North East Linguistics Society

Volume 27 *Proceedings of the North East Linguistic Society 27*

Article 9

1997

Distributed Mutation

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This paper offers a re-interpretation of Initial Mutation (IM) phenomena in Irish, in which apparently unpredictable surface patterns are understood as resulting systematically from the interaction of two underlying mutation systems.* IM is the cover term for a set of phonological processes that target the initial segment of Modern Irish words, resulting either in so-called LENITION or ECLIPSIS on consonant-initial words, and in T- and H-prefixation on vowel-initial words. These effects are illustrated in Tables 1-3 (next page). Although different formal analyses of the phonological process have been proposed, it is the context of application of these rules which is more controversial: c.f. Rotenberg (1978), Gussman (1986), Ní Chiosáin (1991, 1996); Acquaviva (1990), Duffield (1990, 1991), Noonan (1992). The standard view is that IM is triggered by a completely arbitrary set of lexical elements. In this paper, I will argue that the phenomenon is in fact highly systematic, and that interesting generalisations become available once certain underlying properties are identified. If the analysis proposed here is correct, then the phenomenon has more than local significance for it turns out that the generalizations can only be stated within a particular model of grammar, shown in (1), involving 'syntax all the way down' (in the terminology of Halle & Marantz (1992)), and at least two equally privileged 'PF-interfaces': a direct relation between syntactic and phonology, and a mediated relationship between the morphological component and the phonology:

(1)

This model is intentionally rather general: in particular, it makes no claims about the correct theory of morphology. The examples in (2) below illustrate the surface complexity as well as the ubiquitous nature of initial mutation phenomena. In each sentence, the initial segment of mutated forms is indicated in bold, with the citation form —or BASE form— of each word given in parentheses. Consider first how the sentences in (2) might be treated in a traditional description. In (2a), the attributive adjective deas ('beautiful') is unaffected by mutation, since it modifies a singular masculine noun tráthnona ('afternoon'). However, it is a potential mutation target, for if instead it modified a singular feminine noun, such as oíche ('night'), deas would be lenited to dheas:

* This is an abbreviated version of a paper in submission to Canadian Journal of Linguistics. I would like to thank Eithne Guilfoyle, Ken Hale, Máire Ní Chiosáin, as well as members of the NELS audience for their helpful comments and suggestions.

K. Kusumoto (ed.), NELS 27, 103-115

Phonetic Change	Base Form	Lenited Form
[p] → [f]	Parthas 'paradise'	Gairdin Pharthais 'Garden of Eden'
[t] → [h]	tagann sí isteach 'she comes in'	ní thagann sí isteach 'she doesn't come in'
[k]→ [x]	grá a croí 'the love of her heart'	grá mo chroí 'the love of my heart'
[b]→ [w]	briseann sé seic 'he changes a cheque'	seic a bhriseann sé 'a cheque that he changes'
[d]→[ɣ]	díol an bháid 'the sale of the boat'	dhíol sé an bád 'he sold the boat.'
[g]→ [ɣ]	grá 'love'	de ghrá an réitigh 'for peace' sake'
[s]→ [h]	seoladh 'sailing'	bád a sheoladh 'to sail a boat'
[f] → [Ø]	fág! leave	...gur fhág siad... ...that they left...
[m]→ [ʍ]	Is muinteoir é 'he's a teacher.'	Ar mhuinteoir é? 'was he a teacher?'

TABLE 1. LENITION

Phonetic Change	Base Form	Eclipsed Form
[p] → [b]	Parthas 'paradise'	i bParthas 'in Paradise'
[t] → [d]	tagann sí isteach 'she comes in'	an dtagann sí isteach? 'does she come in?'
[k]→ [g]	grá a gcroí 'the love of her heart'	grá a gcroí 'the love of their hearts'
[b]→ [m]	briseann sé seic 'he changes a cheque'	seic a mbriseann sé é 'a cheque that he changes'
[d]→[n]	díol an bháid 'the sale of the boat'	i ndíol an bháid 'in payment for the boat.'
[g]→ [ŋ]	grá 'love'	i ngrá le duine 'in love with someone'
[f] → [v]	fág! leave	áit a bhfágann fear é. 'a place a man leaves'

TABLE 2. ECLIPSIS

Phonetic Change	Base Form	T-Prefixed Form
[sl] → [tsl] [sn] → [tsn]	slaínte ('health') snáthaid ('needle') srann ('snoring')	an tslaínte ('the health') an tsnáthaid ('the needle') an tsrann ('the snoring')
[sV] → [tsV]	súil ('eye')	an tsúil ('the eye')
[V] → [tV]	arán ('bread')	an t-arán ('the bread')
[V] → [hV]	aird ('direction')	na hairde ('the directions')

TABLE 3. T- & H- PREFIXATION

(2) a. Tráthnóna deas gréine sa tsamhradh ann.
afternoon fine sun-F.-GEN in-the summer in-it.
'A beautiful sunny summer's day it was.'

Bhí mo mháthair agus Neili Mhór ina suí.
be-PAST 1SG mother and N. big-SG-F in-3SG-F sitting-VN
'My mother and Big Nel were sitting down.'
(samhradh='summer'; bí='be'; máthair='mother'; mór='big')

b. an bhuceid nach bhfuil sé ach seachtain ...
det bucket negC was it but week.
'The _ that it was only a week...'
(buceid='bucket', fuil='was')

c. 'Beidh tú liom chun na hoifige,' 'féachail an bhfaighinn leath-thicéad duit.'
be you with-me to the office see-VN +WHC get-CND-1SG half-ticket for-you
'Come you with me to the office,' says he, 'see about getting you a half-fare.'
(oifig='office'; faighinn='get'; ticéad='ticket')

Also in (2a), the singular masculine noun tsamradh ('summer') has undergone T-prefixation following the portmanteau preposition sa. In the next sentence, bhí is lenited because it is a past-tense verb-form, like bhfuil in (2b). Almost all preterite verb-forms are targets of lenition; in some conjugations, it is only the presence of lenition which distinguishes the preterite form from the verbal stem. The noun mháthair ('mother) is lenited following the so-called 'possessive adjective' mo ('my'). This is a completely general rule, applying to all nouns following the trigger mo, irrespective of their gender. Different possessive adjectives trigger different mutations, however, with third person forms being distinguished precisely by the type of mutation they induce: for example, third singular masculine forms induce lenition, the plural form induces eclipsis, while the singular feminine form triggers no *consonant* mutation, but compensates for this by inducing H-prefixation on *vowel*-initial nouns instead. In (2b) the feminine singular noun buceid ('bucket') is lenited because it is definite, modified by the definite determiner an. However, if the same feminine noun were indefinite or plural or if it were definite but in genitive case, there would be no consonant mutation. On the other hand, it is in just these latter contexts that we would find H-prefixation before vowel-initial stems, as illustrated in (2c) by the feminine genitive form hoifige. Finally, the lenition of ticéad ('ticket') in the compound leiththicéad ('half-fare') is a common property of the second morpheme in many prefixed and compounded words.

This preliminary discussion serves to illustrate several points. First, IM is a pervasive property of Irish grammar. Nevertheless, in spite of its complexity and lack of phonetic predictability, IM is not totally wild: the past-tense forms of all consonant-initial verbs, for example, are always lenited, closed-class functional elements are almost never themselves mutated. Thus, IM is certainly not arbitrary in the usual sense. Before outlining an analysis of IM phenomena, consider the Appendix to this paper which sets out the classical Rules for Mutation adapted from the Christian Brothers' (1990) presentation. Here some twenty different rules refer to over a hundred mutation contexts. This list shows an eccentric set of phenomena that are still somehow systematic. Features such as definiteness, tense and gender, for example, interact in strikingly parallel ways: all four mutation types treat masculine genitive and feminine common forms in a similar fashion; in fact, as Table 4 demonstrates, there is no cell in the nominal paradigm where *some* type of mutation does not apply:

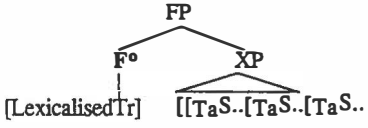
Case	Gender	Singular	Plural
Common	masc.	*an t-ainm* (ainm)	*na h-ainmneacha*
	fem.	AN BHEAN (bean)	*na h-aibhneacha*
Genitive	masc.	AN CHAIT (cat)	NA GCAILÍNÍ
	fem	*na habhann* (abhainn)	NA N-AIBHNEACHA

TABLE 4: IM EFFECTS INDUCED BY DETERMINER ELEMENTS (small capitals indicate lenition and eclipsis, italics indicates prefixation)

Moreover, there is an obvious complementarity between lenition and H-prefixation, in that H-prefixation applies to vowel-initial stems precisely where lenition *fails* to apply to consonant-initial stems. Underlyingly, then, there appears to be a coherent notion of what is a possible mutation context. The question has been how to formally capture this. The specific claim advanced here is that LEXICALISED FUNCTIONAL CATEGORIES are the primary determinants of initial mutation, and that lexically-specified information is of secondary importance (although the two interact in a systematic and predictable fashion.)

Suppose that underlyingly there exist two quite distinct kinds of mutation. The first of these I will term F(UNCTIONAL)-MUTATION, and the second, L(EXICAL)-MUTATION. The basic idea, schematised in (3), is straightforward: F-mutation is triggered by lexicalized functional categories —a notion made more precise below— whereas L-mutation is induced by individual lexically-specified sets of features.

(3) a. F-MUTATION:



b. L-MUTATION:

$[\ \text{LexicalTrigger}\ ]_w \Rightarrow [\text{Target}\ ]_w$

I hypothesise two main differences between L-mutation and F-mutation. The first concerns the type of locality involved. L-mutation is always *linearly* local, requiring strict string-adjacency of mutation-trigger (TR) and target (TA), whereas F-mutation is *hierarchically* local, with the F-mutation trigger potentially targetting all elements within a syntactically-determined domain, essentially a relation of c-command: hence, 'iterative' or 'spreading' mutation is invariably F-mutation, rather than L-mutation.

Second, whereas L-mutation may be sensitive to the phonological properties of the trigger, F-mutation shows no such sensitivity. Simple lexicalisation of an F-mutation trigger, a functional head, is sufficient to induce mutation on the following target, regardless of its phonological properties. The remainder of the paper demonstrates how these fairly general principles operate in specific instances to account for the IM phenomena, concentrating on two main syntactic contexts: preverbal mutation and mutation within noun-phrases. (Given present space constraints, the discussion must be further restricted to a subset of the mutation facts for each syntactic context.)

In previous work —esp. Duffield (1991, 1995)— I provide an analysis of Irish clauses and of VSO word order as schematised in (4), involving four or five functional projections, depending upon whether negation (NegP) is projected:

(4) [CP C^o [TP T^o [NegP [AgrP V_i [VP^{max} NP_{SUBJ} [AsPP NP_{OBJ}j [VP t_i t_j]]]]]]]

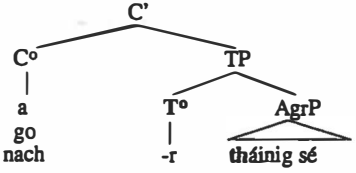
The heads of three projections, C^o, T^o, Neg^o, are assumed to host functional elements, such as complementisers, interrogative elements, and tense and negation morphemes 'at d-structure'; more precisely, they host the abstract functional features associated with these morphemes, assuming 'late vocabulary insertion.' VSOX word order is taken to be derived by movement of the finite verb to Agr, with the thematic subject remaining *in situ*. In matrix contexts, negation features are inserted under Neg^o and are taken to raise to Tense in the overt syntax.[1] Consequently, at s-structure C^o and T^o are the only two VP-external functional projections containing phonetically-realisable functional features. Given these syntactic assumptions, the vast majority of the traditional Rules referring to pre-predicative mutations reduce to the conditions given in (5):

(5) Conditions on Clause-initial F-mutation
(a) Lexicalised C^o triggers Eclipsis; (b) Lexicalised T^o triggers Lenition;
(c) Lexicalised Asp^o triggers Lenition

Implicit here is the claim that F-mutation is not an inherent feature of individual preverbal particles, but is rather a 'pre-specified' property of particular syntactic positions: it does not matter, for example, *which* complementiser element appears in C^o; as long as this position is phonetically-realised by *some element*, eclipsis will be induced on the following element (usually —though not necessarily— the finite verb).

Here I will focus on Condition (5b), F-mutation induced by a lexicalized T^o node. This condition subsumes traditional Rules #6, #9, and #10 (see Appendix), as soon as certain reasonably standard assumptions are made about the structural position of the past-tense morpheme, alternately realised as do/-r. Following Rotenberg (1978) and Chung & McCloskey (1987), I assume that all of the preverbal particles containing -r are bimorphemic 'fused forms', and that the past-tense morpheme -r lexicalises T^o at s-structure. This is illustrated in (6a). Given the additional assumption mentioned above, namely, that the negative head ní raises and adjoins to T^o,— illustrated in (6b) (next page) — Condition (5b) accounts for all of the mutations in traditional Rule #10:

(6) a.



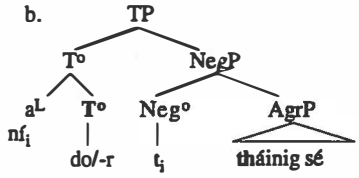
an+r	=> ar	'if (past)'
go+r	=> gur	'that (past)'
nach+r	=> nár	'that..not (past)'
sula+r	=> sular	'before (past)'
cá+r	=> cár	'where (past)'

Condition (5b) generalises further to the lenition of past-tense, imperfect and conditional verb-forms in matrix contexts —Rule #9— if we allow for *T^o to be lexicalised at the relevant level of representation* by the features of past-tense morpheme do (an allomorph of -r). In most contemporary dialects, this morpheme only surfaces before *vowel*-initial stems; it still occurs, however, found in certain varieties, including formal

[1] Bobaljik & Carnie (1996) and McCloskey (1996) argue independently for a different derivation in which the subject raises overtly to some VP-external projection; for Bobaljik & Carnie, the object NP also raises overtly to {Spec, AgrOP}, rather than to {Spec, AspP'}, contrary to what is assumed here. Although it clearly matters which view of VSOX order is correct, it does not matter in the present context; it is the relative, rather than absolute, position of functional heads with respect to complements that is crucial. Clearly, however, some re-labelling of functional heads would be required if the alternative analyses were adopted.

registers, before consonant-initial stems. Since by hypothesis F-mutation scans a 'pre-phonetic' level of representation —what used to be called s-structure— the fact that do is usually subject to subsequent deletion is irrelevant; what is important is that the functional features of T° are *potentially realizable* in this context, hence F-mutation applies. This analysis *does* suggest, however, that it is more correct to speak of a 'level of representation' mediating the syntax and phonology —something like 's-structure'— rather than a pure 'interface' (*pace* Chomsky (1992, 1995).

(6) b.



a+d' => a (following deletion)
nf+pres =>nf 'not ...'
nf+r => nío 'not (past)'

Taken together, the conditions proposed in (5) subsume traditional Rules #6, #9, #10, #14, and #19; three generalisations about syntactic structure account for the mutation behavior of some 23 lexical items. Since lenition appears to be the 'default' F-mutation —a fact that should become clearer in a moment— it is likely that we can further reduce the Conditions in (5) to the statement in (7):

(7) Elsewhere Condition on F-mutation
a. Lexicalised Functional Heads trigger Lenition, unless otherwise specified;
b. Lexicalised C° triggers Eclipsis.[2]

Before discussing mutation in noun-phrase contexts, it is necessary to be more precise about what is meant here by 'lexicalisation.' Let us say that a functional head is lexicalised if it contains 'phonetically realisable' functional features (FF). In turn, functional features are 'phonetically realisable' if there is at least one corresponding lexical item that expresses those features. It does not matter, however, whether the features are actually realised in a given context. From this it follows that, syntactic traces of moved features cannot trigger mutation, since traces (of head movement) have no corresponding lexical exponents; on the other hand, past-tense features invariably induce lenition on verb-stems, since they do have lexical exponents —do~-r— even though, as just mentioned, do is usually fails to be phonetically realised before consonant-initial stems. Furthermore, it is irrelevant whether a functional head is lexicalised by the exponent of functional features inserted under that head or by the exponent of functional features attracted to that head in the course of the derivation. T°, for example, may be lexicalized in two different ways: either by base-generation of the (past-tense) features corresponding to the past-tense morpheme do or by raising and adjunction of +NEG features from a lower functional projection.

Let us turn now to mutation within noun phrases. As with clauses, I assume an articulated structure involving three functional projections. The basic proposal is given in (8), where the functional features of determiners are inserted under D°, where the so-called 'possessive adjectives' are analysed as Agreement features, inserted under Agr°, and subsequently raised to D° and where syntactic features of head-nouns are assumed to undergo head-movement, typically to the head of the Number projection (Num°); cf. also Ritter (1991, 1993):

[2] The mutation effects of the other clausal (functional) projections —C° and Asp°— are treated in the full version of this paper; see first footnote.

(8) [DP '+D' [AgrP '+AGR' [NumP N_i [NP AP* [NP NP$_{SUBJ}$ t_i]]]]]

These syntactic assumptions allow the simple Condition in (9) to account for the bulk of initial mutation effects observed in noun-phrases. It should be clear how this condition relates both to the conditions in (5) above, as well as to the Elsewhere Condition in (7). The following paragraphs illustrate the application of this latter condition in several key nominal contexts.

(9) Condition on PreNominal F-mutation
Lexicalised D^o triggers Lenition, unless otherwise specified

The most straightforward instance of condition (9) —illustrated in (10)— is where the definiteness features of D^o are lexicalised by an overt determiner element (an/na). Every overt determiner triggers some type of mutation on its nominal complement, with the particular mutation found being a function of the gender, number and case features of the corresponding noun:

(10) DP

D^o NumP

an/na

[**t-ainm**	masc/common/sing: (T)	an **t-**ainm ('the name')
[**hh**ean	feminine/common/sing: (L)	an **hh**ean ('the woman')
[**ch**ait	masculine/GEN/sing (L)	ainm an **ch**ait ('the cat's name')
[**h-a**bhann	feminine/GEN/sing (H)	béal na **ha**bhann ('the river's mouth')
[**h-ai**bhneacha	common/plural (H)	na **hai**bhneacha ('the rivers')
[**g**cat	GEN/plural (H)	bia na **g**cat ('the cats' food')

Notice that in all of these cases the phonological properties of the lexicalising determiner are irrelevant. For example, the determiner an triggers consonant mutation on feminine singular and masculine singular *genitive* forms, but fails to lenite masculine nouns in nominative/accusative contexts, precisely where it triggers T-prefixation instead; the complementarity between consonant mutation and vowel prefixation (anti-mutation) is observed once again.

Condition (9) also accounts for the mutation of nominal modifiers once we distinguish Determiner-triggered *lenition* from the other surface mutations. The Elsewhere Condition in (9) states that a lexicalised functional head will induce lenition 'unless otherwise specified.' Suppose, now, that there are two ways of 'otherwise specifying' which mutation will arise: the marked specification may *either* be a (syntactic) property of a particular functional category; —this is the case with C^o—*or* it may be an inherent property of a particular lexicalising element (L-mutation). As Table 5 shows, most elements in the determiner paradigm are lexically specified as triggering some particular (L-)mutation

Case	Gender	Singular	Plural
Common	masc.	an (+T)	na (+H)
	fem.	an	
Genitive	masc.	an	na (+E)
	fem.	na (+H)	

TABLE 5. DETERMINER PARADIGM

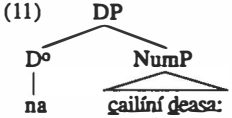
As one expects of an Elsewhere Condition, lenition remains unspecified here, and its application is blocked by any specified L-mutation. There is one crucial, difference between lexically-specified mutation and default lenition, namely, —as stated earlier— that L-mutation is invariably strictly local, whereas default F-mutation, if it is not blocked, may spread to other elements within its domain. With these two ideas in mind, consider now the mutation patterns observed in noun-phrases involving attributive adjectives in Table 6:

Stem	Case	Gender	Singular	Plural
C-initial	Com	masc.	an cailín deas	na cailíní deasa
		fem.	an **fh**uinneog **mh**ór	na fuinneoga móra
	Gen.	masc.	an **ch**ait **dh**uibh	na gcat dubh
		fem.	na fuinneoige móire	na **bhf**uinneog mór
V-initial	Com	masc.	an **t-**úll beag	na **h**úlla beaga
		fem.	an abhainn **bh**eag	na **h**aibhneacha beaga
	Gen.	masc.	an úll **bh**ige	na **n-**úlla beaga
		fem.	na **h-**abhann bige	na **n-**aibhneacha beaga

TABLE 6. ATTRIBUTIVE ADJECTIVE MUTATION

Consider, first, the plural contexts and the feminine singular genitive context. In these cases, we never find lenition. This is just as expected, since the relevant cells of the determiner paradigm in Table 5 above are specified for a particular L-mutation, with the common plural form and feminine genitive singular form being specified for H-prefixation, and the genitive plural specified for eclipsis. Hence, spreading lenition is blocked in these contexts. The mutation patterns found in singular masculine common contexts are also correctly predicted. Here, the relevant determiner an is lexically specified for T-prefixation, so default consonant lenition is blocked on following nouns or adjectives. These L-mutation effects are summarised in (11):

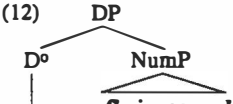
(11)



na	cailíní deasa:	na cailíní deasa ('the pretty girls')
na	**bhf**uinneog mór:	méid na bhfuinneog mór ('the size of the big windows')
	húlla beaga:	na búlla beaga ('the little apples')
	n-aibhneacha beaga:	bun n-aibhneacha ('the confluence of the little rivers.')
	habhann bige:	béal na habhann bige ('the mouth of the little river.'

This leaves two cells of the determiner paradigm unspecified for any L-mutation: the singular feminine common and singular masculine genitive forms. Here —as illustrated in (12)— the Elsewhere Condition applies, inducing (spreading) lenition on all eligible nouns and attributive adjectives:

(12)



	fhuinneog **mh**ór:	an fhuinneog mhór	('the big window)
an	**ch**ait **dh**uibh:	ainm an chait dhuibh	('the name of the big cat')
	abhainn **bh**eag:	an abhainn bheag	('the little river')
	an úll **bh**ige:	dath an úll bhige	('the colour of the little apple')

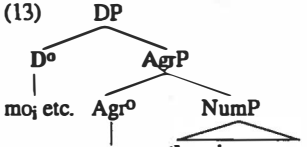
Turning to the prenominal 'possessive adjectives' (mo, a, bhur, etc.) these are assumed to be the realisations of Agreement features that have undergone head-movement to D^o in the overt syntax (much as Negation features raise to T^o), as shown in (13) below. If the analysis is correct, then the mutation properties of these elements can be handled in precisely the same way as determiners, namely as the interaction of L-mutation with Condition (9). Suppose that the Agreement paradigm is lexically specified as in Table 7:

Person	Gender	Singular	Plural
1		mo	ár (+E)
2		do	bhur (+E)
3	masc.	a	a (+E)
	fem.	a (+H)	

TABLE 7. AGREEMENT PARADIGM

It is surely not a coincidence that all of the plural 'possessive adjectives' trigger the same L-mutation as the genitive plural determiner na, namely eclipsis, and that the 3rd sg. feminine possessive a triggers H-prefixation, just like the feminine singular genitive determiner na. This suggests that, *lexically*, eclipsis is just the feature [genitive plural], and that H-prefixation is the lexical realisation of [feminine genitive singular] features; therefore, that lexical paradigms can be further underspecified. By Condition (9), then, all Agr elements are predicted to trigger some type of mutation, once more in virtue of lexicalising the functional head D^o. Agr elements that are lexically specified as triggering L-mutation (3rd.f.sg a, 3rd.pl á, bhur) block default lenition; by contrast, unspecified Agr elements (mo, do, a) fall under the Elsewhere Condition, inducing lenition on following nouns (and any modifying adjectives):

(13)



theach:	mo theach ('my house')
mhac:	do mhac ('your son')
pheann:	a pheann ('his pen')
haois	a haois ('her age')
gcairde	ár/bhur/a gcairde ('our/your/their friends')

The preceding discussion has shown how one reasonably straightforward condition on initial mutation in nominal contexts can subsume 12 traditional Rules, once certain assumptions are made about the syntactic derivation of noun-phrases, and about the interaction of L-mutation with default lenition. Moreover, that condition is simply one instantiation of a more general Elsewhere Condition, applying to all lexicalised functional heads (Condition (7)). This syntactic account of mutation effects, then, is truly cross-categorial, accounting for 15 of the 20 traditional Rules.

Of the four remaining Rules, three refer to mutation in prepositional contexts; with the exception of a few lexically-specified prepositions, all prepositions trigger lenition, just as the Elsewhere condition would predict.

To conclude, the goal of this paper has been to make sense of initial mutation. I have claimed that this can be done by interpreting mutation effects as primarily syntactic, rather than lexical in nature. By adopting the simple hypothesis that initial mutation is due to 'lexicalised functional heads,' it has been possible to reduce twenty traditional Rules,

referring to an even larger number of lexical contexts, to one quite general Elsewhere Condition, repeated in (14):

(14) Elsewhere Condition on F-mutation
(a) Lexicalised Functional Heads (e.g. T^0, Asp^0, D^0, P^0) trigger Lenition, unless otherwise specified;
(b) Lexicalised C^0 triggers Eclipsis

Moreover, it has been possible to provide a unified account of different surface mutations —including both consonant- and vowel-mutations— by assuming a particular type of interaction between lexically-specified mutation (L-mutation) and default lenition, whereby L-mutation blocks the effects of Condition (14). Although the details of this proposal are novel, the basic idea that lexically-specified information blocks the application of a more general condition is a wholly conventional one.

The more general contribution of this proposal is that it argues in favour of a model of grammar where there is a direct relationship between syntax and phonological form that is functionally independent of the lexicon. If there were not the case, it would be hard to explain the fact that the phonological properties of lexical items involved in F-mutation are in many cases completely irrelevant to the resulting surface mutations.

A final conclusion that could be drawn is that the relationship between syntax and phonology information may be better thought of in terms of a distinct 'level of representation' than as a pure interface. Under the current proposal, F-mutation is 'read off' what used to be s-structure; crucially, it is read off the *output* of abstract head-movement processes (such as Neg^0 and Agr^0 raising). It is conceivable that the Minimalist notion of PF-'interface' can be made consistent with this view, but certainly the traditional notion of s-structure appears more compatible with the proposal.

Appendix[3]

Lenition

According to Christian Brothers (1990), lenition is obligatory in the following contexts:

- Rule #1: the definite determiner an lenites the initial consonant of nouns —except those beginning with d,s,t — as follows:

  1a: feminine singular nouns in common case: e.g. an **bh**ean ('the woman')
  1b: masculine singular nouns in genitive case: e.g. hata an **fh**ir ('the man's hat')
  1c: singular nouns of both genders after the prepositions: (i) den, don, sa; (ii) ag, ar, as, chuig, dar, faoi, ionsar, le, ó, roimh,thar, trí, um (*unless* Rule 12b applies instead): e.g. ar an **ch**rann ('on the tree')

[3] Here, I follow the Christian Brothers' presentation reasonably closely, departing from their presentation in only two respects: each sub-regularity it labelled as a Rule (Rule #1, #2, etc.,); and I provide only one example for each rule. I also ignore listed exceptions to the various rules, except where these form a coherent sub-class. Finally, in this paper, I will ignore the mutation properties of numerals and quantifiers, for which , see Duffield (1995b).

- Rule #2: nouns are lenited after certain prenominal 'possessive adjectives': mo ('my'), do ('your'), a ('his'): e.g. mo **mh**ac ('my son').

- Rule #3: nouns are lenited —irrespective of definiteness, see Rule 1—after certain simple prepositions: ar, de, do, faoi, mar, ó, roimh, tri, um: e.g. Thit sé de **ch**rann ('he fell from a tree').

- Rule #4: indefinite nouns in genitive case are lenited when they modify and follow either:

  4a: feminine singular nouns that are not themselves in the genitive: e.g., aimsir **bh**áistí ('rainy weather'); or
  4b: plural nouns ending in palatalised consonants: e.g. buidéil **bh**ainne ('bottles of milk')

- Rule #5: nouns modifying the head of possessor noun-phrases are lenited, even when they do not appear in genitive case, e.g., leabhar **Th**omáis ('Thomas' book'), hata **mh**ac an **fh**ir ('the man's son's hat')

- Rule #6: nominal and adjectival predicates are lenited following the past and conditional forms of the copular verb is ('to be')

  6a: [nominal] e.g., ba **dh**uine mór é ('he was a big man')
  6b: [adjectival] e.g., ba **dh**eas uait é ('it was nice of you')

- Rule #7: attributive adjectives are lenited when they modify either:

  7a: feminine singular nouns that are not themselves in the genitive: e.g., bean **mh**aith ('a good woman'); or
  7b: plural nouns ending in palatalized consonants: e.g. na fir **mh**óra ('the big men'); or
  7c: masculine singular nouns in genitive case: e.g. ainm an **fh**ir **bh**ig ('the little man's name')

- Rule #8: attributive adjectives are lenited following certain prepositions:

  8a.i: following the (compound) prepositions don, den, sa + a feminine noun (lenition is optional following masculine nouns: e.g., don **bh**ean **bh**eag ('for the little woman')
  8a.ii: following the prepositions ar an, ag an, as an, leis an etc. + a feminine noun (lenition following masculine nouns unless that noun is eclipsed; see below: e.g., as an **ch**oill **mh**ór ('from the big forest')

- Rule #9: the initial consonant of verbs are lenited in the simple past, conditional, and imperfect forms:

  9.a: [simple past] e.g. **bh**ris mé ('I broke')
  b: [imperfect] e.g. **bh**risinn ('I used to break')
  c: [conditional] e.g. **bh**risfinn ('I would break')

- Rule #10: verbs are also lenited after the following clause-initial and pre-verbal particles, variously expressing negation, tense, and mood: ní, níor, gur, nár, má, murar, sular,ar, cár, a [direct relative particle], a [preposed object particle]: e.g., ní **th**uigim ('I do not understand'), dúirt sí gur **th**áinig sé ('she said that he came.'), an fear a **th**ug dom é ('the man that gave it to me'), dícheall a **dh**éanamh ('do one's best').

• Rule #11: in compounds, the initial consonant of the second morpheme (and of any subsequent morpheme in the case of words having more than two parts) is lenited, except where a pair of the letters d,l,n,s,t come together: e.g. ainm**fh**ocal ('a noun') *but* an-daor ('very expensive').

Eclipsis

• Rule #12: determiner elements trigger eclipsis on nouns in two instances:

12a: the genitive plural determiner na eclipses consonant-initial nouns and inserts a nasal before vowel-initial nouns, irrespective of gender: e.g., scoil na g**c**ailíní ('the girls' school'), ceol na **n-é**an (the birds' song);

12b: definite nouns may be eclipsed when they appear as complements of the prepositions ag, ar, as, chuig, dar, faoi, ionsar, le, ó, roimh, thar, trí, um, (*unless* Rule 1c applies instead): e.g. ar an g**c**rann ('on the tree')

• Rule #13: nouns are eclipsed after certain prenominal 'possessive adjectives': ár ('our'), bhur ('your' pl.), a ('their'): e.g., a **d**teach ('their house')

• Rule #14: verbs are eclipsed following certain clause-initial elements, including complementisers, conditional and adverbial markers and (indirect) relative particles: a, an, go, nach, sula: e.g., an **d**tagann sé gach lá ('Does he come every day'), mura **bh**fuil tú sásta ('if you were happy'), an rud a **d**tagann sé dom é ('the thing he gives me').

T-prefixation

• Rule #15: the definite determiner an prefixes t to nouns beginning with s followed by a vowel or l,s,r, as follows:

15a: to feminine singular nouns in common case: e.g., an **ts**rón ('the nose')
15b: to masculine singular nouns in genitive case: e.g. hata an **ts**agairt ('the priest's hat')

• Rule #16: (cf. Rule 1c, 12b) the definite determiner an prefixes t- to masculine singular nouns beginning with a vowel *except* when governed by the following prepositions: ag, ar, as, chuig, dar, faoi, ionsar, le, ó, roimh,thar, trí, um: e.g., an **t-**uisce ('the water') but san uisce ('in the water').

H-prefixation

• Rule #17: the definite determiner na prefixes h- to vowel-initial nouns as follows:

17a: to feminine singular nouns in genitive case: e.g., ainm na **h**áite ('the name of the place')
17b: to common plural nouns (of either gender): e.g., na **h**áiteanna ('the places')

• Rule #18: vowel-initial nouns are prefixed after the feminine singular 'possessive adjective' a: e.g. a **h**aois 'her age'

• Rule #19: H-prefixation is induced by the negative imperative morpheme ná and —on pronouns only— by the negative morpheme ní: e.g., ná **h**imigh uaim ('do not leave me'), ní **h**é ('it is not him') but ní (*h-)amadán é ('he's no fool).

• Rule #20: nouns and adjectives are prefixed following certain prepositions: chomh, le, go: e.g. chomh hard le caisleán ('as tall as a castle'), go hÉirinn ('to Ireland')

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