The distribution of mutations in the Irish DP
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1. Introduction

The Celtic languages are well-known for their processes of "mutation," whereby the initial segment of a word (usually a consonant) undergoes a change in some environment. Based on fieldwork data from Irish, mutations seem to be conditioned by a combination of linear adjacency and syntactic relation. I will refer to these, respectively, as "local" and "extra-local" applications of mutation. This paper will seek to lay out the distributions of mutations within the Determiner Phrase (DP) in Irish, and provide suggestions for how they may be analyzed in terms of the syntax.

2. Mutations

Modern Irish has two mutation processes. Here they will be referred to as "lenition" (L) and "eclipsis" (N).[1] The results of these changes are as follows (Green, 2003: 48):

Irish (C′ stands for a phonemically palatalized C)
[phonemic transcription], ⟨orthographic representation⟩

Radical form	Lenition	Eclipsis
[p, p′] ⟨p⟩	[f, f′] ⟨ph⟩	[b, b′] ⟨bp⟩
[t, t′] ⟨t⟩	[h, h ~ x′] ⟨th⟩	[d, d′] ⟨dt⟩
[k, k′] ⟨c⟩	[x, x′] ⟨ch⟩	[g, g′] ⟨gc⟩
[b, b′] ⟨b⟩	[w ~ v, v′] ⟨bh⟩	[m, m′] ⟨mb⟩
[d, d′] ⟨d⟩	[ɣ, ɣ′ ~ j] ⟨dh⟩	[N, N′] ⟨nd⟩
[g, g′] ⟨g⟩	[ɣ, ɣ′ ~ j] ⟨gh⟩	[ŋ, ŋ′] ⟨ng⟩
[f, f′] ⟨f⟩	∅ ⟨fh⟩	[w~v, v′] ⟨bhf⟩
[s, s′] ⟨s⟩	[h, h ~ x′] ⟨sh⟩	*no change*
[m, m′] ⟨m⟩	[w ~ v, v′] ⟨mh⟩	*no change*
[N, N′] ⟨n⟩	[n, n′] ⟨n⟩	*no change*
[L, L′] ⟨l⟩	[l, l′] ⟨l⟩	*no change*
[r] ⟨r⟩	*no change*	*no change*
vowel	*no change*	[N] or [N′] ⟨n-⟩ + vowel

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[1] See Hannahs (2011) for discussion of terminological issues surrounding mutations.

In my elicitations, I was generally unable to distinguish the fortis sonorants "[N, L]" (≈ IPA [n: , l:]) from normal sonorants, so examples focus on other segments. The exception will be eclipsis of /d/ and initial vowels, whose result is marked as a coronal nasal. I have marked this with [n], although, in most cases, I believe it was indeed the fortis [n:]. I will employ superscript [^{j}] to indicate palatalization, rather than traditional < ′ >.[2] In our speaker's dialect, the lenited version of /g^j/ and /d^j/ is exclusively the palatal glide [j].

In the following sections, most examples will consist of three parts. The first line will provide the Irish orthography. The second will give the phonetic transcription. The third will identify the mutation behavior. Lenition is marked with "L", eclipsis is marked with "N", and no change is marked with "Ø". The mutation cell for the first word in the phrase is left empty, as there is nothing to induce mutation on it. (Certain numerals seem to induce their own lenition. This will be discussed below.) The mutation cells which are relevant for the given discussion will generally be marked in bold.

3. Feminine (singular) lenition

In Irish, the default state of affairs is for adjectives to follow their head nouns. (There are cases where this does not hold, which will be discussed below.) When the head noun is feminine singular, each adjective which follows it bears lenition. This applies to at least two adjectives. No examples of three or more post-nominal adjectives were elicited.

FEMININE SINGULAR NOUNS + ADJECTIVES

(1) a red chair (f. sg.)		*cathaoir*	*dhearg*	
		[kahir]	[jærəg]	
MUTATION:			**L (/d^j/ → [j])**	
(2) the short red chair (f. sg.)	*an*	*chathaoir*	*ghiorrtach*	*dhearg*
	[ʌn]	[xahir]	[jirtʌx]	[jærəg]
MUTATION:		L (/k/ → [x])	**L (/g^j/ → [j])**	**L (/d^j/ → [j])**

It is difficult to tell whether this lenition applies "extra-locally," by which I mean directly from the noun to each respective adjective, or "locally" in a sequential fashion, with the noun inducing lenition on the first adjective, the lenited first adjective leniting the second, etc. I favor

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[2] There are likely to be transcription errors where palatalization was improperly omitted/included. This should not make a significant difference for the questions at hand, as there is no indication that mutation processes are sensitive to the palatality of consonants.

the extra-local analysis, given that it does not appear that, in any other cases, the mutation induction behavior of a word is affected by whether or not it undergoes mutation itself (although it is possible that there are interactions of this sort in the context of numerals, as will be discussed below). This issue will be considered further in the discussion of pre-nominal adjectives.

It is only feminine singular nouns that display this behavior. Masculine singular nouns do not lenite following adjectives, nor do plural nouns of either gender. Therefore, lenition of post-nominal adjectives can be used as a diagnostic for nominal gender.[3]

OTHER NOUNS + ADJECTIVES

(3) the broken pen (m. sg.)	*an*	*peann*		*briste*	
	[ʌn]	[pʲæn]		[brʲɪʃtʌ]	
MUTATION:		Ø		Ø	

(4) the broken black pen (m. sg.)	*an*	*peann*	*dubh*	*briste*
	[ʌn]	[pʲæn]	[dov]	[brʲɪʃtʌ]
MUTATION:		Ø	Ø	Ø

(5) brown dogs (m. pl.)		*madraí*	*donna*
		[mɔdri]	[dʌnʌ]
MUTATION:			Ø

(6) the red chairs (f. pl.)	*na*	*cathaoireacha*	*dearga*
	[nə]	[kahirəxʌ]	[dʲærəgʌ]
MUTATION:		Ø	Ø

These effects directly coincide with the lenition effects of the definite article. The feminine singular definite article < *an* > [ʌn] lenites its head noun (and probably also numerals and pre-nominal adjectives if they are what immediately follows, although the evidence I have here is rather limited). On the other hand, the masculine singular definite article < *an* > [ʌn] (at least when nominative/accusative) and the plural definite article < *na* > [nʌ] do not induce mutation. It is likewise difficult to tell whether this lenition process applies locally (and transitively) or extra-locally, since post-nominal adjectives would independently be lenited by the feminine noun.

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[3] These were confirmed by pronoun reference, in which gender distinctions are made in the 3rd singular, in paired carrier sentences of the shape "I VERB'ed the NOUN. **It** was ADJECTIVE." Lenition always coincided with use of the feminine pronoun < *si* > [ʃi].

<u>DEFINITE ARTICLE + NOUN</u>

(7) the short chair (f .sg.)	*an*	*chathaoir*	*ghiorrtach*
	[ʌn]	[xahir]	[jirtʌx]
MUTATION:		**L (/k/ → [x])**	L (/gʲ/ → [j])

versus

(8) the dog (m. sg.)	*an*	*mad(r)a*[4]
	[ʌn]	[madʌ]
MUTATION:		**Ø**

(9) the dogs (m. pl.)	*na*	*madraí*
	[nʌ]	[mɔdri]
MUTATION:		**Ø**

(10) the red chairs (f. pl.)	*na*	*cathaoireacha dearga*	
	[nə]	[kahirəxʌ]	[dʲærəgʌ]
MUTATION:		**Ø**	**Ø**

It seems likely that the plural is not marked for gender, under any context. In addition to this identical behavior with the nouns and article, there are no gender distinctions in the plural pronouns or subject-verb agreement. Therefore, it is likely that lenition is induced by some sort of agreement operation for the feature FEMININE, in all cases where that feature occurs.

The exception to the "FEMININE induces lenition" rule is the 3rd sing. feminine possessive pronoun < *a* > [æ], which does not induce lenition. This contrasts with the other singular possessive pronouns, which all *do* induce lenition. This could be some sort of "anti-homophony" condition with the 3rd sing. masculine possessive pronoun < *a* > [æ], which is phonetically identical. If it were to induce the same mutation behavior as well, there would be complete ambiguity. This solution might add credence to the view that mutation induction behavior is part of the lexical representation (Hamp, 1951, *et seq*.),[5] as it is difficult to conceive of how to apply anti-homophony over non-uniform syntactic phrases.

Another approach might be to appeal to an arbitrary switch in the marked feature value with which agreement takes place. This feature could not simply be MASCULINE, since the

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[4] Our speaker indicated that the < r > [r] in the singular for 'dog' is not pronounced in her dialect, but is retained in the standard language.

[5] See Hannahs (2011) for a survey of these approaches.

equivalent mutation induction behavior is found on the 1st and 2nd singular possessive pronouns, which are not marked for gender distinctions. The other option would be SINGULAR. This would be appealing in light of the behavior of the plural possessive pronouns, which all induce eclipsis. Such a story, however, would seem to require the 3rd singular feminine possessive pronoun to not be marked for SINGULAR, for which I do not see any other evidence.

Alternatively, we might just say that this is not really the same sort of FEMININE feature, or it is not in a position where it can enter into an agreement relationship. Whatever the case may be, the account must include an answer for why the 3rd singular feminine possessive pronoun patterns differently from all the other possessive pronouns. Maybe it is the case that there is indeed agreement for FEMININE, and that the mutation associated with that particular agreement relationship just happens to be NO CHANGE, which might itself be thought of as a "mutation" of sorts, under the view that it is a purely arbitrary relationship to begin with. If we do see NO CHANGE as a mutation, then the fact that the mutation induced is not lenition might suggest that it is a different sort of FEMININE feature than the one in the noun.

4. Lenition by non-feminine singular possessive pronouns

As just alluded to, the non-feminine singular possessive pronouns (i.e. 1st sing., 2nd sing., and 3rd sing. masculine) all induce lenition on the immediately following element. There is no clear evidence for extra-local application (although there is some ambiguous evidence in numeral contexts). This lenition can never cross over a noun to affect post-nominal adjectives. There are no environments where local application of this lenition is impeded.

SINGULAR POSSESSIVE PRONOUNS

(11) his short red chair (f. sg.)	a		chathaoir	ghiorrtach	dhearg
	[æ]		[xahir]	[jirtʌx]	[jærəg]
MUTATION:			**L (/k/ → [x])**	L (/gʲ/ → [j])	L (/dʲ/ → [j])
(12) his old short red chair (f. sg.)	a	shean-	chathaoir	ghiorrtach	dhearg
	[æ]	[hʲan]	[xahir]	[jirtʌx]	[jærəg]
MUTATION:		**L (ʃ → hʲ)**	L (/k/ → [x])	L (/gʲ/ → [j])	L (/dʲ/ → [j])
(13) his black pen (m. sg.)	a		pheann	dubh	
	[æ]		[fʲæn]	[dov]	
MUTATION:			**L (/pʲ/ → [fʲ])**	Ø	

(14) his old broken pen (m. sg.)	*a*	*shean-*	*pheann*	*briste*
	[æ]	[hʲan]	[fʲæn]	[brʲɪʃtʌ]
MUTATION:		**L (ʃ → hʲ)**	L (/pʲ/ → [fʲ])	Ø
(15) his seven long bridges (m. pl.)	*a*	*sheacht*	*ndroichead*	*fhada*
	[æ]	[hʲaxt]	[nroxʲəd]	[adə]
MUTATION:		**L (ʃ → hʲ)**	N (/d/ → [n])	L (/f/ → Ø)

If we were to pursue an agreement-based account, as suggested for the feminine noun to adjective relationship, the most likely feature here is SINGULAR. We would still have to account for the differential behavior of the 3rd singular feminine possessive pronoun, which, as discussed above, does not induce this lenition. But we could well assume that, whatever the right solution for the 3rd singular feminine, that mechanism bleeds SINGULAR agreement, and it does actually apply in all these cases.

Given the apparently local behavior of this mutation, though, we might instead consider a less sophisticated analysis, in which it is just linear adjacency that controls the lenition. This could be localized in the morphology-phonology interface level of the grammar, and might work best by assuming that there is a SINGULAR POSSESSIVE morpheme whose underlying form is essentially /LENITION/, or that the constraints referencing this morpheme interact to yield surface lenition. The equivalent move would be made for the plural possessives in order to generate eclipsis; however, this would have to be significantly more complicated, because there is clear evidence for extra-local application. Again, the 3rd singular feminine possessive would need additional consideration.

5. Eclipsis by plural possessive pronouns

As mentioned already, the plural possessive pronouns each induce eclipsis. In large part this behavior mirrors that of the lenition from the singular possessives, but it does have some effects which are, at least at first glance, different in their scope. Just as with the singulars' lenition, the plurals' eclipsis always occurs when the pronoun immediately precedes the noun, and it never affects a post-nominal adjective.

(16) their bridge (m. sg.)	*a*	*ndroichead*		
	[æ]	[nrox^{j}əd]		
MUTATION:		**N (/d/ → /n/)**		
(17) their short red chair (f. sg.)	*a*	*gcathaoir*	*ghiorrtach*	*dhearg*
	[æ]	[gahir]	[jirtʌx]	[jærəg]
MUTATION:		**N (/k/ → [g])**	L (/g^j/ → [j])	L (/d^j/ → [j])

Unlike singular possessive lenition, there is clear evidence that plural possessive eclipsis can apply "extra-locally." This can be seen when a single adjective or numeral intervenes between pronoun and noun. In such cases, both adjective and noun display eclipsis. Underlying /s, ʃ/ do not have an eclipsed variant, so words beginning with those segments, such as < *sean* > /ʃan/ 'old', will surface as if there were no change in eclipsis environments.[6] There does not appear to be any effect of *surface change* vs. *no surface change* on the application of mutation to subsequent words in these extra-local circumstances.

PLURAL POSSESSIVE + INTERVENER + NOUN

(18) their old short red chair (f. sg.)	*a*	*sean-*	*gcathaoir*	*ghiorrtach*	*dhearg*
	[æ]	[ʃan]	[gahir]	[jirtʌx]	[jærəg]
MUTATION:		**N (/ʃ/ → [ʃ])**	**N (/k/ → [g])**	L (/g^j/ → [j])	L (/d^j/ → [j])
(19) their bad black pen (m. sg.)	*a*	*ndroch-*	*bpeann*	*dubh*	
	[æ]	[nrox]	[b^{j}æn]	[dov]	
MUTATION:		**N (/d/ → [n])**	**N (/p^j/ → [b^j])**	Ø	
(20) their old broken black pen (m. sg.)	*a*	*sean-*	*bpeann*	*briste*	*dubh*
	[æ]	[ʃan]	[b^{j}æn]	[br^{j}ɪʃtʌ]	[dov]
MUTATION:		**N (/ʃ/ → [ʃ])**	**N (/p^j/ → [b^j])**	Ø	Ø
(21) their five long bridges (m. "pl."[7])	*a*	*gcúig*	*ndroichead*	*fada*	
	[æ]	[gu.ig]	[nrox^{j}əd]	[fadə]	
MUTATION:		**N (/k/ → [g])**	**N (/d/ → /n/)**	Ø	
(22) their bad young boys (m. pl.)	*a*	*ndroch-*	*mbuachaillí*		
	[æ]	[nrox]	[mʊxəl^{j}i]		
MUTATION:		**N (/d/ → [n])**	**N (/b/ → [m])**		

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[6] I will mark such forms as eclipted, but be aware that this is basically a theory-internal construct.
[7] Nouns modified by numerals other than '1' and '2' take singular agreement/allomorphy. This will be outlined below.

It is clear that this is extra-local application because the pre-nominal adjectives < *sean* > /ʃan/ 'old'and < *droch* > /drox/ 'bad', and the numeral < *cúig* > /ku.ig/ 'five' do not themselves normally induce eclipsis, as will be shown below. The eclipsis on the noun must be coming "extra-locally" from the plural possessive pronoun. It is again hypothetically possible to view this as transitive/sequential local application. But, unlike the case of the post-nominal adjectives under feminine agreement, the interveners have their own inherent mutation induction properties. In order for it to apply transitively, those properties would have to be overwritten and then (re-)applied to the following element.

It seems more likely that the eclipsis surfacing on both elements comes directly from the possessive pronoun. However, it may still be local in some real sense, if we consider prosodic domains, as it is quite possible that these intervening elements are forming a single prosodic phrase with the noun, in the sense of Elfner (2012). This will not be pursued further in this paper, but will likely be a fruitful avenue for future solutions.

Eclipsis of this sort appears also to spread across two interveners – either two *pre-nominal adjectives*, or a *numeral* + a *pre-nominal adjective*. The prenominal adjectives, and some of the numerals, would normally induce lenition on whatever immediately follows. This is being overridden by the eclipsis from the plural possessive pronoun.

PLURAL POSSESSIVE + TWO INTERVENERS + NOUN

(23)	their five old long red bridges (m. pl.)	*a* [æ]	*gcúig* [gu.ig]	*sean-* [ʃan]	*ndroichead* [nroxʲəd]	*fhada* [adə]	*dhearga* [jærəgʌ]
	MUTATION:		N (/k/ → [g])	N (/ʃ/ → [ʃ])	N (/d/ → /n/)	L (/f/ → Ø)	L (/dʲ/ → [j])
(24)	their five bad red bridges (m. pl.)	*a* [æ]	*gcúig* [gu.ig]	*ndroch-* [nrox]	*ndroichead* [nroxʲəd]	*dhearga* [jærəgʌ]	
	MUTATION:		N (/k/ → [g])	N (/d/ → [n])	N (/d/ → /n/)	L (/dʲ/ → [j])	
(25)	their five old big white bones (f. pl.)	*a* [æ]	*gcúig* [gu.ig]	*sean-* [ʃan]	*gcnámh* [gnɔv]	*mhóra* [wɔrə]	*bhána* [wɔnə]
	MUTATION:		N (/k/ → [g])	N (/ʃ/ → [ʃ])	N (/k/ → [g])	L (/m/ → [w])	L (/b/ → [w])
(26)	their good, new, minor change (m. sg.)	*a* [æ]	*ndea-* [nʲɔ:]	*mion-* [mʲɪn]	*n-athrú* [naru]	*nua* [nu]	
	MUTATION:		N (/dʲ/→[nʲ])	N(?)[8]	N (Ø → [n])	Ø	

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[8] /m/ does not have an eclipted variant.

(27) their good, new, minor changes (m. pl.)	*a*	*ndea-*	*mion-*	*n-athruithe*	*nua*
	[æ]	[nʲɔ:]	[mʲɪn]	[arihʲɛ]	[nu]
MUTATION:		**N (/dʲ/→[nʲ]) N(?)**		**N (Ø → [n])**	**Ø**

6. Lenition by pre-nominal adjectives

As we have in the previous examples, there is a small set of adjectives which can appear before the noun, including: < *sean* > /ʃan/ 'old', < *droch* > /drox/ 'bad', < *ndea* > [dʲɔ:] 'good', and < *mion* > [mʲɪn] 'minor', and maybe some others. This set in part overlaps with the adjectives that can appear pre-nominally in Romance. These adjectives always induce lenition on the following item, except in certain cases where this is overridden by extra-local eclipsis (for example, in those phrases listed immediately above in (24-27)). In most cases, the following element will be the noun it modifies; but these adjectives can be stacked, in which case the first will induce lenition on the second (and the second will induce lenition on the noun). As with the possessive pronouns, this lenition does not extend past the noun to affect post-nominal adjectives.

LENITION BY PRE-NOMINAL ADJECTIVES

(28) the old brown dog (m. sg.)	*an*	*sean-*	*mhada*	*donn*
	[ʌn]	[ʃan]	[wadʌ]	[dʌn]
MUTATION:		Ø	**L (/m/ → [w])**	Ø
(29) the old brown dogs (m. pl)	*na*	*sean-*	*mhadraí*	*donna*
	[nʌ]	[ʃan]	[wɔdri]	[dʌnʌ]
MUTATION:		Ø	**L (/m/ → [w])**	Ø
(30) the bad young boy (m. sg)	*an*	*droch*	*bhuachaill*	*og*
	[ʌn]	[drɔx]	[wʊxəlʲ]	[og]
MUTATION:		Ø	**L (/b/ → [w])**	Ø?
(31) the good friend (m. sg)	*an*	*dea-*	*chara*	
	[ʌn]	[dʲɔ:]	[xarʌ]	
MUTATION:		Ø	**L (/k/ → [x])**	
(32) the old chair (f. sg)	*an*	*tsean-*[9]	*chathaoir*	
	[ʌn]	[t-an]	[xahir]	
MUTATION:		L (/ʃ/ → Ø)	**L (/k/ → [x])**	

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[9] When a vowel-initial word, whether underlyingly so or as the result of feminine-article lenition, follows the article, the article displays a sandhi variant: [ʌnt] in the singular, [nʌh] in the plural. The sandhi segment is written orthographically with the following word, rather than the article.

(33) the good, minor change (m. sg.)	*an*	*dea-*	*mhion-*	*athru*
	[ʌn]	[dʲɔ:]	[vɪn]	[aru]
MUTATION:		Ø	**L (/mʲ/ → [v])**	**L? (/#a/ → [#a])**

(34) the good, minor changes (m. pl)	*na*	*dea-*	*mhion-*	*athruithe*
	[nʌ]	[dʲɔ:]	[vɪn]	[arihʲɛ]
MUTATION:		Ø	**L (/mʲ/ → [v])**	**L? (/#a/ → [#a])**

(35) his good, old friend (m. sg.)	*a*	*dhea-*	*shean-*	*chara*
	[æ]	[dʲɔ:]	[han]	[xarʌ]
MUTATION:		L (/dʲ/ → [j])	**L (/ʃ/ → [h])**	**L (/k/ → [x])**

(36) his good, old friends (m. pl.)	*a*	*dhea-*	*shean-*	*chairde*
	[æ]	[dʲɔ:]	[han]	[xɔ:rdʲɛ]
MUTATION:		L (/dʲ/ → [j])	**L (/ʃ/ → [h])**	**L (/k/ → [x])**

7. Numerals

Of all the things that induce mutations within the determiner phrase, the numerals are the most complicated. This section will present some generalizations that can be obtained from the data. As yet there seem to be no obvious explanations for many of the distinctions. The last portion of data to be presented remains utterly recalcitrant, and practically defies generalization, let alone explanation.

What can be said most clearly is that all numerals '1-10' induce mutation on an immediately following noun, or indeed any immediately following element: '1-6' cause lenition, whereas '7-10' cause eclipsis.[10] As with pre-nominal adjective mutation, this can be overridden in certain contexts by preceding mutators.

LENITING NUMERALS

(37) *(the) one horse[11]	*an t'aon chapall* (L)
	[ʌn t-e:n xapəl]
(38) two horses	*dhá chapall* (L)
	[ɣɔ: xapəl]
(39) three horses	*trí chapall* (L)
	[tʲrʲi xapəl]
(40) four horses	*cheithre chapall* (L)
	[xʲɛɾɛ xapəl]

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[10] I have not yet attempted to get data on numerals higher than 10.

[11] To say the indefinite 'one horse', the numeral is not used. Instead it is < *capall amhoin* > [kapəl əwɔn].

(41)	five horses	*chúig chapall* (L)
		[xuig xapəl]
(42)	six horses	*sé chapall* (L)
		[ʃe xapəl]

<u>ECLIPTING NUMERALS</u>

(43)	seven horses	*seacht gcapall* (N)
		[ʃaxt gapəl]
(44)	eight horses	*ocht gcapall* (N)
		[ɔxt gapəl]
(45)	nine horses	*ni gcapall* (N)
		[ni gapəl]
(46)	ten horses	*deich gcapall* (N)
		[dʲɛx gapəl]

There could be another correlation hidden here. '2' < *dhá* > [ɣɔ:], '4' < *cheithre* > [xʲɛɾɛ], and '5' < *chúig* > [xuig] each lenite on their own (in certain contexts). '1' would not be able to show lenition, since it is vowel initial, and it is unclear if initial /tr/ sequences undergo lenition. If so, '6' < *sé* > [ʃe] would be the only one of the leniting numerals which unambiguously does not lenite itself – i.e. it is not *[h⁽ʲ⁾e]. '7-10' on the other hand show no evidence of this sort of lenition. It would be visible on '7' and '10'. (It could be the case that '6' is analogically patterning with '7'.) If this correlation is significant and not an idiosyncratic accident, it might be the case that whatever is inducing lenition on these numerals is the same thing inducing lenition on the noun.

The numerals appear to be the only pre-nominal element that can induce mutation on post-nominal adjectives. '3-8' always lenite post-nominal adjectives.

<u>NUMERALS: 3-8 always lenite post-nominal adjectives</u>

(47) the three good brown horses	*na trí chapall mhaitha dhonn*
	[nə tʲɾʲi xapəl (L) waha (L) ɣɔn (L)]
(48) the four good brown horses	*na cheithre chapall mhaitha dhonn*
	[nə xʲɛɾɛ xapəl (L) waha (L) ɣaʊn (L)]
(49) the five good brown horses	*na chúig chapall mhaitha dhonn*
	[nə xuig xapəl (L) waha (L) ɣaʊn (L)]
(50) the six good brown horses	*na sé chapall mhaitha dhonn*
	[nə ʃe xapəl (L) waha (L) ɣaʊn (L)]

(51) the seven good brown horses	*na seacht* *gcapall* *mhaitha* *dhonn* [nə ʃaxt gapəl (N) waha (L) ɣaʊn (L)]
(52) the eight good brown horses	*na ocht* *gcapall* *mhaitha* *dhonn* [nə ɔxt gapəl (N) waha (L) ɣaʊn (L)]

'9-10' seem to *optionally/variably* lenite post-nominal adjectives. There do not seem to be any clear patterns. There may be some interaction between definite marking and/or overt plural agreement and lenition, but the data is not systematic enough to draw any clear conclusions here. Furthermore, the judgments for these forms (particularly those with multiple adjectives) were generally more difficult than many of the others involving numerals. It would be useful to check these judgments with other speakers.

NUMERALS: '9' & '10' sometimes lenite post-nominal adjectives

(53) nine good horses	*naoi gcapall* *maith* [ni gapəl (N) ma: (Ø)]
(54) nine brown horses	*naoi gcapall* *donn(a)* [ni gapəl (N) dɔn(ʌ) (Ø)]
(55) the nine brown horses	*na naoi gcapall* *donna* [nə ni gapəl (N) dɔnʌ (Ø)]
(56) the ten brown horses	*na deich gcapall* *donna* [nə dʲɛx gapəl (N) dɔnʌ (Ø)]
(57) the nine good brown horses	*na naoi gcapall* *mhaitha* *dhonn* [nə ni gapəl (N) waha (L) ɣaʊn (L)]
(58) the ten good brown horses	*na deich gcapall* *mhaitha* *dhonn* [nə dʲɛx gapəl (N) waha (L) ɣaʊn (L)]
(59) nine old brown horses	*naoi sean- chapall donna* / **dhonna* [ni ʃan (N) xapəl (L) dɔnʌ (Ø) / *ɣɔnʌ (*L)]
(60) the nine bad lame brown horses	*na naoi ndroch- chapall* *b(h)acach* *d(*h)onn* [nə ni nrɔx (N) xapəl (L) (b/w)akax (Ø/L) (d/*ɣ)aʊn (Ø/*L)]

'1' & '2' seem not to lenite adjectives, although there is lenition of a single adjective by '2': (63). Interestingly, this is the only example which has taken plural agreement on the adjective, which is usually not seen with '2' – it normally acts as if it is singular for the purposes of number agreement.

<u>NUMERALS</u>: '1' & '2' (usually) don't lenite post-nominal adjectives

(61) the one good horse	*an t'aon*	*chapall*	*maith*	
	[ʌn.t eːn	xapəl (L)	maː (Ø)]	
(62) the one good brown horse	*an t'aon*	*chapall*	*maith*	*donn*
	[ʌn.t eːn	xapəl (L)	ma (Ø)	daʊn (Ø)]
(63) the two brown horses	*an dá*	*chapall*	*donn*	
	[ʌn dɔː	xapəl (L)	daʊn (Ø)]	
(64) the two good brown horses	*an dá*	*chapall*	*maith*	*donn*
	[ʌn dɔː	xapəl (L)	ma (Ø)	daʊn (Ø)]
(65) **the two good horses**	***an dá***	***chapall***	***mhaitha***	
	[ʌn dɔː	**xapəl (L)**	**waha (L)]**	

The distinction between the behavior of '1-2' – (usually) no lenition – and '3-10' – lenition, maybe optionally for '9-10' – implies that the lenition may be due to some sort of number agreement. *Nouns embedded under numerals always take their singular form.* It thus appears as though number agreement with the noun is somehow by-passed. This can be rescued when there are post-nominal adjectives, which can inflect for number. As just mentioned, '2' normally does not take plural agreement on its adjectives. This appears to correlate with the lack of lenition on those same adjectives. We can thus surmise that this lenition is some avatar of plural agreement, in very much the same vein as lenition was the mark of feminine singular agreement between noun and (post-nominal) adjective. Further evidence for this notion will come from the mutation behavior of certain numeral contexts when no adjectives follow the noun, to be discussed below.

There is conflicting evidence for whether or not, and to what extent, '7-10' numeral eclipsis can apply extra-locally across pre-nominal adjectives. The majority of examples indicate that it cannot: eclipsis applies locally to the pre-nominal adjective, but lenition (presumably that which regularly comes from the pre-nominal adjective) surfaces on the noun.

<u>STRICTLY LOCAL NUMERAL ECLIPSIS</u>

(66) nine old horses	*naoi*	*sean-*	*chapall*		
	[ni	**ʃan (N)**	**xapəl (L)**]		
(67) ten old horses	*deich*	*sean-*	*chapall*		
	[dʲɛx	**ʃan (N)**	**xapəl (L)**]		
(68) nine old brown horses	*naoi*	*sean-*	***chapall*** *donna*	*/ *dhonna*	
	[ni	**ʃan (N)**	**xapəl (L)** dɔnʌ (Ø)	/ *ɣɔnʌ (*L)]	
(69) seven big old white bones	*seacht*	*sean-*	***chnámh*** *mhór*	*bhána*	
	[ʃaxt	**ʃan (N)**	**xnɔv (L)** wɔr (L)	wɔnʌ (L)]	

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(70) the seven good (white) horses	*na seacht* **ndea-** **chapall**[12] (*bhana*)
	[nə ʃaxt **nʲɔː (N)** **xapəl (L)** (wɔːna (L))]
(71) the nine good old brown horses	*na naoi* **sean-** **chapall** *mhaitha dhonn*
	[nə ni **ʃan (N)** **xapəl (L)** waha (L) ɣaʊn (L)]
(72) the nine bad lame white horses	*na naoi* **ndroch-** **chapall** *bhacach bhán*
	[nə ni **nrox (N)** **xapəl (L)** wakax (L) wɔn (L)]

I also have one example with two pre-nominal adjectives that works in the same way.

(73) seven bad old horses	*seacht* **ndroch**- **shean-** *chapall*
	[ʃaxt **nrɔx (N) han (L)** xapəl (L)]

There are, however, a handful of examples where eclipsis does indeed surface on the noun, indicating extra-local application.

EXTRA-LOCAL NUMERAL ECLIPSIS

(74) seven bad (white) horses	*seacht* **ndroch-** **gcapall** (*bhána*)
	[ʃaxt **nrox (N)** **gapəl (N)** (wɔːnʌ (L))]
(75) nine good brown horses	*naoi* **ndea-** **gcapall** *donn*
	[ni **nʲɔː (N)** **gapəl (N)** dʌn (Ø)]

I see no obvious conditioning factors for this distinction.

There is conflicting data for the mutation pattern when a possessive pronoun precedes a numeral. The following will be annotated for the normal behavior of each pre-nominal element.

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[12] I think the eclipsed version < *gcapall* > [gapəl] was reported here as degraded but not ungrammatical.

POSSESSIVE + NUMERAL + NOUN

(I)   Eclipting Possessive (→N) + Eclipting Numeral (→N) + Noun = N, N

(76) their eight long bridges	*a*	*n-ocht*	*ndroichead*[13]	*fhada*
	[æ]	[nɔxt]	[nroxʲəd]	[adʌ]
MUTATION:		**N (/V/ → [nV])**	**N (/d/ → [n])**	L (/f/ → Ø)

(77) their seven long bridges	*a*	*seacht*	*ndroichead*	*fhada*
	[æ]	[ʃaxt]	[nroxʲəd]	[adʌ]
MUTATION:		**N (/ʃ/ → [ʃ])**	**N (/d/ → [n])**	L (/f/ → Ø)

(II)   Eclipting Possessive (→N) + Leniting Numeral (→L) + Noun = N, N

(78) their five bad red bridges	*a*	*gcúig*	*ndroichead*	*dhearga*
	[æ]	[gu.ig]	[nroxʲəd]	[jærəgʌ]
MUTATION:		**N (/k/ → [g])**	**N (/d/ → [n])**	L (/dʲ/ → [j])

(79) their five bridges	*a*	*gcúig*	*ndroichead*
	[æ]	[gu.ig]	[nroxʲəd]
MUTATION:		**N (/k/ → [g])**	**N (/d/ → [n])**

(III)   Leniting Possessive (→L) + Eclipting Numeral (→N) + Noun = L, N

(80) his seven long bridges	*a*	*sheacht*	*ndroichead*	*fhada*
	[æ]	[haxt]	[nroxʲəd]	[adʌ]
MUTATION:		**L (/ʃ/ → [h])**	**N (/d/ → [n])**	L (/f/ → Ø)

(81) his seven long red bridges	*a*	*sheacht*	*ndroichead*	*fhada*	*dhearga*
	[æ]	[haxt]	[nroxʲəd]	[adʌ]	[jærəgʌ]
MUTATION:		**L (/ʃ/ → [h])**	**N (/d/ → [n])**	L (/f/ → Ø)	L (/dʲ/ → [j])

In each case, the possessive applies its expected mutation to the numeral. The mutation behavior of the noun, however, is somewhat more complicated. Each case displays eclipsis. This shows that the mutations cannot simply be determined in a step-wise fashion. If so, pattern (II), where the numeral normally induces lenition, the noun should show lenition. We saw earlier (in §5), that eclipsis from the plural possessive pronouns can apply extra-locally. It can eclipt the noun and up to at least two intervening pre-nominal adjectives. This seems to indicate that there is some impetus to apply eclipsis all the way until the noun. In this context, it comes into conflict not with a leniting pre-nominal adjective but with a leniting numeral. In these cases, where lenition and eclipsis are vying for the same position, it appears that eclipsis wins out, just as

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[13] The lenited form < *dhroichead* > [ɣroxʲəd] was explicitly rejected here.

eclipsis won out over pre-nominal adjective lenition. But a general "eclipsis beats lenition" statement will not work once we add a pre-nominal adjective back into the mix.

First, though, in that context, we need to address another unexpected dichotomy. In a DP with the sequence ECLIPTING POSSESSIVE + ECLIPTING NUMERAL + PRE-NOMINAL ADJECTIVE + NOUN, it can sometimes be the case that the noun surfaces with lenition!

(I) ECLIPTING POSS (→N) + ECLIPTING NUM (→N) + ADJ + NOUN WITH ADJECTIVE(S) = N, N, ***N***

(82) their eight old red bridges	*a* [æ]	*n-ocht* [nɔxt]	*sean-* [ʃan]	***ndroichead*** **[nroxʲəd]**	*dhearga* [jærəgʌ]	
MUTATION:		N (Ø → [n])	N (/ʃ/ → [ʃ])	**N (/d/ → [n])**	L (/dʲ/ → [j])	
(83) their eight old big white bones	*a* [æ]	*n-ocht* [nɔxt]	*sean-* [ʃan]	***gcnámh*** **[gnɔv]**	*mhóra* [wɔrə]	*bhána* [wɔnə]
MUTATION:		N (Ø → [n])	N (/ʃ/ → [ʃ])	**N (/k/ → [g])**	L (/m/ → [w])	L (/b/ → [w])

(II) ECLIPTING POSS (→N) + ECLIPTING NUM (→N) + ADJ + NOUN W/O ADJECTIVE(S) = N, N, ***L***

(84) their eight old bridges	*a* [æ]	*n-ocht* [nɔxt]	*sean-* [ʃan]	***dhroichead*** **[ɣroxʲəd]**
MUTATION:		N (Ø → [n])	N (/ʃ/ → [ʃ])	**L (/d/ → [ɣ])**
(85) their eight bad bridges	*a* [æ]	*n-ocht* [nɔxt]	*ndroch-* [nrox]	***dhroichead***[14] **[ɣroxʲəd]**
MUTATION:		N (Ø → [n])	N (/d/ → [n])	**L (/d/ → [ɣ])**
(86) their eight old bones	*a* [æ]	*n-ocht* [nɔxt]	*sean-* [ʃan]	***chnámh*** **[xnɔv]**
MUTATION:		N (Ø → [n])	N (/ʃ/ → [ʃ])	**L (/k/ → [x])**

Despite there being no element that induces local lenition (other than the pre-nominal adjective, which in all other cases exerts no influence under conflict), lenition appears on the noun in pattern (II). The nouns eclipts in pattern (I), as is probably more expected. The reason for this distinction must be the non-local lenition induced by the numerals, as described earlier in this section. This cross-cut the *leniting vs. eclipting* numeral division, and thus is probably more central to the grammar – it is not an arbitrary property (although its seeming optionality with '9' and '10' slightly diminishes the weight of that statement). It was suggested that this sort of lenition results from number agreement which is otherwise blocked. If this agreement pattern

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[14] The eclipsed version < *ndroichead* > [nroxʲəd] was explicitly rejected here.

takes precedence over extra-local application of eclipsis, possibly only when local application has already successfully taken place, then this dichotomy is explained.

In pattern (I), plural-agreement-lenition can surface on the adjectives, freeing the noun to receive the extra-local eclipsis from the possessive and/or the numeral. On the other hand, in pattern (II), there is no adjective to bear plural-agreement-lenition, so it must surface on the noun. This takes priority over extra-local eclipsis. This will not precisely capture the data presented earlier the distribution of local vs. extra-local numeral eclipsis (especially (79) *a gcúig ndroichead* [æ gu.ig nrox^{j}əd]); however, there may be certain confounds not being properly controlled for, which, once understood, will interact with this suggestion in such a way to make more sense of that data, which, even prior to this, was not fully explained. Given the apparent success of this assertion for streamlining the POSSESSIVE + NUMERAL + PRE-NOMINAL ADJECTIVE data, though, I will adopt it.

Once we control for having at least one post-nominal adjective, the data can be broken down into the same three categories as before, based on underlying mutation induction behavior of the possessive pronoun and of the numeral. Again, ECLIPTING POSSESSIVE + LENITING NUMERAL patterns with ECLIPTING POSSESSIVE + ECLIPTING NUMERAL, in contradistinction to LENITING POSSESSIVE + ECLIPTING NUMERAL.

POSSESSIVE + NUMERAL + ADJECTIVE + NOUN

(I)	**ECLIPTING POSS (→N) + ECLIPTING NUM (→N) + ADJ + NOUN = N, N, N**				

(87) their eight old red bridges	*a* [æ]	*n-ocht* [nɔxt]	*sean-* [ʃan]	*ndroichead* [nroxʲəd]	*dhearga* [jærəgʌ]	
MUTATION:		**N (Ø → [n])**	**N (/ʃ/ → [ʃ])**	**N (/d/ → [n])**	L (/dʲ/ → [j])	

(88) their eight old big white bones	*a* [æ]	*n-ocht* [nɔxt]	*sean-* [ʃan]	*gcnámh* [gnɔv]	*mhóra* [wɔrə]	*bhána* [wɔnə]
MUTATION:		**N (Ø → [n])**	**N (/ʃ/ → [ʃ])**	**N (/k/ → [g])**	L (/m/ → [w])	L (/b/ → [w])

(II)	**ECLIPTING POSS (→N) + LENITING NUM (→L) + ADJ + NOUN = N, N, N**				

(89) their five old (long red) bridges	*a* [æ]	*gcúig* [gu.ig]	*sean-* [ʃan]	*ndroichead* [nroxʲəd]	*(fhada* [adʌ]	*dhearga)* [jærəgʌ]
MUTATION:		**N (/k/ → [g])**	**N (/ʃ/ → [ʃ])**	**N (/d/ → [n])**	L (/f/ → Ø)	L (/dʲ/ → [j])

(III)	**LENITING POSS (→L) + ECLIPTING NUM (→N) + ADJ + NOUN = L, L, L**				

(90) his seven old long red bridges	*a* [æ]	*sheacht* [haxt]	*shean, *sean* [han], *[ʃan]	*dhroichead* [ɣroxʲəd]	*(fhada* [adʌ]	*dhearga)* [jærəgʌ]
MUTATION:		**L (/ʃ/ → [h])**	**L (/ʃ/ → [h])**	**L (/d/ → [ɣ])**	L (/f/ → Ø)	L (/dʲ/ → [j])

Whereas without the pre-nominal adjective there was always eclipsis on the noun, even when lenition was placed on the numeral by the possessive, now the L + N sequence (pattern III) shows lenition completely overriding eclipsis. I suspect that some or all of these differences arise due to factors relating prosodic constituency, but how exactly that works out, I don't yet know.

8. Conclusion

In this paper, I have sought to lay out the various patterns of mutation that are displayed within the Determiner Phrase in Irish. There are numerous elements which lead to mutation:

(91) Mutators:
   a. Feminine (agreement) – lenition
   b. Singular possessive pronouns – lenition
   c. Plural possessive pronouns – eclipsis
   d. Pre-nominal adjectives – lenition
   e. Numerals – various patterns

These interact in very complex ways. Often, the more complex of these interactions are only sparsely exemplified. It would be quite useful to obtain more data, and check the current data with additional speakers. Assuming the correctness of the data, it seems likely that the various patterns arise from interactions between syntax (specifically agreement operations) and considerations of prosodic phrasing.

9. References

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