building" (e.g., Spencer & Zwicky 1998:1) is unnecessarily narrow, since this leaves a group of phenomena that have been described with respect to a "syntax-phonology interface" that is neither syntax nor phonology. Assuming as an upper limit a word-size morphology prevents these phenomena from finding their natural home. It is not necessary that one assume morphology to be one or more autonomous components of grammar, one or more interface components, or a collection of static rules mapping relationships in a largely or

even fully redundant lexicon. What does matter is that the work of marking words and constituents as related semantically and/or paradigmatically involves the use of formal methods to realize functions, and that work need not be coherently performed in a theory of speech-sound interaction (i.e. "phonology") or in a theory of phrase-building or – parsing (i.e. "syntax").

In the preceding chapters, and in particular chapter 5, I proposed a broad three-pronged morphological approach to SGIM. **Intralexemic morphology** builds the paradigm of inflected forms using the **stems** of individual lexemes to be used in particular syntactic contexts. **Interlexemic morphology** builds morphologically complex lexemes using **bases** defined with respect to existing lexemes, although these bases may be formally equivalent to a root, a stem, an inflected form, or some other string defined by rule for this purpose. **Supralexemic morphology** involves the formal marking of a syntactic constituent, typically with respect to a juncture point, employing a particular **shape** of one or more words in the constituent. In SG, mutations are put to use in each of these sub-domains.

Given that any number of distinct marking systems is possible in principle, it is remarkable that SG uses two major mutation types, Lenition and Nasalization, with all lexeme classes and for a variety of functions. Far from maintaining an idealized one-form-to-one-meaning relationship, these two mutation types are deployed and redeployed both regularly and productively in SG morphology (cf. Comrie 2002, *pace* Ford & Singh 1983:67-68). I suggest that a **meta-redundancy-rule** is appropriate for describing each of the mutation types, and that these meta-redundancy-rules, in the range of their

instantiations, define a Lenition **constellation** (see §5.4.2.4 above) and a Nasalization

constellation, respectively.

By removing the burden of accounting for non-automatic alternations from

phonology and the work of accounting for the formal marking of words and constituents

from syntax, a more constrained theory of phonology and syntax is possible, and at least

in principle that is an analytically desirable result. Constraining morphology at the same

time is just as important—I am pleading the case here simply for a "demilitarized zone"

on the map between syntactic and phonological camps.

6.2

With the preceding in place as a framework for description, several lines of

research suggest themselves. I do not see the following topics as "work left undone" in

this dissertation, but rather as ways to flesh out some of the aspects of the current analysis

into other descriptive and methodological areas[1].

6.2.1

Although this study does not include a rigorous formalization of the concepts

invoked, in particular the idea of shapes, it has been conceived with an eye toward that

potential goal. In order to leave the stem/base/shape distinction available for treatment in

a variety of morphological and general theoretical framework, I have decided it would be

best not to couch the presentation in one established formalism over another. The effort

to create a formalism of my own has seemed to be beside the point as well. In

appreciation of the wealth of descriptive options on the "market" I include the Appendix

below, adapted from Stewart (forthcoming), surveying how each of thirteen

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contemporary morphological theories would presumably approach the phenomenon of SG noun inflection.

6.2.2

I deliberately have not attempted to describe all of Celtic mutation in a single study, owing in part to the descriptive difficulties and presentation complications that would entail (cf. Hamp 1951, Pyatt 1997; see p. 1 above). The description of initial mutations in other Celtic languages in terms of the description given here, however, would be a necessary test of the overall adequacy of the distinctions drawn here.

6.2.3

A theory of initial mutation should not of course be isolated from the rest of morphological theory. An analogous description of segment gradation and other non-concatenative morphological phenomena in terms of stems, bases, and shapes is an important bridge toward that integrating end. Relevant phenomena are widely available in other languages across a wide range of genetic affiliations (e.g. Fula (Skousen 1972, Anderson 1976, Lieber 1984)).

6.2.4

Contrastive studies of dialects of a single language or of distinct languages in contact could make use of the distinctions between shapes, stems, and shapes, and perhaps constellations as well to describe variations in usage or transfer effects (Stewart 2000, to appear).

6.2.5

In the spirit of Anderson (1985) and especially Janda (1987), these morphological distinctions could usefully inform an investigation of the paths of historical evolution of

rules between automatic sandhi phenomena and any of the morphological domains in a constrained rule and/or representation typology.

6.3

The SGIMs and related non-concatenative, non-automatic formal distinctions challenge existing morphological theories to treat affixes and non-affixes as qualitatively equivalent as exponents of grammatical categories, and as indices of lexical relationships. Without the integration of concatenative and non-concatenative means of marking, one or the other (or both) can find itself incorporated into an adjoining domain, as we have seen, concrete segmentable affixes becoming micro-syntax, and non-segmentable processes becoming macro-phonology. By developing a morphological approach to constellations of phenomena that have proven problematic for syntax and phonology alone, cleaner boundaries for all three components can be identified.

Notes to Chapter 6:

1. So as to put speakers into the equation, as it were, and not to limit the description to

abstract, purely theoretical constructs, the design and implementation of

psycholinguistic experiments (e.g., priming protocols) are an appropriate

outgrowth of the present analysis. Such experiments would test the psychological

reality of the different units (bases, stems, shapes, constellations).

Boyce, Browman, & Goldstein (1987) present a series of psycholinguistic

experiments that suggest that not only does initial mutation in Welsh prime

related words as well as affixation does, but also that "abstract morphological

categories, rather than identity of phonological form, are required to organize the

Welsh lexicon" (419, 440-42).

APPENDIX

FORMAL MORPHOLOGICAL APPROACHES TO A FRAGMENT OF
SCOTTISH GAELIC NOUN INFLECTION

In this appendix, taken and adapted from my forthcoming issue of *OSU Working Papers in Linguistics*, I present analyses of the following Scottish Gaelic Noun inflectional facts from the perspective of 13 contemporary morphological theories. In lieu of repeating the descriptive background for each theory here, I refer the interested reader to the OSUWPL issue, or to the respective references for each framework given below. Traditional case designations (Nom./Gen./Dat./Voc.) are used here, rather than those adopted in the body of the dissertation.

I. *doras* (m.) 'door'

	SINGULAR	*PLURAL*
NOM.	doras /tɔrəs/	dorais /tɔriʃ/
GEN.	dorais /tɔriʃ/	dhoras /ɣɔrəs/
DAT.	doras /tɔrəs/	dorais /tɔriʃ/
VOC.	a dhorais! /əɣɔriʃ/	

II. *balach* (m.) 'boy, lad'

	SINGULAR	*PLURAL*
NOM.	balach /palax/	balaich /paliç/
GEN.	balaich /paliç/	bhalach /valax/
DAT.	balach /palax/	balaich /paliç/
VOC.	a bhalaich! /əvaliç/	

III. *sgoil* (f.) 'school'

	SINGULAR	*PLURAL*
NOM.	sgoil /skɔl/	sgoiltean /skɔltʃən/
GEN.	sgoile /skɔlə/	sgoiltean /skɔltʃən/
DAT.	sgoil /skɔl/	sgoiltean /skɔltʃən/
VOC.	a sgoil! /əskɔl/	

IV. *clach* (f.) 'stone'

	SINGULAR	*PLURAL*
NOM.	clach /kʰlax/	clachan /kʰlaxən/
GEN.	cloiche /kʰlɔjçə/	chlach /xlax/
DAT.	cloich /kʰlɔjç/	clachan /kʰlaxən/
VOC.	a clach! /əkʰlax/	

A-Morphous Morphology (Anderson 1992)

Inflectional rules take as input pairs {S, M} consisting of a lexically-specified stem and a (contextually appropriate) morphosyntactic representation (*MSR*). The stems in the stem set of a given lexeme are those not characterizable by (partial) suppletion, that is, alternating in ways that are lexically specific and not representative of systematically part of a lexical class. Since initial mutation is regular and productive in terms of its mapping between alternant pairs, it is preferable to capture that as an inflectional word-formation rule. For at lest the *doras–balach* class (henceforth class N), i-Ablaut will similarly be (part of) a word-formation rule (WFR).

Stem sets

Class Nα   Doras: {/tɔrəs/}

              Balach: {/palax/}

Class Nβ   Sgoil: {/skɔl/}

Class Nγ   Clach: {/kʰlojç/ [gen/dat, sg.]; /kʰlax/}

Since none of the forms in the set has multiple specifications for the same feature(s), there is no call for layering in the MSRs.

WFRs (all are +N)

(1)   [{+Nom, +Dat}, +sg]   (2)   [+Gen, +sg]
         /X/   →   /X/   /YVC/ →   /YV [+high] C/   (Nα)
                                                   /X/   →   /X´/

Rule (1) states that the bare stem will be used in the nominative and dative singular. In the case of *clach*, the lexically specified [+Dat] stem will be selected, owing to its greater specificity, and will be used as-is for the dative. In (2), disjunctivity is to be invoked twice:

      a. the more specific clause will apply to Na nouns only, and the second clause will
          apply elsewhere, and

      b. the lexically specified [+Gen] stem will be selected for *clach*.

(3) [+Gen, +pl]   (4) [+pl]
     /CY/   →   /C'Y/   /YVC/ →   /YV [+high] C/   (Nα)
                                 /X/   →   /Xtʃən/   (Nβ)
                                 /X/   →   /Xən/   (Nγ)

The Elsewhere Condition is in play here, since rule (3) will precede and pre-empt rule (4). Within rule (4), where it does apply, the different clauses are indexed to the lexical class of the input stem, and thus apply disjunctively.

(5) [+Voc]
     /CYVC/   →   /əC'YV [+high] C/   (Nα)
     /X/   →   /əX/

In (5) the first clause precedes and pre-empts the second clause. **C'** is used to indicate the mutated alternant of the corresponding C in the input stem.

Articulated Morphology (AM, Steele 1995)

It requires a bit of formal ingenuity to represent non-concatenative, non-zero morphology in the AM framework. The following, however, is in keeping with the spirit of what AM rules do.

As for morphological objects in Scottish Gaelic, it seems clear that there are roots, different stems, and words. Case and Number are often marked jointly, and may also be marked in multiple ways on the same inflected word. Defining the morphological objects by means of content is problematic, therefore. Taking the root as the starting point, and since every rule must be information-increasing, the following rules are a significant subset of those required for the paradigms given.

(1) Singular in class N: (2) Nominative in class N:
    X   X   X   X
    [ ]   →   [N: sg]   [ ]   →   [Case: nom]

(3) Dative in class N: (4) Plural in class Nα:
    X   X   [...VC]   [...V [+high]C]
    [ ]   →   [Case: dat]   [ ]   →   [N: pl]

(5) Genitive singular in class Nα:

  [...VC]   [...V [+high] C]
  [N: sg] →   [N: sg, Case: gen]

(6) Genitive plural in classes Nα and Nγ:

  [C...]   [C'...]
  [ ] →   [N: pl, Case: gen]

(7) Genitive singular in classes Nβ and Nγ:

  X   X*e*
  [N: sg] →   [N: sg, Case: gen]

(8) Vocative singular in class Nα:

  [C...V C]   *a* [C'...V [+high] C]
  [ ] →   [N: sg, Case: voc]

(9) Vocative singular in classes Nβ and Nγ:

  X   *a*X
  [ ] →   [N: sg, Case: voc]

(10) Plural in class Nβ: (11) Plural in class Nγ:

  X   *X*tean   X   *X*an
  [ ] → [N: pl]   [ ] → [N: pl]

In the above rules, **C'** is used to indicate the mutated alternant of the initial C in the input expression. Class Nβ almost motivates a distinct singular versus plural stem, but Nα and Nγ are not consistent with such a step. The Gen/Dat singular stem for *clach* would seem to be a lexical matter, rather than the stuff of rules.

Autolexical Syntax (Sadock 1985, 1988, 1991)

        Mutation and i-Ablaut are consigned them to the principles of Prosodic Phonology (McCarthy 1981, Marantz 1982), as was proposed in Sadock (1991:26). The remaining few "lexemes" have the following lexical representations:

	-e	*-tean*	*-an*	*a-*
Syntax	nil	nil	nil	nil
Semantics	nil	nil	nil	nil
Morphology	N[fem]\N[gen,sg]	N[Nβ]\N[pl]	N[Nγ]\N[pl,{nom,dat}]	N[voc,sg]/N

The Morphology describes appropriate insertion contexts, using Categorial Grammar formalism.

        In Autolexical Syntax, stems are considered to be the head of inflected words. Inflections (Y) are introduced by the following general rule (X = N, for the present data set), and then placed with respect to the stem (X[–0]) depending on whether they are prefixes or suffixes:

        X[–1] →   X[–0], Y

The case and number properties would be assigned based on context, whereas declension class would be a lexical property of the noun. All four example lexemes are simple nouns (N[0]), and therefore semantically intransitive predicates (F[-1])(Sadock 1991:31).

	doras	*balach*	*sgoil*	*clach*
Syntax	N[0]	N[0]	N[0]	N[0]
Semantics	F[-1] 'door'	F[-1] 'boy'	F[-1] 'school'	F[-1] 'stone'
Morphology	N[-0]	N[-0]	N[-0]	N[-0]

The combination of the affixes and the stems give N[–1], i.e., inflected words in the morphology, once all appropriate inflections are introduced. These are N[0] elements in the syntax, and examples of such inflected words would be the following:

	doras	*bhalach*	*sgoile*	*cloich*
Syntax	N[1, nom, sg]	N[1, gen, pl]	N[1, gen, sg]	N[1, dat, sg]
Morphology	N[-1]	N[-1]	N[-1]	N[-1]

Semantics are assumed to be unchanged under inflection.

Categorial Morphology (Schmerling 1983, Hoeksema 1985, Hoeksema & Janda 1988)

Although there is some concatenation going on here, that seems to be no more important then the non-concatenative operations happening here. We're going to need operations of addition and substitution, as outlined in Hoeksema and Janda (1988).

First the two-place operations, definable in terms of lexical entry triples on the morpholexically context-sensitive affixes.

-tean   <Nstem\Nβ\, N, Suff>
-an   <Nstem\Nγ\, N, Suff>
-e   <Nstem\N$x$\, N, Suff> Where $x \in \{\beta, \gamma \}$

The Vocative prefix applies in all classes, and so does not require the subcategory specification in its input requirements.

a   </Nstem, N, Pref>

These affixes will be added via a cancellation operation—left-cancellation for the suffixes, right cancellation for the prefix.

Initial mutation would have a lexical entry <Nbasic, Nmut, *f*mut>, and its effect, i.e., the operation *f*mut, should be treated with a rule of replacement.

*f*mut (C [–strident, –continuant, αspread glottis] X) = C [+continuant, –αvoice] X

The i-Ablaut would parallel mutation to some degree, with and entry <Nbasic, Nablaut, *f*ablaut>, where application is limited to Nα (the class of *doras* and *balach*), and the operation defined as follows:

     *f*ablaut (X V C) = X V [+high] C

The alternation *a ~ oi* in *clach* seems to separate from this, and so should probably be handled in the lexicon, rather than with a rule that would imply more general applicability. More data would make clear the (lack of) motivation for a separate synchronic ablauting rule.

(<u>Note</u>: Because of the multifunctionality of mutation and i-Ablaut, the entries

given above contain purely formal second members, Nmut and Nablaut. Categorial Morphology would typically give more content-specific second members, such as N[+Nom] or the like, and so the above lexical entry formulations are rather more like schemata, containing a variable as the second member, and so abbreviate (part or all of) several distinct morphological rules. The operations *f*mut and *f*ablaut, however, are defined over strings, and so are phrased appropriately without reference to input and output categories.)

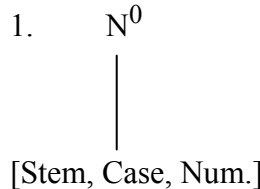These affixes and operations may be applied singly or jointly to bases, according to the rules of Categorial Grammar.

Distributed Morphology (DM, Halle 1990, Halle & Marantz 1993, Pullum & Zwicky 1991)

In each case, Morphological Structure takes the terminal nodes of Surface Structure and creates morphosyntactic feature nodes (plus one for the stem). If we were going to consider larger structures involving agreement, a Gender node would be created as well.
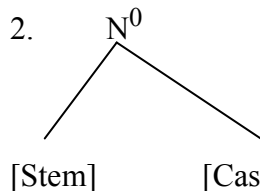
$$N^0$$

Stem   Number   Case
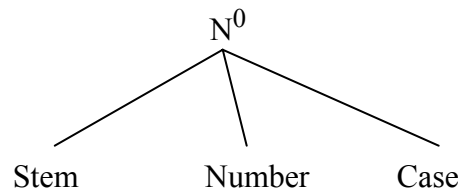
From this point, morphological operations of Fission and/or Fusion will join or split nodes, depending on the nature of the morphemes to be inserted, e.g., are there multiple exponents (redundantly) marking the same category (fission), or are there morphemes which carry multiple feature specifications (fusion)?

Let's look at the various configurations needed for correct vocabulary insertion.
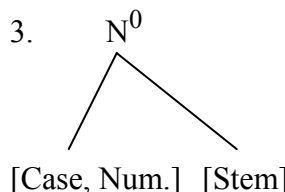
1. N^0

    |

    [Stem, Case, Num.]

doras, *balach*: [Nom, Sg.], [Dat., Sg.]
sgoil: [Nom., Sg.], [Dat., Sg.]
clach: [Nom., Sg.]

STEM IS USED 'AS-IS'.

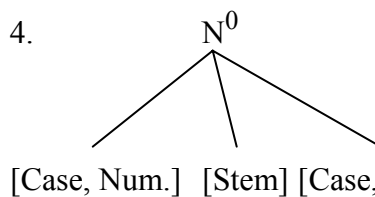2. N^0

    [Stem]   [Case, Num.]

doras, *balach*: [Gen., Sg.], [Nom., Pl.], [Dat., Pl.]
sgoil: [Gen., Sg.], [Nom., Pl.], [Gen., Pl.], [Dat., Pl.]
clach: [Gen., Sg.], [Dat., Sg.], [Nom., Pl.], [Dat., Pl.]

NULL OR OVERT SUFFIX, MAY TRIGGER I-ABLAUT IN STEM.

3. N^0

    [Case, Num.]   [Stem]

doras, *balach*: [Gen., Pl.]
sgoil: [Voc., Sg.]
clach: [Gen., Pl.] [Voc., Sg.]

NULL OR OVERT PREFIX, MAY TRIGGER MUTATION IN STEM.

4. N^0

    [Case, Num.]   [Stem] [Case, Num.]

doras, *balach*: [Voc., Sg.]

OVERT PREFIX TRIGGERS MUTATION, NULL SUFFIX TRIGGERS I-ABLAUT IN STEM.

In this analysis, structures 1, 2, and 3 presuppose the operation of Fusion, whereas structure 4 requires Fusion, and the Fission of the fused node (these operations are crucially ordered, so as to minimize the number of morphological operations in the derivation).

The analysis above entails the following set of lexically-listed affixes:

Affix	MP rules	Meaning	Restrictions
Ø-X	[+mutating]	[+Gen., +Pl.]	Where X = *doras*, *balach*, *clach*...
ə-X	[+mutating]	[+Voc., +Sg.]	Where X = *doras*, *balach*, *clach*...
ə-X		[+Voc., +Sg.]	Where X = *sgoil*...
X-ə	[+i-Ablaut]	[+Gen., +Sg.]	Where X = *clach*, *sgoil* (vacuous)...
X-Ø	[+i-Ablaut]	[+Gen., +Sg.]	Where X = *doras*, *balach*...
X-Ø	[+i-Ablaut]	[+Nom., +Pl.]	Where X = *doras*, *balach*...
X-Ø	[+i-Ablaut]	[+Dat., +Pl.]	Where X = *doras*, *balach*...
X-ən		[+Nom., Pl.]	Where X = *clach*...
X-ən		[+Dat., +Pl.]	Where X = *clach*...
X-tʃən		[+Nom., +Pl.]	Where X = *sgoil*...
X-tʃən		[+Gen., +Pl.]	Where X = *sgoil*...
X-tʃən		[+Dat., +Pl.]	Where X = *sgoil*...

A further morphological operation of feature Deletion would allow a unified [+Pl.] morpheme in the case of *sgoil*, since Case is apparently not distinguished in the plural for that class. Alternatively, but certainly worse, we could avoid Case-Number Fusion for the *sgoil* class and unify [+Pl.] that way, but at the cost of a special full set of (homophonous) null case markers. (Note: More data would show that initial <sg-> clusters are impervious to mutation, and so the [+Voc.] prefix can be unified as well.)

This analysis is a fairly conservative, in that a unitary stem is assumed for each "lexeme." It is for this reason that stem alternations are "projected" into the stem's phonological representation from without (cf. Pyatt (1997) for an extended DM analysis of Celtic Initial Mutation, largely consistent with the above methodology).

Lexeme-Morpheme Base Morphology (Beard 1995)

The analysis here really only needs to consider I[nflectional]-derivation and Morphological Spelling, i.e., the realization of the inflectional categories Case, Number, and the inherent category of inflectional class (which may or may not correspond one-to-one with Gender). The grammatical functions for which the various inflected forms may be used are beside the point here.

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The Separation Hypothesis leads us to treat the relationship between inflectional categories and their exponents as a mapping. The evidence given supports treating I and II as instances of the same lexeme-class (call it Nα), and III and IV should provisionally be classes unto themselves, Nβ and Nγ, respectively).

Let us assume that the initial mutations are formally parallel (Note: more data would confirm this), despite some divergence in phonetic detail. All operations on the stem, whether affixations or alternations, are to be considered elements of Morphological Spelling. The lexeme contributes its phonetic representation as an input to MS, and depending on inflectional class, Case, and Number, different MS operations are selected.

Class	Case	Number	Mutation	i-Ablaut	-ə	-ən	-tʃən
Nα	Nom.	Sing.					
		Plur.		✓			
	Gen.	Sing.		✓			
		Plur.	✓				
	Dat.	Sing.					
		Plur.		✓			
	Voc.	Sing.	✓	✓			
Nβ	Nom.	Sing.					
		Plur.					✓
	Gen.	Sing.			✓		
		Plur.					✓
	Dat.	Sing.					
		Plur.					✓
	Voc.	Sing.					
Nγ	Nom.	Sing.					
		Plur.				✓	
	Gen.	Sing.		✓	✓		
		Plur.	✓				
	Dat.	Sing.					
		Plur.				✓	
	Voc.	Sing.					

Two dimensions are unable to capture the complex mapping in the clearest fashion, but the matrix above does make clear the usefulness of a separation between inflectional categories and their exponents, in combination with lexical declension class.

Lexical Morphology and Phonology (Kiparsky 1982, 1985; Mohanan 1986)

Mutation and i-Ablaut in LM&P are level-one phenomena, despite their regularity and productivity, by virtue of the locus of their effects, i.e., the stem. It is difficult to say whether the Vocative prefix triggers initial mutation or not, since the mutation is motivated independently for the Genitive Plural. The plural suffixes apparently do not interact with i-Ablaut (synchronically, anyway), and they do not pile up in the data here, so a really precise level assignment for the suffixes is not really possible here. To say that they must not apply before level one (the mutation and Ablaut) is not terribly insightful.

The Blocking phenomenon has some interesting implications here, especially in the *sgoil* class, since neither initial mutation nor i-Ablaut is evident there. In order to determine whether the Plural suffix and the Genitive Singular suffix are applied in addition to level 1 inflection, or whether they apply as a back-up to the non-application of the level 1 inflection.

The identical Genitive Singular suffix is used in addition to a stem alternation in the case of *clach*, i.e., *cloiche*, and so this appears to simply be the Genitive Singular suffix used with Feminine nouns. If, on the other hand, the Plural marker in *sgoiltean* is a backup to initial mutation, the prediction would be that plural nouns which begin with /sp/, /st/, or /sk/ should mark the plural categorically with some affix, *-tean* or otherwise. To verify this prediction, it is necessary to go beyond the given data, and even then it the facts are unclear. If the suffix is motivated by blocking, however, one is hard pressed to explain the suffix used in addition to mutation, in attested cases like *ghillean* 'of young men' (cf. *gille* 'young man'). The Elsewhere Condition and the related Blocking effect would not predict this multiple marking.

Natural Morphology (Dressler 1985, 1987)

In every case no form is less 'markered' (*merkiert*, a.k.a. 'featured') than the Nominative Singular, which is unmarked for case and number. In I, II, and III. the Dative is syncretic with the Nominative, syncretism is bad semiotically (it is not biunique), but if you had to pick a form that was next in line in markedness to the Nominative, it would have to be the Dative, so the syncretism could be worse.

For the masculine nouns (I and II), the Plural is more markered than the corresponding singular, and that is in line with iconicity. Also in I and II, the Genitive is more markered than the Nom./Dat., but less markered than the Vocative, which is surely the most marked case of all in these paradigms.

In III, we observe neutralization of case within number, excepting the Genitive Singular. This is unusual in comparison to the other three examples, but chances are that *sgoil* is a loan word from English. Some morphological anomaly is less worrisome on that assumption. That the Genitive Plural is not distinguished formally from the other Plural forms is particularly unusual, given the other three examples.

As for IV, we lose the syncretism between Nominative and Dative Singular, which is good from a biuniqueness standpoint, but there is a new syncretism with, of all things, the (marked) Vocative—very unusual on the markedness/iconicity dimension.
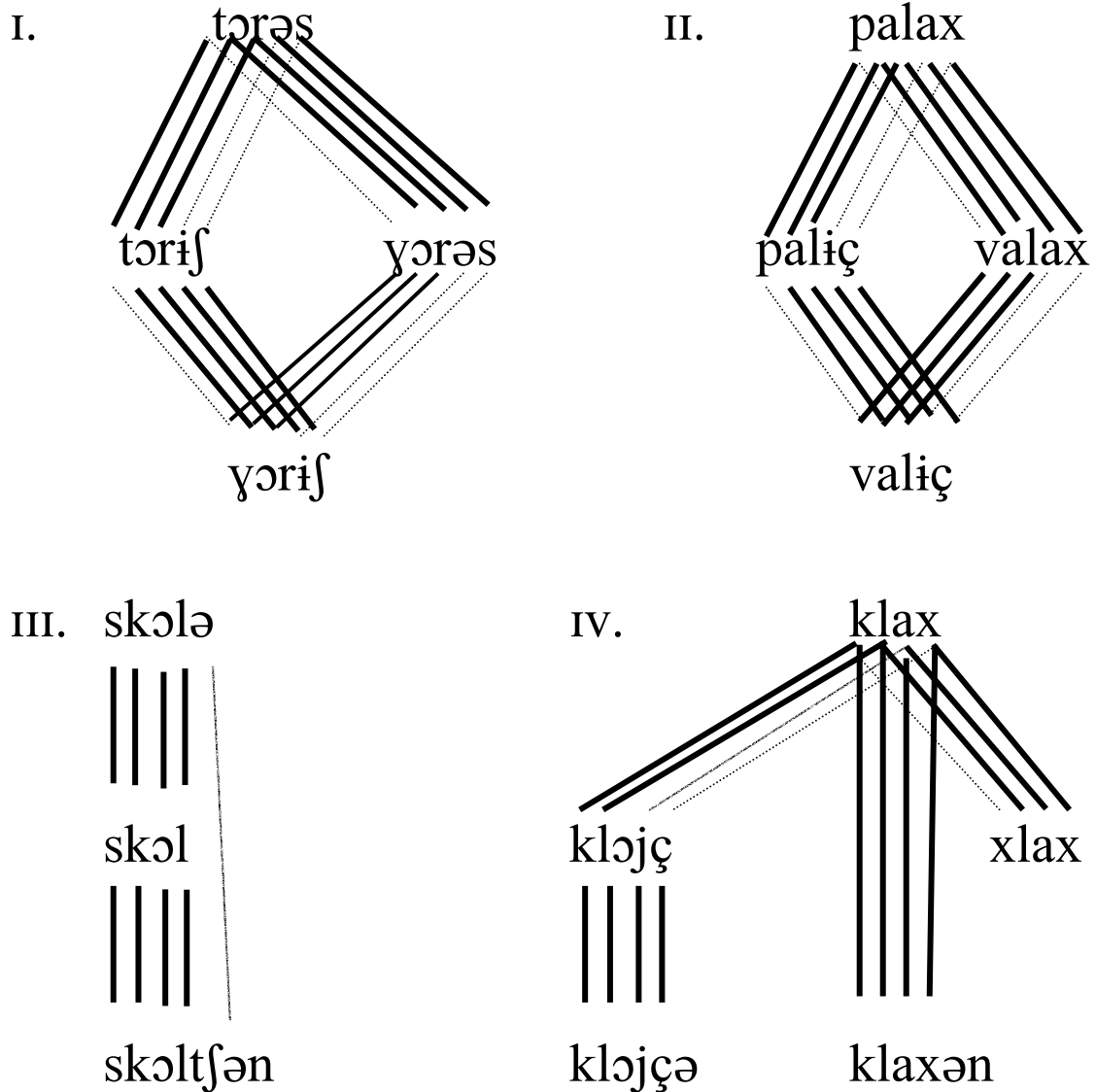
It is true, although somewhat vacuously, that III exhibits the same Nom./Voc. syncretism as IV, so perhaps paradigm III is not as anomalous as it looks. The Genitive Singular in IV is just like the Dative Singular, but with a final /ə/, and the same is true in III, although again less strikingly than the facts in IV.

Although there are some affixes in use here, these paradigms rely to a remarkable degree on Modulator Featured symbolizing, the least optimal symbol type (other than no marker at all). The fact that there is at least one syncretic pair in each number column of each paradigm here would suggest that the case system is under pressure to collapse or to attract a new marker morpheme in one case (more likely the Dative for I and II, on markedness grounds). It looks like the Nom./Dat. distinction is being kept alive by patterns like IV. If IV is a(n unproductive) minority pattern in the language, the pressure to regularize forms like *cloich* to *clach* is quite high, and the Natural Morphology

prediction is that Dative case will collapse in time, all else being equal.

"**Network Model**" (Bybee 1985, 1988, 1995)

Since these are nouns, the relevance hierarchy doesn't really help here. The first thing to do is to draw networks, and see how they compare:

I.

tɔrəs

tɔriʃ   ɣɔrəs

ɣɔriʃ

II.

palax

paliç   valax

valiç

III. skɔlə

skɔl

skɔltʃən

IV. klax

klɔjç   xlax

klɔjçə   klaxən

I and II show a nicely closed network, indicating that there is an element of regularity in these related forms. The fact that the corresponding forms also fill parallel

grammatical functions is a sure sign of a paradigmatic pattern. The stronger versus weaker links are even in the same positions with respect to the phonemic sequences. This pattern is predicted to be stable and should be relatively productive.

The alternation of the initial consonant in I (changing place, manner, and voicing) is more distant in phonetic terms than in II (manner and voicing), which is still greater than in IV (manner only). The less the phonetic distance between alternants, the more recoverable the correspondence, and the easier will be lexical access. I, therefore stands out in language independent terms, although if the alternation is productive, that may support the pattern's continued existence.
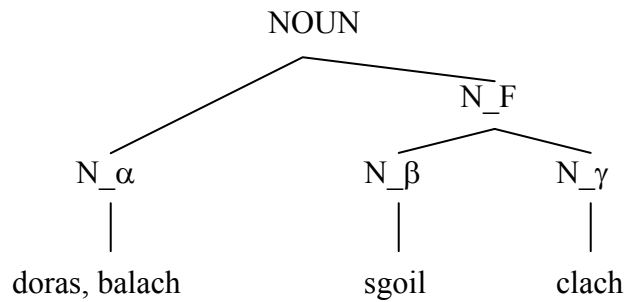
III shows a simpler pattern of identity of the stem across the board with suffixal inflection. The regularity here makes this an even more readily detectable morpheme than the patterns we observe in I and II, but the one to many form-meaning mappings undercuts the value of the stem's consistency.

As sets of related forms go, the pattern in IV is quite remarkable. There should be a lot of pressure on this paradigm to regularize at least the vowel quality of the stem. The lexical strength of the word for "stone," however, might be quite high for Gaelic speakers, given the frequency of occurrence of stones in the relevant part of the world. That might explain the irregularity's ability to endure to this point.

It is also important to find out just how productive the vowel quality alternation is in Gaelic nouns more generally, since that may affect the degree to which the alternation may be considered an irregularity. In this limited data set, IV stands out. It would be premature to assume that this sample was representative of the language as a whole or that type and token frequencies can be reliably projected without more evidence.

Network Morphology (Brown 1998, Brown et al. 1996, Corbett & Fraser 1993, Fraser & Corbett 1995)

The situation here is remarkably similar to the Russian example discussed in the body of the exam. The four paradigms under discussion here may be seen as belonging to two or three declension classes.

```
                        NOUN
                      /       \
                              N_F
                            /      \
         N_α            N_β         N_γ
          |              |           |
    doras, balach      sgoil       clach
```

Since the phonology of the mutated and/or ablauted stem clearly depends on the phonology of the root, lexical items will be assumed to have up to four formally distinct yet relatable stems for use in the statement of particular morphological facts. There's more redundancy in the stem set at the phonological level, but this follows from a limitation in the formalism. There ought to be a way to capture the formal correspondences among stems with the First/Last/Rest convention (as used in Hoeksema and Janda (1988) and as used for argument structure in Evans and Gazdar (1995)). Brown (1999:216-17) offers a tentative hierarchical representation of morphophonological selection, but the system is not readily transferable to this case. This will not be pursued here.

Doras:
```
< > == N_α
<infl_root> == tɔrəs
<mut_stem> == ɣɔrəs
<i_stem> == tɔriʃ
<mut_i_stem> == ɣɔriʃ.
```

Balach:
```
< > == N_α
<infl_root> == palax
<mut_stem> == valax
<i_stem> == paliç
<mut_i_stem> == valiç.
```

```
Sgoil:        < > == N_β                      Clach:        < > == N_γ
              <infl_root> == skɔl                           <infl_root> == klax
              <stem> == "<basic_stem>".                      <mut_stem> == xlax
                                                             <stem sg> == klɔjç.


NOUN:         <basic_stem> == "<infl_root>"
              <mor dat> == "<mor nom>"
              <mor nom sg> == "<basic_stem>"
              <mor gen pl> == "<mut_stem>".


N_α:          < > == NOUN %     masculine nouns
              <mor nom pl> == "<i_stem>"
              <mor voc sg> == "a_<mut_i_stem>"
              <mor gen sg> == "<mor nom pl>".

N_F:          < > == NOUN %     feminine nouns
              <mor gen sg> == "<mor dat sg>_e"
              <mor voc sg> == "a_<mor nom sg>".

N_β:          < > == N_F
              <mor pl> == "<mor nom sg>_tean".

N_γ:          < > == N_F
              <mor dat sg> == "<stem sg>"
              <mor nom pl> == "<mor nom sg>_an".
```

Inheritance principles together with the default/override relation and rules of referral will map the above lexical entries into the paradigms in question. In this way, generalizations between and across declensions are captured, and the fact that Nβ is more similar to Nγ than either is to Nα is captured without making sameness or difference a simple binary choice. Carstairs-McCarthy's (1987) notion of a *macro-paradigm* might therefore cover the relationship between Nβ and Nγ.

Paradigm Function Morphology (Stump 1991, 1993, 2001)

The given data show seven paradigm cells for Gaelic nouns. We are dealing, therefore with two morphosyntactic features, {CASE} and {NUM}. The former is an *n*-ary feature with four permissible values: *nom*, *gen*, *dat*, and *voc*. The latter is also *n*-ary, but since the feature has only two permissible values, it is effectively binary. There is only one co-occurrence restriction to mention here, and that is the (apparent) limitation of {CASE:voc} to extensions of {NUM:sg}. Thus the seven cells are defined (4 x 2 – 1 = 7).

Regular and productive stem-internal alternations are to be described as stem formation-rules, and since the most differentiated cases, *doras* and *balach* (class Na), show four distinct but related stems, we will posit four stems for the class N in general. Since initial mutation is unified from a conditioning perspective but not from a form perspective, it is misleading to render mutation as a quasi-phonological rule. The stated alternations as given below the data set is adequate for the present purpose. I-Ablaut can be simply formulated as a feature-changing rule, but even this must be clearly recognized as a morphologically-conditioned rule.

The alternation patterns, therefore, will be assumed as static relationships between alternants, Basic-C and Mutant-C for initial consonants, and Basic-V and Ablaut-V for stem-final vowels. Stem-formation rules will be as follows:

Where L is a masculine (=Nα) noun with root C_1YV_nC, each of (a)-(d) implies the other three:

(a)	The Basic stem is identical to the root
(b)	The Mutant stem has Mutant-C for C_1
(c)	The Ablaut stem has Ablaut-V for V_n
(d)	The Combo stem has Mutant-C for C_1 and Ablaut-V for V_n

Where L is a feminine (=Nβ or Nγ) noun with root C_1Y, each of (a)-(c) implies the other two:

(a)	The Basic stem is identical to the root
(b)	The Mutant stem has Mutant-C for C_1
(c)	Refer other stems to Basic stem

Lexically specified stems such as *cloich* for *clach* will of course override the application of more generally applicable stem formation and selection rules.

Given the limited data set, we have distributional evidence for exactly three rule blocks: a stem selection block (Block 0), a suffixing block (Block 1), and a prefixing block (Block 2). A general paradigm function for Gaelic nouns can be posited as follows:

Where σ is a complete set of morphosyntactic properties for lexemes of category N,

(i) $PF(<X,\sigma>) =_{def} Nar_2(Nar_1(Nar_0(<X,\sigma>)))$

The rule blocks are the following:

Block 0

(ii) $RR_{0,\ \{CASE:voc\},\ [N]}(<X,\sigma>)$ $=_{def} <Y,\sigma>$, where Y is X's Combo stem

(iii) $RR_{0,\ \{CASE:gen,\ NUM:pl\},\ [N]}(<X,\sigma>)$ $=_{def} <Y,\sigma>$, where Y is X's Mutant stem

(iv) $RR_{0,\ \{CASE:gen\},\ [N]}(<X,\sigma>)$ $=_{def} <Y,\sigma>$, where Y is X's Ablaut stem

(v) $RR_{0,\ \{NUM:pl\},\ [N]}(<X,\sigma>)$ $=_{def} <Y,\sigma>$, where Y is X's Ablaut stem

(vi) $RR_{0,\ \{\ \},\ [N]}(<X,\sigma>)$ $=_{def} <Y,\sigma>$, where Y is X's Basic stem

Block 1

(vii) $RR_{1,\ \{NUM:pl\},\ [N\beta]}(<X,\sigma>)$ $=_{def} <Xtean,\sigma>$

(viii) $RR_{1,\ \{CASE:gen,\ NUM:pl\},\ [N\gamma]}(<X,\sigma>)$ $=_{def} <X,\sigma>$

(ix) $RR_{1,\ \{CASE:gen,\ NUM:sg\},\ [N\beta]}(<X,\sigma>)$ $=_{def} <Xe,\sigma>$

(x) $RR_{1,\ \{NUM:pl\},\ [N\gamma]}(<X,\sigma>)$ $=_{def} <Xan,\sigma>$

Block 2

(xi) $RR_{2,\ \{CASE:voc\},\ [N]}(<X,\sigma>)$ $=_{def} <aX,\sigma>$

According to PFM's paradigmatic interpretation of the Pāṇinian Principle, as represented in the formalization of the paradigm function (PF) above, the narrowest applicable rule in each block will apply in defining the evaluation of the PF for any given pair $<X,\sigma>$ (the Pāṇinian Determinism Hypothesis). No rules in block 1 are applicable to lexemes of class Nα, inflection in that class will be done without suffixation. The distinct stem formation rules for masculine versus feminine noun lexemes allow the rules of stem selection to be stated generally across the category N. The following proofs will exemplify the correctness of the preceding analysis:

Where $\sigma = \{\text{CASE:nom, NUM:pl}\}$,
$\quad$ PF($<$*clach*$,\sigma>$)
$\quad = \text{Nar}_2(\text{Nar}_1(\text{Nar}_0(<$*clach*$,\sigma>)))$ $\hfill$ [by (i)]
$\quad = \text{RR}_{2,\ \{\ \},\ [\text{N}]}(\text{RR}_{1,\ \{\text{NUM:pl}\},\ [\text{N}\gamma]}(\text{RR}_{0,\ \{\text{NUM:pl}\},\ [\text{N}]}(<$*clach*$,\sigma>)))$ $\hfill$ [by Nar_n
$\hfill$ notation]
$\quad = <$*clachan*$,\sigma>$ $\hfill$ [by IFD, (x), and (v)]

Where $\sigma = \{\text{CASE:gen, NUM:sg}\}$,
$\quad$ PF($<$*sgoil*$,\sigma>$)
$\quad = \text{Nar}_2(\text{Nar}_1(\text{Nar}_0(<$*sgoil*$,\sigma>)))$ $\hfill$ [by (i)]
$\quad = \text{RR}_{2,\ \{\ \},\ [\text{N}]}(\text{RR}_{1,\ \{\text{CASE:gen, NUM:sg}\},\ [\text{N}\beta]}(\text{RR}_{0,\ \{\text{CASE:gen}\},\ [\text{N}]}(<$*sgoil*$,\sigma>)))$
$\hfill$ [by Nar_n notation]
$\quad = <$*sgoile*$,\sigma>$ $\hfill$ [by IFD, (ix), and (iv)]

Where $\sigma = \{\text{CASE:voc, NUM:sg}\}$,
$\quad$ PF($<$*balach*$,\sigma>$)
$\quad = \text{Nar}_2(\text{Nar}_1(\text{Nar}_0(<$*balach*$,\sigma>)))$ $\hfill$ [by (i)]
$\quad = \text{RR}_{2,\ \{\text{CASE:voc}\},\ [\text{N}]}(\text{RR}_{1,\ \{\ \},\ [\text{N}]}(\text{RR}_{0,\ \{\text{CASE:voc}\},\ [\text{N}]}(<$*balach*$,\sigma>)))$
$\hfill$ [by Nar_n notation]
$\quad = <$*a bhalaich*$,\sigma>$ $\hfill$ [by (xi), IFD, and (ii)]

Recall that IFD—the *Identity Function Default*—serves, where no more specific rule is applicable within a rule block, to map the input to itself. Thus the block is evaluated, the form is definable, and no formal change to the input is effected, i.e., there are no zero-morphs involved in this analysis. Note that rule (viii) above is an identity function, but it is a separate stipulated override, not a default, partially realizing the properties $\{\text{CASE:gen, NUM:pl}\}$ on lexemes of class Nγ.

$\quad$ Note also that (full or partial) syncretism in these paradigms is handled through the application of defaults, rather than through special rules of referral in the rule blocks. See Stump (1993) for a discussion of criteria related to the decision 'to refer or not to refer'.

Prosodic Morphology (McCarthy 1981, 1982; Lieber 1983, 1984; Marantz 1982)

Assuming that part of the lexical entry for any root is a segmental tier, the mutation effects can be represented as features which are associated to the initial C position in the skeleton, adding or altering features so as to convert the initial C to its mutated counterpart. The same morpheme does not condition a uniform phonological effect on the initial C of the stem, so the Structural Description and Change is going to have to be somewhat complex.

The morpheme contains at least the feature specification [+continuant], which overrides the lexical specification for the C_1 slot (vacuously where the stem is continuant initial). Since the stop contrast is one of aspiration rather than voicing, but the fricative contrast is one of voicing, a [$-\alpha$ voice] can be a part of the morpheme, sensitive to the setting of [spread glottis] in the root. Since the mutation never results in a change from [+voice] to [−voice], an analysis in which [Voice] is a privative feature is also possible.

Since i-Ablaut seems to be assigned right to left, given its effect on C_n, morphemes triggering i-Ablaut can be formalized so as to attach to V_n of the stem, rather than to a V numbered left to right. Such morphemes will consist of a feature [+high], which will override the lexical specification for V_n's height. This could also be done as a spreading of palatality from C_n of the root, but palatalization of C next to front vowels is general enough in Scottish Gaelic that it needn't be handled in the morphology, separate from phonology.

Since mutation is a matter of changing specifications in roots, rather than filling empty slots in the C–V skeleton, the Prosodic Morphology analysis of mutation is different from Arabic interdigitation or spreading and prespecification in reduplication. This is a more powerful sort of operation than Prosodic Morphology was originally designed to handle.

Using the OT style (Prince & Smolensky 1993), however, the formalism is undaunted:

ALIGN (Mutation-L, Stem-L) >> *hC[+stop] >> PARSE

With this constraint ranking, ALIGN keeps the mutation at the left edge of the stem. If the co-occurrence constraint were ranked higher than ALIGN, the mutation would be allowed to move in from the left edge just in case it would violate *hC[+stop].

Because underlying s-stop clusters do not license mutation, and because this co-occurrence constraint outranks PARSE, it is better to leave mutation unparsed than to force the /s/ to mutate before a stop.

Even though the mutated alternants are not phonetically parallel, and even though the conditioning for mutation in the data is completely morphological, this formulation within OT makes it seem as though it were driven primarily (if not purely) by segmental and prosodic phonology.

Since i-Ablaut is more restricted in its application than initial mutation, the restriction to the *doras–balach* class might have to be a condition on the Parse constraint, i.e.,

PARSE[Dat., Pl.]$_{Class1}$.

This mixes general morphological conditioning and particular lexical-class conditioning, but the OT formalism could handle it. The claim that constraints must be universal seems to be at odds with such an idiosyncratic constraint, but the usual counterargument in such cases is that in languages where there is no direct evidence for the constraint, we assume that it is ranked very low.

As for the "normal affixation" cases, Prosodic Morphology doesn't fundamentally differ from a concatenation account, except that the morphemes are represented as belonging to distinct morpheme-tiers.

Word Syntax (Lieber 1981, 1992; Selkirk 1982; Di Sciullo & Williams 1987)

Lieber (e.g., 1992:165-71) has dealt most directly with mutation and Umlaut in the Word Syntactic framework. Lieber's examples of mutation involve a sort of complex affixation whereby an overt affix (a "mutation trigger") attaches to the stem at one point and an empty timing slot is attached adjacent to the segment to be mutated. On analogy with the Fula analysis in Lieber (1992:167-69), the empty timing slot attaches autosegmentally to the stem's initial segment, forming a geminate. The resulting initial geminate is assumed to meet the structural description of a phonological process of "lenition" which produces the observed mutation effects. The fact that no overt affix correlates with the mutation in Genitive Plural forms means simply that there is a zero affix meaning [+Gen, +Pl] which associates the empty timing slot in initial position. Perhaps both could be handled at once if we assume that the empty timing slot "is" the [+Gen, +Pl] affix, a prefix, although this move is an innovation here, not suggested in Lieber (1992) or elsewhere.

If we claim that the Vocative prefix *a* similarly contributes an empty timing slot just after it, this could add some indirect support for the empty Genitive Plural prefix. In classes Nα and Nγ (but not Nβ), a null [+Gen, +Pl] affix could explain the failure of additional [+Pl] marking, since that would be featurally redundant. If we assume further that the null [+Gen, +Pl] does not apply to Nβ instead of applying with no perceptible effect on the initial, this could explain the application of the [+Pl] suffix in *sgoiltean* [+Gen, +Pl]. (<u>Note</u>: See LM&P's response, however, for discouraging counterevidence from data beyond the set given here.)

The analysis of Umlaut is similar to that of initial mutation, since Umlaut strictly speaking is triggered by a vowel in a following morpheme. Lieber (1992:170) appeals to a floating feature ([−Back], for German), which is part of the lexical entry of triggering suffixes. Stems, on this analysis, are underspecified, with only marked values present underlyingly. The floating feature, once associated to the last vowel in the stem, pre-empts the later association of the unmarked value ([+Back], for German). To accommodate the productive (e.g., *dorais* and *balaich*) Gaelic i-Ablaut facts, however, the triggering suffix must be null itself, but carrying a floating [+High], since we observe

both / a / and / ə / raising (but not fronting) to [ɨ].

Other affixes in the data contribute inflectional features to the stems they attach to by means of the unexceptional application of affixation and percolation.

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