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Initial Consonant Mutation in Modern Irish: A Synchronic and Diachronic Analysis

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INITIAL CONSONANT MUTATION IN MODERN IRISH: A SYNCHRONIC AND DIACHRONIC ANALYSIS

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ABSTRACT

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by Janine F. Robinson

This thesis presents an overview of the process of initial consonant mutation in Modern Irish. Initial consonant mutation is most simply described as a phonetic change in the initial consonant of a word triggered by a closed set of morphosyntactic environments. These triggers and environments are varied and difficult to generalize. Many attempts at classification have utilized current theories of phonology, morphology, and syntax to describe and explain the synchronic process, with the original motivation being a purely phonological environment that existed in earlier stages of the language. By examining the original mutation environments in comparison to the corresponding forms in Modern Irish, a possible motivation for synchronic mutation behavior is found. It is suggested that mutation in Modern Irish often serves to maintain various semantic contrasts where the phonological environment has disappeared. In examples where a clear contrast is not maintained, mutation may still provide important semantic clues in the constructions in which it appears. Current theories of cognitive linguistics are employed to attempt to motivate the consistency and predictability of the process in terms of template matching.

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1. Introduction and Hypothesis

Initial consonant mutation in Modern Irish has been the focus of many attempts at classification. Initial consonant mutation (ICM) is a phonetic change in the initial consonant of a word, based on its syntactic environment. These syntactic "triggers" (a closed set of pronouns, articles, nouns in certain cases, and others) are often described by listing, since they do not lend themselves to categorization except for the type of mutation that they cause. Many accounts have utilized current theories of phonology, syntax, and morphology to explain a very complex system of morphosyntactically triggered phonological variations. While these accounts do describe mutation environments, they do not provide any motivation for the complex mechanisms they propose. While many current arguments do take into account historical data that make the diachronic origins clearly accessible, I argue that historical forms together with the maintenance of important contrasts may enhance our understanding of the synchronic pattern of grammaticalized mutations we see today. I present a historically based explanation, which considers environments that once caused the phonological changes we see today. This thesis is a preliminary investigation into the extensive process of initial consonant mutation, in which I will isolate and motivate tendencies in Modern Irish.[1]

[1] IPA will used in brackets or virgules to represent the basic phonological change that a consonant undergoes and as necessary to illustrate other relevant information about pronunciation. Transcriptions are not meant to be a detailed representation of actual pronunciation. All other representations will be in standard orthography as appropriate, with lenition represented by an *h* following the lenited consonant and eclipsis represented by the eclipsing consonant preceding the eclipsed consonant.

Table 1 shows an example of ICM environments in Modern Irish. More detailed descriptions of the processes and environments will be provided as needed.

Table 1

Mutation Environments in Modern Irish

	No mutation	**Eclipsis**	**Lenition**
Environment	*cat*	*a gcat*	*mo chat*
Pronunciation	[**k**ɑt]	[ɑ **g**ɑt]	[mo **x**ɑt]
Gloss	"cat"	"their cat"	"my cat"

The data in Table 1 exemplify the unmutated form of "cat," as well as an eclipsis trigger "their" resulting in the voicing of the initial consonant of "cat," with [k] → [g], and a lenition trigger "my" resulting in the spirantization of the initial consonant of "cat" with [k] → [x]. These changes are highlighted in bold here and throughout the data.

2. Approach

In an attempt to explain the process of mutation, I will present evidence of a historical phonologically conditioned process, isolate morphosyntactic environments, and provide possible semantic motivations for the synchronic tendencies observed in Modern Irish. The prevalence of ICM in Modern Irish will then be investigated in terms of the cognitive linguistic theory of template

matching in order to begin moving towards a description that takes into account every aspect of mutation.

3. Irish Language

Before further exploring ICM, it is important to briefly discuss Irish phonology and syntax as it relates to mutation behavior. Irish word order is generally Verb Subject Object, and has four cases- nominative, vocative, genitive, and dative. Adjectives follow the noun and can be used predicatively and attributively. When used attributively, adjectives are inflected to match the noun they follow. Modern Irish also has grammatical gender, masculine and feminine. The majority of nouns are masculine, and most feminine nouns tend to follow one of a few certain spelling patterns or semantic classes, such as abstract nouns, which can aid in identification. Nouns also follow one of five declension patterns for the formation of genitive and plural forms, one of which consists of mostly feminine nouns, and another of mostly masculine nouns.

Irish phonology is characterized by contrastive consonant pairs that are classified as *broad* or *slender*. *Broad* refers to a velarized pronunciation of the consonant and is indicated by a superscript voiced velar fricative [ˠ]. *Slender* refers to a palatalized pronunciation of the consonant and is indicated by a superscript palatal approximant [ʲ]. Table 2 shows a phonemic inventory of Irish[2]. It is interesting to note in certain cases that the palatalization or velarization is not

[2] Irish is a minority language spoken by 1.77 million people, mostly as a second language. There are no monolingual Irish speakers, and there is no standard pronunciation. For the purposes of this investigation, the Munster dialect spoken in southern Ireland is used where there is a difference in behavior.

a secondary articulation, as in the case of the velar nasal [ŋ], palatal nasal [ɲ], and others as indicated by IPA transcription.

Table 2

Consonant Inventory of Modern Irish

		LABIAL		CORONAL		DORSAL		GLOTTAL
		BROAD	*SLENDER*	*BROAD*	*SLENDER*	*BROAD*	*SLENDER*	
STOP	*VOICELESS*	pˠ	pʲ	t̪ˠ	tʲ	k	c	
	VOICED	bˠ	bʲ	d̪ˠ	dʲ	g	ɟ	
FRICATIVE/	*VOICELESS*	fˠ	fʲ	sˠ	ʃ	x	ç	h
APPROX.	*VOICED*	w	vʲ			ɣ	j	
NASAL		mˠ	mʲ	n̪ˠ	nʲ	ŋ	ɲ	
TAP				ɾˠ	ɾʲ			
LATERAL				l̪ˠ	lʲ			

4. Description of Mutation

ICM occurs in living Celtic languages (Irish and Scottish Gaelic) as well as in dead languages under revitalization efforts (Cornish, Manx, and Breton). There are multiple types of mutation found in these languages. I will discuss the two main types observed in Modern Irish: Lenition, where a stop becomes a fricative, and Eclipsis, where a voiceless stop is voiced, and a voiced stop becomes a nasal. Table 3 demonstrates the changes mutation causes in each consonant, as well as any other changes or deletions caused by each mutation type.

Table 3

Lenition and Eclipsis Effects

0LENITION		**ECLIPSIS**	
Lenition: A stop becomes a fricative. Voicing and place of articulation are retained, except for the coronals.		**Eclipsis:** A voiceless stop or /fˠ/, /fʲ/ is voiced. A voiced stop becomes a nasal. A vowel initial word receives a preceding /n̪ˠ/ or /nʲ/.	
BROAD	SLENDER	BROAD	SLENDER
pˠ → fˠ	pʲ → fʲ	pˠ → bˠ	pʲ → bʲ
t̪ˠ →/h	tʲ → h	t̪ˠ → d̪ˠ	tʲ → dʲ
k → x	c → ç	k → g	c→ ɟ
bˠ → w	bʲ → vʲ	fˠ → w	fʲ → vʲ
d̪ˠ → ɣ	dʲ → j	bˠ → mˠ	bʲ → mʲ
g → ɣ	ɟ → j	d̪ˠ → n̪ˠ	dʲ → nʲ
mˠ→ w	mʲ→ vʲ	g → ŋ	ɟ → ɲ
sˠ→ h	ʃ→ h		
fˠ→ Ø	fʲ→ Ø		

Table 4 shows a few relevant examples of each mutation trigger, though the full list of environments is extensive. It is important to note these and all examples are a simple representation of the phonological changes that occur and are not meant to capture subtle phonetic information on pronunciation or dialect.

Table 4

Lenition and Eclipsis Environments

Lenition:	Environment: After the definite article *an* *an* + Feminine noun in nominative singular *an* + *bean* ‘woman’ *an* ***bh****ean* "the woman" Phonological change: [b] → [v]	Environment: After preposition *roimh* “before” *roimh* + *maidin* ‘morning’ *roimh* ***mh****aidin* “before morning” Phonological change: [m]→ [v]
Eclipsis:	Environment: After plural possesive pronouns *bhur* “your” *bhur* + *páistí* ‘children’ *bhur* ***bp****áistí* “your children” Phonological change: [p] → [b]	Environment: After plural possessive pronoun *a* “their” *a* + *bád* ‘boat’ *a* + ***mb****ád* “their boat” Phonological change: [b] → [m]

These examples illustrate that although the phonological change we see for each type of mutation is a similar process, the mutation triggers have no discernible phonological similarities that would condition such a change. For example, the words *an* [ɑn] and *roimh* [rov] end in a nasal and a fricative respectively, and would therefore not clearly be phonologically responsible for

eliciting an identical result from the following consonant. Observations such as this have led to the conclusion that these mutations must be syntactically based.

5. Current Theories

Discussion in recent years has focused on Optimality Theory (OT) (Prince & Smolensky, 1993) based approaches in order to explain what seems to be a phonological process being triggered morphosyntactically.

Green (2006) argues that based on OT's interpretation of phonology, consonant mutation cannot be considered a phonological process at all. His argument hinges on the OT constraints of faithfulness and markedness. According to OT, all phonological processes can be reduced to an interaction between the two, where faithfulness refers to the underlying representation and markedness refers to phonotactic constraints acting upon it to produce the surface form. Since we do not see phonological environments causing the changes observed in predictable ways, Green argues that mutation cannot be based on constraints acting upon an underlying form resulting in a surface form. Therefore, the mutations seen in Irish are argued to be purely morphological. Green goes on to posit that each mutated form is stored as an allomorph of the underlying representation, and surface forms are based on lenition or eclipsis triggering morphemes rather than any phonological process. For example, according to Green, the Irish word *bróg* 'shoe' is not stored as /bro:g/, with certain processes resulting in surface forms of *mbróg* [mro:g] and *bhróg* [vro:g] based on eclipsis or lenition environments. Instead, /bro:g/, /mro:g/ and /vro:g/

are all lexically distinct allomorphs stored alongside each other in the lexicon. Morphemes are then subcategorized by mutation type, and licensed within the theory to directly choose the correct allomorph. Green likens this process to that of case marking, where mutated forms are stored similar to the way inflected forms are proposed to be stored in the lexicon. In this way, *bróg, bhróg,* and *mbróg* are all stored as "shoe," with morphosyntactic context (what subcategory the morpheme belongs to) determining what form surfaces.

However, Green's proposal does not account for the diversity of triggers because it requires each trigger to be subcategorized for which allomorph will surface. The triggers do not generalize beyond what type of mutation they trigger, resulting in a categorization that does little more than list triggers by mutation type.

Green also concludes that there are other problems with calling the mutation process phonological, since the mutations do not target any natural class of sounds and do not improve markedness. He also argues that there are too many different changes to be generalized. For example, lenition causes oral stops and /m/, but not /n/, to be spirantized, coronal obstruents to be debuccalized, and /f/ to delete (Green, 2006). Additionally, Green cites the fact that the presence of specific proclitics are not the only environments where mutations occur. Lenition is also triggered in the initial consonant of an attributive adjective when it modifies a plural noun ending in a slender consonant,

or when definite noun phrases are used in a genitive function, whether or not the noun is morphologically in the genitive case.

Additionally, examples provided in Table 5 are quoted by Green as evidence that mutations cannot be a phonological process, because the trigger words do not have to be adjacent to the target.

Table 5

Nonadjacent Trigger and Target

Mutation Environment	**Gloss**	**Mutation behavior**
(5.1) idir **fh**ir agus **mh**ná	"both men and women"	Lenition of *fir* and *mna*
(5.2) trí **sh**ioc agus **sh**neachta	"through frost and snow"	Lenition of *sioc* and *sneachta*
(5.3a) a súil	“her eyes”	no mutation of *súil*
(5.3b) dhá **sh**úil	“two eyes”	lenition of *súil*
(5.3c) a dhá súil	“her two eyes”	no mutation of *súil*
(5.4a) bhur **dt**each	“your (pl.) house”	eclipsis of *teach*
(5.4b) dhá **th**each	“two houses”	lenition of *teach*
(5.4c) bhur dhá **dteach**	“your (pl.) two houses”	eclipsis of *teach*

In 5.3 and 5.4, we see examples of nonadjacency of trigger and target. In 5.3, *a* “her” does not cause mutation, and *dhá* “two” causes lenition. In 5.3a and 5.3b, we can see the mutation effects on the adjacent word *súil* “eyes.” In 5.3c however, *dhá* “two” does not trigger lenition on the adjacent word *súil* “eyes.”

Instead, the mutation effects of the possessive pronoun *a* “her” are what affects the noun. Similarly, in 5.4 we see another example where the mutation effect of the personal pronoun “jumps” over the number to the noun. In 5.1 and 5.2, the mutation caused by the prepositions *idir* and *tri* jumps over *agus* “and” (which causes no mutation in any environment) and lenites both nouns.

This evidence supports the conclusion that mutation in Modern Irish is not a straightforward phonological process, and the environments triggering these mutations are incredibly varied and ungeneralizable.

Pyatt (1996) makes some similar arguments to Green’s. Whereas Green’s claim is that the mutation process is purely morphological, Pyatt attempts to describe the phenomenon in terms of a process that takes into account both the morphosyntactic and phonological aspects that are observed. She posits that morphemes are marked both for mutation and for a specific phonological process at the level of phonological readjustment, where phonology can still access morphosyntactic information, so that a morpheme marked for mutation can be considered responsible for a phonological change. Pyatt also aims to categorize morphemes that trigger lenition in terms of features, such as [+feminine] and [-plural], to minimize the idiosyncratic assignment of the mutation diacritics. These diacritics are marked for lenition and nasal mutation, as well as a “non-mutation” diacritic to explain the forms that might be expected to trigger a certain mutation but do not. While most mutation can be described in feature-based terms, some must be marked lexically for specific mutations (or non-

mutations), which then block the assignment of other types of mutation that would otherwise apply to all morphemes possessing certain features. Pyatt's argument accounts for some cross-linguistic variations in mutation that are seen across Celtic languages, and does allow for a certain degree of generalization among forms triggering the same mutation type.

If a phonological analysis were accepted, as Pyatt argues, it would necessitate a floating diacritic posited solely to explain the mutation it causes. However, they serve no other purpose than to explain the mutations they were created to explain, and lack independent evidence to support their existence. Pyatt and Green both mention an original historical motivation for these mutations, where consonants would lenite intervocalically, and eclipse following a nasal. Although these historic environments seem like a strong possibility for motivation, Pyatt and Green both claim that they are insufficient to explain the mutations synchronically.

Duffield (1990) attempts to motivate the mutations synchronically with what he calls a "less stipulative" (p. 31), grammatical context motivated approach to mutation. Employing generative syntactic theories of verb raising and head movement, Duffield asserts that particles are either inserted or moved to Comp or Tense. Particles occupying Comp trigger eclipsis, and particles occupying Tense trigger lenition. Duffield and a review of his arguments by Doyle (1997), both claim that this approach provides a "highly economical account of seemingly disparate phenomena" (Doyle, 1997, p. 59). This approach addresses the need

for a simplified account, in contrast with theories that require any kind of marking or independent categorization of each individual trigger.

Duffield's account employing generative syntactic theory attempts to explain the synchronic process of mutation without the problematic phonological analysis or independently marked morphemes. While more streamlined, Duffield's account presupposes the existence of projections such as Comp and Tense as a syntactic level of representation prior to Phonological Form, and accounts for the surface VSO word order of Irish as verb raising from underlying SVO order. An explanation that relies heavily on theory internal, language specific mechanisms only describes the phenomenon in specific theoretical terms, and does not explain or motivate them.

6. Historical Phonological Context

While current arguments do address the complexity of Celtic mutations, they fail to motivate them. Simply stating that morphemes are marked for mutation and categorized by either the phonological process or by the allomorph they select does not explain the mutation process at all. While some idiosyncrasies are to be expected, explanations that rely on classifications based solely on the mutations they elicit are not really getting to the root cause.

Instead, an explanation that takes into account the original historic motivation for these changes can address both the mutation that occurs and the words that trigger it. Although similar mutations do occur in other Celtic languages, for the purposes of this thesis I only examine historical data as they

relate to the Modern Irish mutations already discussed. As Pyatt and Green both mention, and according to material on Old Irish mutation such as Stifter (2006), and Lewis and Pederson (1974), consonants lenited intervocalically and eclipsed when following a nasal. This was due to extensive sandhi effects, which were common in Old Irish.

In order to begin to motivate the mutations' retention, it is first important to understand the original phonological environments in which the mutations occurred. Although a complete historical analysis is unnecessary and beyond the scope of this thesis, it is important to outline the general sound changes that Irish has undergone.

Table 6 shows a brief overview of relevant sound changes, from Stifter (2006) and adapted from Summers (2008). Summers also cites McCone (1996), Thurneysen (1946), and McManus (2004) in her description of sound change.

Table 6

Relevant Sound Change

TIME PERIOD	RELEVANT SOUND CHANGES
PRIMITIVE IRISH: 4th-6th century	- No representation of lenition in orthography - /w/ → /f/ *werah → *fera “man” - Apocope (loss of final vowels) at the end of this period *fera → fer “man” (Old Irish)
EARLY OLD IRISH: 6th-7th century	- Syncope (deletion of internal vowels) - New consonant clusters produced fodaimet → fodmat “answer” - Loss of final syllables *biyatlis → *beathl → biail “axe” (Old Irish)
OLD IRISH: 8th-9th century	- Voiced stops pronounced as fricative counterparts word medially and finally (Stifter, 2006, p. 20), not represented orthographically - Voiceless stops pronounced as voiced counterparts word medially and finally (Stifter, 2006, p. 19) - Inconsistent marking of lenition using digraphs, no consistent orthographic representation - /s/ → /h/
EARLY MODERN IRISH: 13th- 17th century & MODERN IRISH: 17th century- present	- Orthographical representation of mutation standardized - Western Roman alphabet adopted

These important historical changes indicate the previous presence of phonological environments for pervasive sandhi effects that were reduced or in many cases removed by apocope, syncope, and final syllable deletion.

Table 7 shows the Proto-Celtic and Modern Irish forms of some relevant mutation triggers, and Table 8 lists the Proto-Celtic form of a few common nouns.

Table 7

Lenition and Eclipsis: Historical Forms

Modern Irish: LENITION TRIGGERS	**Proto-Celtic Form**
mar 'as'	*keni
roimh 'before'	*ϕrimo/ϕro
mo 'my'	*mewe/mene
do 'your'	*towo/tu
an 'the' (fem)	*sinda
a 'his'	*esjo
Modern Irish: ECLIPSIS TRIGGERS	**Proto-Celtic Form**
ár 'our'	*san
bhur 'your'	*wesrom
a 'their'	*esom

Source: University of Wales Proto-Celtic Database

Table 8
Historical Forms

Modern Irish	**Proto-Celtic**
teach ‘house’	*tegos
duine ‘person’	*donjo
cairde ‘friends’	*karant
bean ‘woman’	*benā
fir ‘men’	*wiro

Source: University of Wales Proto-Celtic Database

The forms in Table 7 indicate a trend emerging among the proto-forms of Lenition-causing and Eclipsis-causing morphemes. While the Modern Irish forms do not have uniformity in their final sound, the Proto-Celtic forms causing lenition all end in a vowel. Similarly, the proto-forms of the Eclipsis causing morphemes all end with a nasal. By combining the proto-forms of the morphemes causing mutation, and the morphemes which are affected by the mutation in Table 9, a clear phonological environment for mutation arises- namely, lenition occurring intervocalically and eclipsis following a nasal.

Table 9

Historical Phonological Environments

Modern Irish	Proto-Celtic	Mutation
*an **bh**ean* "the woman" [**v**ɑn]	*sind**a** benā	Lenition
*mar **dh**uine* "as a person" [**ɣ**inə]	*ken**i** donjo	Lenition
*ár **gc**airde* "our friends" [**g**ɛrdə]	*san **n** karant	Eclipsis
*a **dt**each* “their house” [**d**ɑx]	*eso**m** tegos	Eclipsis

Considering the progression of sound change shown in Table 6, it is important to note that final vowel apocope occurring in the stage of Primitive Irish could have conceivably created the environment for eclipsis in some cases, such as that of **keni* in Table 9. It is indeed a possibility that mutation environments may have changed throughout time, with some environments disappearing and others appearing. Since mutation was not represented orthographically at all until Old Irish, and not in a consistent way until Early Modern Irish, it is difficult to investigate what role mutation played at each stage, at what point certain environments disappeared, or whether or not speaker pronunciation maintained mutations when not marked orthographically. More extensive research into the historical development of Modern Irish would be needed in order to attempt to pinpoint when certain mutations entered or disappeared from the language. However, the evidence of Proto-Celtic reconstructions and general pattern of sound change from Proto-Celtic to Modern Irish suggests the presence of

historical phonological environments for mutations that have disappeared or changed over time. The focus of this thesis is not to determine which environments appeared or disappeared at what time, but to provide a possible historical basis for an original phonological motivation.

While the forms shown in Table 9 provide evidence for the historic motivation, they do not tell the whole story. It would be reasonable to assume that once the environment for mutation had disappeared due to historic changes in the language, the mutation effect would disappear as well. However, the mutation effects were maintained even after the environment was no longer present. A possible explanation involves the maintenance of important semantic contrasts, a theory which is explored in detail in the following section.

7. Motivating Retention: Maintenance of Contrast

According to Stifter (2006), mutations in Primitive Irish often crossed phrase boundaries. By the time of Old Irish, mutations rarely crossed phrase boundaries, and in Modern Irish they never do. This suggests that at the time of Primitive Irish, mutations were simply the result of sandhi effects- that is, purely phonologically conditioned. It wasn't until the time period of Old Irish that the environments began to disappear, resulting in the necessity to mark some mutations, albeit inconsistently (Stifter, 2006). The need to mark them in any situation at all suggests that they began to carry meaning beyond an environmentally conditioned phonological process as far back as Old Irish. As I will suggest, their meaning-carrying function may have influenced the fact that

they are retained in Modern Irish despite the loss of their phonological conditioning.

Table 10 gives two clear examples of instances where the mutation triggers are the same form in Modern Irish, but cause different mutations. In the example of *an **bh**ean* [ɑn **v**ɑn] "the woman" and *an fir* [ɑn fiɾ] “the men,” the proto-form of the definite article was once marked for case and gender. In Modern Irish, the masculine and feminine forms of the definite article are the same, regardless of case or gender. However, the following noun lenites only if it is a feminine noun in the nominative case. If the noun is masculine in the nominative case, then no mutation takes place. This results in a distinction (in this case, of grammatical gender) that is only apparent in the mutation the noun undergoes. In the example of *a **th**each* [ɑn hɑx] “his house” and *a **dt**each* [ɑn dɑx] “their house,” the resulting distinction is even more salient. Here, the pronoun *a* can mean either “his,” “her,” or “their.” In the proto-forms, we can see that **esjo* “his” would have caused lenition, where as **esom* “their” creates the environment for eclipsis. The Proto-Celtic forms have since changed, both to the Modern Irish ‘*a’*. However, the mutation that was originally conditioned phonologically was retained, maintaining a different semantic contrast. The data suggest that this retention may have been influenced by the role mutation plays in maintaining a distinction between the two forms. In Modern Irish, the only distinction between “his” and “their” is in the resulting mutation.

Table 10

Historical Phonological Contrasts

Modern Irish	Proto-Celtic
*an **bh**ean* "the woman"	*sinda benā (Fem. Nom. Sing.
an fear “the man”	*sindos fir (Masc. Nom. Sing.)
*a **th**each* “his house”	*esjo tegos
*a **dt**each* “their house”	*esom tegos

Masculine nouns in the genitive singular also lenite following the definite article *an*, resulting in the forms in Table 11, where *cat* “cat” is a lexically masculine noun, and *comhairle* “advice” is lexically feminine.

Table 11

Gender and Case

Case and Gender	Pronunciation	Gloss	Mutation
Masc. Nom. Sing.	an **c**at [ɑn **k**ɑt]	“the cat”	No mutation
Masc. Gen. Sing.	an **ch**ait [ɑn **x**ɑtʸ]	“of the cat”	Lenition
Fem. Nom. Sing.	an **ch**omhairle [ɑn **x**ovɑrʸlə]	“the advice”	Lenition
Fem. Gen. Sing.	an **c**omhairle [ɑn **k**ovɑrʸlə]	“of the advice”	No mutation

These examples show lenition of the noun in the masculine genitive, and feminine nominative case. Here, it may not be clear solely from the mutation effect whether *an chat* is a masculine singular noun in the genitive case or a feminine singular noun in the nominative case. The mutation cannot be said to be solely responsible for the distinction between masculine and feminine nouns, or nominative and genitive case, and similarly mutation's sole motivation is not to maintain this distinction. However, important information regarding case and gender is strengthened by the mutation. The genitive form of the noun *cait* "cat" changes in spelling and pronunciation. *An chait* "of the cat" therefore has additional information indicating case and gender besides the mutation. In *an chomhairle* "the advice" and *an comhairle* "of the advice," the noun *comhairle* does not change in form or pronunciation except for the mutation effect. The presence or absence of mutation in this case then indicates case and gender, but it is not immediately clear from the isolated forms what is being indicated. In Irish, abstract nouns are usually feminine, so the semantic meaning of the noun "advice" can aid in determining the grammatical gender, further illuminating the semantic information the presence or absence of mutation indicates.

Similarly, the relative pronoun *a* has the same form as the pronouns his, her, and their, and also causes lenition.

(1) An bhean **a th**abhairt dom é "The woman who gives it to me"
[ɑn vɑn ə **h**ɑvɑrt dom e]

Recall from Table 10 that *a* meaning “his” and as a relative pronoun both cause lenition. This is another example of mutation effects maintaining important contrasts but also having identical triggers and effects on different targets. In this case, *a* “his” and *a* relative pronoun are identical triggers with identical mutation effects. In these cases, other syntactic information provides additional cues to semantic meaning: the target of “his” is a noun, and the target of the relative pronoun is a verb, as seen in the example sentence (1). Table 11 shows an example where mutation in a definite noun phrase can indicate grammatical gender and nominative or genitive case depending on the gender of the noun. Mutation does not indicate only one or the other in the definite noun phrase and is not the only morphosyntactic marker of gender or case. As seen in Table 11, form and pronunciation of the masculine noun in *an chait* “of the cat” give additional clues as to genitive case of the noun, and the semantic information of *an chomhairle* “the advice” as an abstract noun provides information as to the feminine gender of the noun. This suggests that this additional information, in conjunction with the mutation effects, can aid in semantic disambiguation when mutation effects alone do not provide a clear contrast.

7.1. Past Tense Mutation

Verb tense, specifically simple past, is another area where mutation plays a large role. In this case, we do not need to look as far back as Primitive Irish or even Old Irish for the original motivation. In general, a verb in the past tense lenites if it begins with a consonant, or is preceded by *d’* (full form: *do*) if it begins

with a vowel. In older varieties of the Munster dialect, still spoken to some extent by older speakers and used in formal writing style, the full form *do* is also found before consonant initial verbs. Therefore, it is easy to see both the original (and to some extent, still present) phonological environment as well the important contrast that the mutation effect retains, even as the phonological environment is being lost. Table 12 shows examples of the effect of mutation in past tense constructions, and Table 13 shows the phonological environment with and without *do*.

Table 12

Past Tense

Example	Gloss	Tense
Mhúin mé Bearla [**v**uɪn me bɛrlɑ]	"I taught English"	PAST
Múin mé Bearla [**m**uɪn me bɛrlɑ]	"I teach English"	PRESENT
D'ól mé uisce [dol me ɪʃkə]	"I drank water"	PAST
Ól mé uisce [**o**l me ɪʃkə]	"I drink water"	PRESENT

Table 13

Past Tense Phonological Environment

Example Sentence	Gloss	Tense
Do **mh**úin mé Bearla	"I taught English"	PAST
Múin mé Bearla	"I teach English"	PRESENT
D'ól mé uisce	"I drank water"	PAST
Ól mé uisce	"I drink water"	PRESENT

In the case of the first example, "I taught English," when the full form *do* is present, it reveals an environment for lenition, as seen in Table 13. The subsequent and ongoing loss of *do* means that the resulting mutation remains as the only difference between past and present. Similarly, the preverbal particle *do* in its shortened form is more obviously the only difference between the past and present for vowel initial verbs.

This is an example of a loss of phonological environment that is to some extent still in progress. This also suggests that the types of contrasts that are retained by the mutations are varied, just like the triggers themselves.

7.2. Other Contrasts

There are other examples where mutation type can indicate not only broad semantic distinctions such as gender, person, and number, but also more subtle semantic distinctions such as predicative vs. attributive adjectives or in some cases different meanings of words based on whether or not lenition occurs. The

sentences in Table 14 give two examples of such distinctions, with the mutated and non-mutated consonants in bold. IPA is provided for the mutated word.

Table 14

Predicative and Attributive Pronouns

Example Sentences	**Gloss**	**Mutation**
Bhí an bhean ***g****nóthach* ina hoifig*.* [**g**nohax]	*"The woman was busy in her office"*	None
Bhí an bhean **gh**nóthach ina hoifig. [**ɣ**nohax]	*"The busy woman was in her office"*	Lenition
Tá cluiche idir **f**ir agus **m**ná sa pháirc*.* [**f**ɪr] [**m**nɑ]	*"There is a game between men and women in the park"*	None
Tá idir **fh**ir agus **mh**ná sa pháirc. [ɪr] [**v**nɑ]	*"There are both men and women in the park"*	Lenition

Here there is a difference in semantic information, including a different meaning of the preposition *idir*, based on mutation behavior. The difference in mutation behavior with the two uses of the preposition *idir* might be able to be explained diachronically by various factors such as different Proto-Celtic or Primitive Irish forms, or different syntax based on semantic meaning. However,

the presence of the mutation in Modern Irish is necessary to strengthen and maintain contrasts of meaning, and sometimes to provide the only contrast.

8. Numbers and Historical Analogy

Another area where the triggers of mutation may seem exceptionally random are in the case of numbers. In Irish, singular nouns are most often used with numbers, such as *tri bo*, literally “three cow.” However, certain nouns use a special plural that is used only after numbers. Generally, numbers 1-6 cause lenition, and 7-10 cause eclipsis. Things get even more complicated when we consider that the special plural form does not mutate at all when following numbers 3-6, but still eclipses after 7-10, as seen in the following examples.

(2) tri **ch**at “three cats”
[tri **x**æt]

(3) tri **b**liana (*__bh__liana) “three years” (special plural *bliana*)
[tri **b**liaŋɑ] [*__v__liaŋɑ]

(4) seacht **mb**liana “seven years” (special plural *bliana*)
[ʃɑkt **m**liana]

(5) seacht **gc**at “seven cats”
[ʃɑkt **g**æt]

While this may seem even stranger than a seemingly “simpler” distinction between grammatical gender, an investigation into numbers and mutation in Old Irish illuminates possible historic explanations. First, it is important to note that in Modern Irish and Old Irish, numbers come before the noun they reference. In Modern Irish, numbers do not agree in case, number, or gender with the noun

they modify, whereas as recently as Old Irish, some of them did. According to Stifter (2006), the numbers 3 and 4 agreed with the noun they modified, causing either lenition, eclipsis or “aspiration” (h-insertion) depending on their gender and case. Numbers 5 through 10, on the other hand, were not inflected, and therefore their mutation type did not change based on inflectional endings. By examining the mutation paradigm of numbers in Old Irish, a possible explanation arises. As previously mentioned, numbers 3-4 caused lenition, eclipsis and h-insertion depending on their gender or inflectional ending. Numbers 5 and 6 caused lenition and h insertion respectively, while 7-10 are the only numbers causing eclipsis consistently. This analysis is supported by the Primitive Irish reconstructions in Table 15. The data in Table 15 are adapted from Stifter (2006) and the University of Wales Proto-Celtic Database.

Table 15

Proto-Celtic Numbers

PRIMITIVE IRISH	**MODERN IRISH**	**GLOSS**
*kuogue	cuig [kuɪg]	“five”
*sueh	se [ʃe]	“six”
*sekte**n**	seacht [ʃɑxt]	“seven”
*okte**n**	hocht [hɑxt]	“eight”
*noue**n**	naoi [nɔj]	“nine”
*deke**n**	deich [de]	“ten”

Additionally, by examining the pattern of mutation types caused by each number in Old Irish, a pattern emerges. Table 1[3] according to Stifter (2006).

Table 16

Old Irish and Modern Irish Numbers

Number	OI Masc.	OI Neut.	OI Fem.	MI	MI with SP
1 Inflected	-	-	-	Lenition	Lenition
2 Inflected	Lenition	Eclipsis	Lenition	Lenition	Lenition
3 Inflected	H Insert.	Lenition	H Insert.	Lenition	None
4 Inflected	None	Lenition	H Insert.	Lenition	None
5 No Infl.	Lenition	Lenition	Lenition	Lenition	None
6 No Infl.	H Insert.	H Insert.	H Insert.	Lenition	None
7 No Infl.	Eclipsis	Eclipsis	Eclipsis	Eclipsis	Eclipsis
8 No Infl.	Eclipsis	Eclipsis	Eclipsis	Eclipsis	Eclipsis
9 No Infl.	Eclipsis	Eclipsis	Eclipsis	Eclipsis	Eclipsis
10 No Infl.	Eclipsis	Eclipsis	Eclipsis	Eclipsis	Eclipsis

[3] Numerals 1-10 are used throughout this section to refer to Proto-Celtic and Modern Irish numbers. Mutation type is marked in the table, so exact forms and transcription are not necessary in order to establish the paradigm.

In Table 16, the following acronyms and abbreviations are used: Modern Irish (MI), Old Irish (OI), Special Plural (SP), No Inflection (No Infl.), H-Insertion (H Insert.).

Table 16 shows numbers 7 through 10 are the only numbers that cause eclipsis regardless of case, number, or gender of the noun they modify. Numbers 2 through 4 had varying mutation effects based on their inflectional endings, which originally varied the phonological environment. The numbers 5 and 6, although consistent in the mutation caused because they were not inflected, caused lenition and h-insertion, respectively. In this way, they are as a whole more like 3 and 4 (where only the neuter mutation of 2 causes eclipsis) rather than 7 through10.

Therefore, a reanalysis of mutation behavior after the original phonological environment and inflectional endings disappeared results in 5 and 6 behaving like 3 and 4 rather than 7 through 10. This analogical leveling of the paradigm results in the mutation behavior observed in Modern Irish.

The numbers 1 and 2 also cause lenition in both singular and plural nouns, although 1 is only used with the singular. Additionally, 1 in Old Irish was compounded with the following noun, causing lenition between the two words. Modern Irish no longer compounds the numeral and the following noun, but 1 still causes lenition in the following noun.

Old Irish made use of a dual number in addition to singular and plural, which was always used with 2 and caused lenition in both masculine and

feminine, but not in neuter. Since the neuter gender is no longer used in Modern Irish, and forms with neuter gender historically became masculine, it makes sense that the mutation pattern shown in Table 16 would follow, with historically neuter forms behaving like masculine forms. The fact that 1 and 2 were not used with the plural form of the noun in Old Irish helps to explain why their mutation behavior differs from the behavior of 3 through 6 when used with plural nouns in Modern Irish.

While the resulting forms do not serve to maintain a contrast, these historical forms do serve to show the original motivation as well as the retention of mutations throughout changes in the language. This and other examples listed in Tables 10 through 12 suggests that mutations are not preserved only when they maintain a contrast, but also by historical analogy. In the case of the seemingly strange behavior of the numbers, although there are not obvious cases where the presence or absence of a certain mutation would provide vital semantic distinctions or information, the mutations are still present consistently in Modern Irish. This might suggest that mutations are not retained only in an environment where a contrast is maintained, but also in environments where they have appeared historically, throughout changes in the language.

The data presented so far have outlined possible historical phonological motivations for ICM, and have isolated examples where mutation assists in the maintenance of important semantic contrasts. By exploring recent accounts of mutation, it is apparent that the motivation of mutation is unclear, and that

explanations that discount the interaction of multiple factors do not capture the full extent of mutation behavior.

9. Integrated approach

As we have seen, the labelling of ICM as a purely phonological, morphological, or syntactic process can be problematic. In order to fully understand both the how and the why of a morphosyntatic process surfacing phonologically, it is important to take into account the interaction between phonological, morphological, and syntactic processes, and their semantic consequences.

It is apparent that these mutations occur in various environments, and maintain a variety of contrasts across grammatical categories. However, in some cases they are not the sole indicator of a semantic contrast. While it may be enough to attribute the overall retention of mutation to historical analogy, where mutations that may not maintain a contrast are retained because at one point historically mutations were phonologically conditioned, a theory that accounts for every retention in a more systematic way is preferred.

To claim that mutation is a meaningful change in a word's form based on a syntactic environment is to essentially label the mutational process as morphological. In accordance with Green, this would mean that each mutated form is stored as an allomorph alongside the radical, unmutated form, and accessed based on the mutation the trigger's subcategory licenses. While this explanation accounts for the fact that the process itself is no longer purely

phonological, as in the example of mutation non-adjacency, it does not fully take into account the fact that a phonological change does take place. This change, though no longer conditioned by a phonological environment, does employ a phonological process. In the case of lenition, this can be characterized generally as [-continuant] → [+continuant], and in the case of eclipsis, as [-voice] → [+voice], and [+voice] → [+nasal]. The fact that this process applies consistently to sounds in a certain class, as previously noted, indicates that it is still a phonological process to some extent. This analysis would class mutations not as allomorphs that are activated, but as a phonological process that is triggered by a morphosyntactic environment for reasons of semantic contrast.

This idea is supported by a study of L2 learning by Scott (2010). Both L1 and L2 learners of Irish, in some situations, will accept either lenition or eclipsis as grammatical in a situation where a mutation is required. This indicates that the forms may not be stored as allomorphs, with a certain diacritic marking the trigger for which form is activated. Instead, what is triggered is a phonological process, allowing for what Scott calls “expect a mutation, accept any mutation.” However, since the process no longer applies in a phonological environment, and instead appears only as a result of a morphosyntactic environment, it is best viewed as an inextricably linked interaction of phonology, syntax, and morphology motivated by contrast retention. Therefore, a process that does not describe the phenomenon solely with rule based accounts operating at a certain level of representation is necessary to both explain and motivate the process.

10. Template Matching

There is certainly an interaction of morphology and phonology in the case of ICM. However, an account that relies on a set of rules for the activation of allomorphs or diacritically marked instructions for a specific phonological change fails to capture the interaction with semantic factors. Additionally, a system that requires floating diacritics of any kind, motivated only by theory internal requirements cannot be sustained. If a process as productive and pervasive as mutation can only be accounted for by a theoretical addition that accounts only for mutation and does not generalize to any other process in the language, it is probably not a very compelling account. It may be claimed that a process as unique as mutation may necessitate a language-specific theoretical addition of constraints. However, a theory that encompasses phonological, morphological, diachronic and semantic facts of mutation and accounts for their synchronic productivity in a framework that can apply cross-linguistically may be preferred, and is suggested by the patterns explored here.

With this goal in mind, the concepts of “template matching” and “entrenchment” can be applied. According to theories of cognitive semantics (Evans & Green, 2006), a word or construction that is encountered frequently becomes entrenched, resulting in the establishment of a cognitive pattern, or schema. Type frequency of a certain construction results in an abstract schema that can be applied in multiple instances.

A template in the case of Irish refers to the presence of mutation in a certain, productive environment resulting in a “trigger-target” schema. In this schema, a closed set of words act as triggers for lenition or eclipsis, with the target being any word that follows the trigger (usually a verb or a noun). The target in this schema undergoes a phonological change as previously outlined. It is important to note that this approach is crucially different from a “rule” by which a closed set of words necessarily cause a change in another word. Instead, this schema is derived from the frequency of the “trigger target” template, and derives based on the matching of forms to the schema. This relates to the word-based morphology theory of word-and-paradigm morphology.

According to Blevins (2006), in approaches involving word-based morphology, or abstractive approaches, predictability is the most important relationship between forms, and one form does not necessarily underlie the other. In the case of mutation, there would not be a derivational relationship between mutated and non-mutated forms, where one form is the base for the other. Instead, the predictability with which a word matches with a certain paradigm or schema is the crucial relationship. Blevins claims that principal parts of a word or construction are matched against an exemplary paradigm, determining what pattern the item follows, and a correspondence is established. Further forms are deduced by analogy of these correspondences. In the case of Irish, the principal parts of the paradigm are the trigger and the target. Potential triggers are matched against the closed set of words that constitute part of the

template, the entrenchment of which is affected by type frequency. If a word matches a trigger, the target will be affected phonologically in a highly predictable way, also based on the template.

10.1. Entrenchment

As we have seen, mutation is often contrastive in terms of semantic information, for example *a teach* "her house," *a **th**each* [ɑn hɑx] "his house," *a **dt**each* [ɑn dɑx] "their house." This maintenance of contrast provided by the mutation is useful, and also common. Mutation maintains functional contrasts between items such as grammatical gender, case, tense, attributive and predicative adjectives, and person/number. It also stems from pervasive historical sandhi effects that were retained even as the phonological environments were disappearing. This resulted in a high frequency of phonologically arbitrary occurrences of mutation throughout the language. It is important to note that there are two factors at play in the entrenchment of the "trigger target" schema. First, the pervasiveness of the process itself results in a high type frequency. Mutation as a process is seen with many divergent triggers with a generalizable effect on any number of targets. While certain classes of sounds behave differently in a mutation environment, theoretically any word could be a target. Second, a number of the mutations currently provide important semantic contrasts. The meaningfulness of at least some of the mutations provides an overall motivation for the process, resulting in the retention of the process as a template throughout the language by analogy. Examples from

Tables 11-13, 16 are instances where the presence of mutation does not maintain a clear contrast. Regardless of whether or not the mutation maintains a contrast or what semantic information it conveys, the pattern of mutation follows the same "trigger target" template, with the mutation trigger affecting the target consistently. In these cases, context may provide additional cues as to semantic information and distinctions. Mutation then provides semantic redundancy, morphologically strengthening semantic aspects such as gender or case as previously seen. Even in cases where the mutation does not appear to convey any vital semantic information, as in the case of the numbers and the nonadjacent mutation effects of *dha* "two*,"* template matching results in the retention of these mutation effects. Since it is important that the mutation be retained in cases where it maintains a contrast or provides semantic redundancy, the template of "trigger and target" may also be employed in cases where it does not maintain a contrast.

The theory of template matching can also begin to explain exceptions. For example, overextension of the "trigger target" template results in mutation "jumping" over the conjunction *agus* "and" as seen in Table 5. Here, the same trigger applies to two targets: *trí* ***sh****ioc agus* ***sh****neachta* "through frost and snow." Since "and" indicates combination, it is likely that the semantic consequence of template overextension results in "*through* frost and *through* snow." Other exceptions may not have similar semantic consequences, and may be present simply because the trigger matches a template, perhaps an infrequent one.

These exceptions could have original historical motivations, as may be the case with the behavior of *dha* “two” in Table 5. This would result in an unusual and likely infrequent template variation, but an accessible template nonetheless. The unique behavior may either enhance the template’s productivity, or perhaps result in a future abandonment of the template as the language continues to change.

In addition to the preference for a cross-linguistic explanation that accounts for exceptions, it is also important to consider the cognitive load any proposed linguistic process may have. According to theories of cognitive linguistics (Evans & Green, 2006), a proposed linguistic process must take into account what is already known about the human brain, and must be feasible in accordance with cognitive functions such as memory and processing time. As it relates to a morphological process, a rule based derivational process may present an unrealistic cognitive load as compared to a frequency based model. According to Blevins (2006):

> The idea that morphological forms are derived in isolation may be regarded merely as a theoretical idealization. However, a substantial body of psycholinguistic research suggests that this idealization is psychologically implausible. It has been shown that the frequency of inflected forms and the size of morphological ‘families ’ have a robust effect on lexical decision tasks in a range of languages. (p. 535)

The finding that frequency of forms can have an effect on lexical decision-making tasks supports the theory of template matching as a productive process.

Since ICM in Modern Irish is pervasive and exhibits high type frequency, an explanation employing template matching appeals not only to the need to account for historical, phonological, morphosyntactic, and semantic facts, but to the frequency and predictability of ICM.

11. Conclusion

This thesis has provided a brief overview of initial consonant mutation in Modern Irish. The process of predictable phonetic change in the initial consonant of a word triggered by a closed set of words or specific syntactic position has many facets that make it difficult to fully understand the process. Evidence of a historical phonological environment in Proto-Celtic reconstructions suggests that the origin of the mutation process stems from sandhi effects in Proto-Celtic and Old Irish, and throughout sound change in the language those environments were lost. The progressive loss and possible emergence of new environments over the course of the development of Modern Irish led to the retention of some mutation effects, though their presence was not marked consistently or systematically throughout the history of the language. Considering the prevalence of mutation in Modern Irish, the question of the motivation for retention of certain mutation effects despite the loss of environments requires serious and systematic scrutiny. I have suggested that a possible avenue for exploration involves the importance of semantic information provided by the mutations. While the data presented here have provided a glimpse into the constructions in which mutation plays a semantic role, there is much more to be

investigated. Mutation can appear in various syntactic constructions, and seems to carry semantic influence in multiple ways. A thorough investigation into the exact influence in each construction may provide valuable insight into tendencies and correlations between construction type and mutation role. Although Irish has no monolingual speakers, experiments involving fluent speakers who use Irish in their daily lives can further illuminate the consistency with which mutations are employed in the environments in which they are expected. The experiment cited by Smith (2010) begins to investigate such areas of consistency, and inconsistency. Furthermore, investigations into what semantic import the mutations actually have for fluent speakers in these and other contexts would also provide important information regarding this hypothesis.

A complicated system such as initial consonant mutation begs for a simple explanation to describe what on the surface may appear arbitrary. However, an explanation that takes into account a number of factors, both diachronic and synchronic, including motivation as well as the cognitive implications, may in fact be simpler in its inclusion of all of these factors. The facts of mutation presented here suggest that such an approach may be helpful in beginning to understand the complicated behavior of initial consonant mutation in Modern Irish. An approach that considers possible semantic motivations in relation to observed phonological and morphosyntactic processes, such as the one presented here, may therefore be a step in the right direction.

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