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SPLITTING 'INTERVOCALIC': EXPANDING THE TYPOLOGY OF LENITION ENVIRONMENTS*

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Abstract: The basic types of lenition environments ('initial', 'intervocalic', 'final') need to be separately evaluated as they differ along parameters like word position (e.g., pre-consonantal vs. final codas) or stress relations. This paper argues that we need to recognise an additional such parameter: the length of the vowel preceding an intervocalic consonant. We show that a number of phenomena from varieties of English and German show lenition patterns which draw a distinction between reflexes found in post-short (vc) and post-long (vvc) environments. The theoretical consequence of our observations is that phonological theory needs to be able to account for the post-short vs. post-long distinction in the form of a parametrically-determined representational difference.

Keywords: phonology, lenition, intervocalic, stress, Germanic

Introduction

Lenition theory investigates the types of consonantal processes that cannot be easily reduced to assimilation, dissimilation or to another type of interaction with a segment's (sub)segmental neighbourhood. One of the fundamental planks of work in this area is an understanding of which

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kinds of phonological environment favour or inhibit the innovation of lenitions. In this paper we argue that previous discussions of the typology of lenition environments have missed a generalisation: the environment that is often described as 'intervocalic' needs to be split, because the length of the vowel preceding the consonant in question can matter. We propose a parameter along which systems of lenition may vary in their treatment of the intervocalic environment in terms of vocalic quantity, namely, whether there is or is not a difference in consonantal behaviour following short vowels versus such behaviour following long vowels. This paper is thus a contribution to our understanding of what is possible in phonology—to our understanding of what is possible in the patterning of a lenition process. If we are correct, models of lenition need to be able to account for the post-short vs. post-long distinction in the form of a representational difference, in a way that has not previously been recognised.

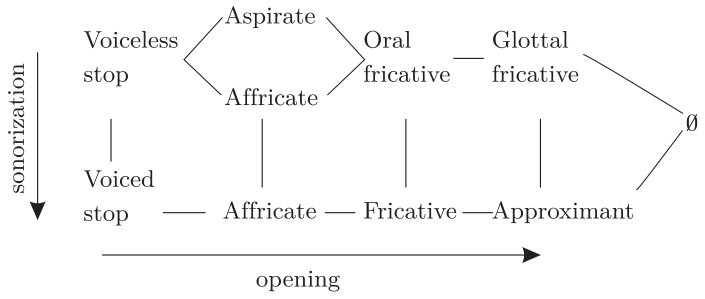
The type of phonological patterning that we describe here has not gone **entirely** unnoticed up till now: only one of the four data sets that we consider has never been discussed in print before. The implications of the data have not been recognised before, however, and they have only ever been treated separately—as individual oddities, sometimes without even recognising that their patterning is notable. By bringing them together in this paper we make a clear case that this aspect of phonological patterning cannot be ignored or dismissed, contrary to what some work in lenition theory has explicitly asserted. We develop our argument by first setting out, in section **1**, the details of relevant related notions. Our main emphasis lies on the sets of data that we think theoretical work in this area has previously missed. We discuss these in section **2**. Section **3** turns to theoretical issues, briefly considering previous analyses of these or related phenomena. Section **4** concludes.

1. Background: lenition and lenition environments

The concept of consonantal lenition has generated a range of ideas in phonological theory, as Honeybone (2008), among others, shows. There are two aspects of lenition that have been claimed to be phonologically interesting: (i) the set of phonological processes involved, and (ii) the set of environments in which those processes can or cannot occur. We consider both aspects briefly here.

Some of the types of process and/or change which are typically grouped under the heading of lenition are **spirantisation** (a segment becoming a fricative, e.g., *p* becoming *f*), **debuccalisation** (a segment losing its oral articulation to become a glottal, such as *x* becoming *h*) and **sonorisation** (e.g., a stop becoming a tap/flap, as taps are perceived as lenis). We will see several such processes in **2**, but first we consider why such processes have been grouped together. Lenition is commonly related to phonological 'strength', such that a reduction of strength can be seen as a **weakening**, a term now taken as a synonym of lenition. There is likely no unified phonetic correlate of this kind of weakening—but this does not mean that we cannot seek a phonological and/or historical definition for lenition, and several have been offered: Anderson and Ewen (1987) see it as the increase in particular types of subsegmental component; Harris (1994; 1997) as segmental decomposition; Kirchner (1998) as the reranking of constraints; Cser (2003) as an increase in sonority; Ségéral and Scheer (1999; 2008) as the effect of phonological government on segmental expression. It is common in discussions of lenition to cite Vennemann's claim (recorded in Hyman 1975, 165) that "a segment X is said to be weaker than a segment Y if Y goes through an X stage on its way to zero". This links different segment-types in terms of their relative weakness on a continuum (a 'strength hierarchy' or 'lenition trajectory'), along which segments are likely to progress diachronically. A widely-cited example is given in (1), from Lass (1984, 178).

(1) A lenition trajectory (Lass 1984, 178)



All these definitions allow us to group together processes of various types as cases of lenition, and—as we do not need to adopt any specific definition to make our point—we move on to focus on the environments in which they can occur. Environmental patterning is, after all, another thing that lenitions have in common (indeed, some argue that it is **all** that they have in common).

One common terminological tradition (exemplified in Ségéral–Scheer 2008) distinguishes between phonologically **weak** and **strong positions**, where 'weak' means that a position is a frequent site for lenition, both synchronically and diachronically, and 'strong' that a position inhibits lenition (with either absolute segmental stability or less weakening than in weak positions). The relation between strong and weak positions can be understood as an implicational hierarchy: if lenition occurs in a strong(er) position, it must also occur in a weak(er) position, as exemplified in (2), which summarises strong and weak positions, and where 'c' = a consonant, and 'v' = a vowel. (2) also gives these environments some of their traditional labels, but is intended to remain theoretically non-committal.

(2) A basic typology of lenition environments

STRONG	WEAK	
'initial, onset'	'final, coda'	'medial, intervocalic'
[#__] [c.__]	[__.c] [__#]	[v__v]

It is a phonological commonplace that lenition is unexceptional in the positions marked 'weak' in (2), and not in positions marked 'strong'. In this paper, we focus on this second, positional aspect of lenition theory—specifically on the environment labelled 'intervocalic' or 'medial' in (2).[1]

Most positional generalisations about lenition involve universal statements about the basic positions in (2), coupled with parameters along which individual lenition systems vary. One of these parameters that is relevant to our purposes is the 'stress parameter': in systems in which it is switched on, (lexical) lenition only occurs if the vowel following the segment is not stressed.[2] This pattern is often found in Germanic languages, as in English wide-distribution glottalling, which affects the

[1] Although the term 'intervocalic' is the standard one (so we retain it here) we note that the segments on either side of the consonant in question do not need only to be vowels—very sonorous consonants such as rhotics can also form the environment, so it is sometimes referred to as 'intersonorant'.

[2] Other parameters include the following: Within the 'coda' position, do preconsonantal and final codas both cause lenition or not? Within the 'onset' position, do initial and post-coda onsets both inhibit lenition or not? In post-coda onsets, does the segmental quality of the coda-final consonant count to condition the lenitability of the onset-initial consonant? See Ségéral – Scheer (2008).

medial /t/ in *a**tt**ic, pe**tt**y* but not in *a**tt**ack, pe**t**ite* (cf. especially Harris 1994; 1997). In these languages there can thus be two types of medial environment; that is, 'intervocalic' needs to be split into a stronger [v__ý] and a weaker [ý__v] position (the latter has often been dubbed 'ambisyllabic' or foot-medial, as we discuss below). This expands the typology of possible lenition environments to that shown in (3), which focuses only on one of the three 'basic' environments: 'intervocalic'—the shading for the other two indicates that no claims are made here as regards any relevant parameters.

(3) A revised typology of lenition environments

<table>
<tr><td>STRONG</td><td colspan="3">WEAK</td></tr>
<tr><td>'initial, onset'</td><td>'final, coda'</td><td colspan="2">'medial, intervocalic'</td></tr>
<tr><td>[#__]
[c.__]</td><td>[__.c]
[__#]</td><td colspan="2">[v__v]</td></tr>
<tr><td rowspan="3"></td><td rowspan="3"></td><td colspan="2">'stress parameter'</td></tr>
<tr><td>[OFF]</td><td colspan="2">[ON]</td></tr>
<tr><td>[v__v]</td><td>STRONG
[v__ý]</td><td>WEAK
[ý__v]</td></tr>
</table>

The present paper argues that we need to recognise another such parameter, in terms of the length (or 'quantity') of the vowel preceding the potential lenition site. We show that a number of lenition patterns (have) exist(ed) in varieties of English and German which draw a distinction between reflexes found in post-short (vc) and post-long (vvc) environments.[3] Our point is that an empirical observation has been missed up till now: 'intervocalic' needs to be further splittable into a stronger [vv__v] and a weaker [v__v] position. Some work in lenition theory has gone so far as to deny that such a parameter could ever be needed: Scheer and Ziková (2010, 418) write that "[t]his kind of variable consonantal strength according to whether the preceding vowel is long or short hardly meets any empirical echo". Our observations aim to provide precisely the empirical echo that Scheer and Ziková fail to find.

[3] By 'post-long', we mean 'following a complex nucleus' with two ×-slots/moras, which could be filled by a long monophthong or a diphthong, and 'post-short' means 'following a simple nucleus' with one ×-slot/mora.

We aim, therefore, to establish a distinction between two subtypes of 'intervocalic', which may, in fact, turn out to be related: the stress and the length parameters. These parameterisations are necessary because **some** cases of lenition pattern in these ways, so phonology must be able to characterise them in a phonologically significant way.

2. Data: does vowel length matter in lenition?

In order to make our point, we need to show that phonological patterns can be found in (the history of) languages which (i) involve segmental changes which are clearly of the 'lenition' type, and (ii) occur in an intervocalic environment, but only if the vowel which precedes the leniting consonant is short. We have four such examples. We expect that more will be found, and that they may have been missed in previous observations because the pattern was not one that phonologists were looking for—as they have never been collected before, we did not expect to find them. In any case, we believe that four is enough (**one** would be enough, in principle) to show that lenition theory needs to be able to account for this type of patterning.

The phenomena all derive from once-active synchronic lenitions. They are not all **still** clearly synchronically active, but, in the cases where they are not, the diachrony of the phenomena is clear and the split intervocalic patterning is indubitable. They involve sonorisation (**2.1** and **2.2**), lenisisation (what looks like 'voicing'—**2.3**), and spirantisation (**2.4**). The data in **2.3** has been collected by one of us. The other three cases are taken from previous discussion, which has dealt with them separately, and has not realised the theoretical importance that they have when grouped together.

2.1. Sonorisation: English flapping/tapping

One phenomenon which has been firmly taken into the canon of lenitions is the process known as 'tapping' or 'flapping'.[4] It affects coronal plosives

[4] These names are synonymous, and we refer to the process henceforth as 'flapping' as it is the more common name. The process occurs in many varieties of Present-Day English, including some Irish, Southern Hemisphere and American dialects, and similar processes are reported in other languages (e.g. Western Apache and Bantu).

(/t/ and /d/) deriving flaps ([ɾ]), and therefore it is seen as a sonorisation, in part because the input can be voiceless (or 'fortis'), and the output is 'lenis'; also, a flap is typically considered to be more sonorous than a stop. In this section we consider only the effects on the fortis stop.

The classical description of English flapping is as follows. It occurs in intervocalic position, but, while postlexically any word-final intervocalic /t/ lenites, in the lexical phonology the 'stress parameter' is in play: the [v́ __ v] environment triggers flapping (e.g., *petty* [ˈpʰɛɾi]), but [v __ v́] does not (e.g., *petite* [pʰəˈtʰiːt]). Importantly for our purposes, in standard descriptions of flapping, the length of the preceding vowel is irrelevant, thus flapping occurs in both *ratting* [ˈɹarɪŋ] and *writing* [ˈɹaɪrɪŋ].

New Zealand English (NZE) offers data which is relevant to our claim, however, as Bye and de Lacy (2008, 197) explain. NZE Basilect flapping follows the 'classical' pattern, but NZE Acrolect flapping shows a different pattern, illustrated in (4), with data taken from Bye and de Lacy but adapted (slightly) to IPA transcription practices used elsewhere in the paper.

(4) (a) Flapping after a short stressed vowel and before a vowel

[ˈhærə]	'hatter'	[ˈkæɾi]	'catty'
[ɹəˈgærə]	'regatta'	[ˌtʰærəməˈguʧi]	'Tatamagouchee'

(b) No flapping after a stressed long vowel or stressed diphthong

[ˈbaːtə]	'barter'	[ˈmiːtə]	'metre'
[kəmˈpjuːtə]	'computer'	[ˈɹaɪtə]	'writer'
[ˈpaʊtə]	'pouter'		

(c) No flapping after unstressed vowels

[ˈhɔspətəl]	'hospital'	[ˈtʰɛɹətən]	'Terreton'

In the above data, the crucial distinction for us is that between examples like *hatter* [ˈhæɾə] (4a) and *barter* [ˈbaːtə] (4b). In its lexical instantiation, NZE Acrolect flapping occurs foot-internally (so the 'stress parameter' is in play) and—because feet are maximally disyllabic—the forms in (4c) do not flap. This flapping **only** happens, however, if the vowel which precedes the foot-internal /t/ is short. Long vowels block flapping.

2.2. Sonorisation: (the origins of) Northern English T-to-R

A phonological pattern found in a number of British English dialects also fits well with the notion of sonorising lenition. It is often referred

to as T-to-R (see, for example, Wells 1982; Broadbent 2008; Honeybone forthcoming), and occurs in dialects from the Midlands to the North of England. It affects /t/ and derives the typical rhotic of the variety—for most varieties, this is [ɹ]—and can be seen as sonorisation for much the same reason as flapping. However, it affects mostly only word-final occurrences of /t/ in cross-word situations, and is lexically-specific: it affects certain lexical items, e.g., *not*, but not others, e.g., *knot*. All this means that relevant words end with an obstruent realisation of /t/ pre-pausally or pre-consonantally but, in T-to-R, are instead realised with a rhotic, as shown in (5).

(5)	[ʃʊtdaʊn]	shut down	[ʃʊɹʊp]	shut up
	[gɛtdaʊn]	get down	[gɛɹɒf]	get off

Wells (1982, 370) describes T-to-R as a rule with the following form: "t → r / [short V]__# V". Wells thus explicitly claims that only words with short vowels are involved in the phenomenon, which seems to fit our requirements perfectly. However, T-to-R is **very** lexically restricted: it is most common in only a handful of words such as *it, not, what, but, let, get/got, at, that* (there is also a tail of words in which it is possible, but less common, such as *fit, cut, hit*), and work on speaker intuitions (see Honeybone forthcoming) has in fact shown that it is possible in some words with long/complex vowels, too, e.g., *about, eat, caught*. Therefore, its current patterning is not a perfect fit as a phenomenon of the type that we are looking for. However, its 'parent process' does have precisely the environmental patterning that we need.

Broadbent (2008) provides a compelling account of the early history of T-to-R, based on reliable nineteenth-century phonological descriptions of Northern English. These texts describe a productive, non-lexically-specific phonological process which is found in areas where (lexically constrained) T-to-R is currently robust, and which is clearly the ancestor of T-to-R. Ellis (1889, 395) writes: "t, d preceding a vowel and after a short vowel becomes very vulgarly (r)", while Wright (1892, 87) writes that "the **t** in all verbal forms ending in **t** preceded by a short vowel, appears as **r** when the next word begins with a vowel", thus *meet him* is [miːt ɪm], but *met him* in [mɛr ɪm]. Crucially, both sources agree that this process occurs intervocalically, but only if the preceding vowel is short—long/complex nuclei block it.

The earlier process had a simple environment, with all the hallmarks of a low-level, phrasal phenomenon. It has since undergone a reanalysis

and fundamentally changed its character, so that much of what we now call T-to-R has been lexicalised to involve the alternation of two underlying forms in the few words in which it occurs, one of which allows the rhotic to surface (see Honeybone, forthcoming). The restriction **requiring** short vowels has been lost—it now just tends to happen in words with short vowels because its ancestor process did so, and it has not been analogised too far to other words (although the lexicalisation has allowed T-to-R to spread to some words with long vowels). The short-vowel restriction was robust in the process in the nineteenth century, and it is therefore similar to flapping in present-day Acrolectal NZE, although there is no reason to assume a diachronic link between the two processes.

2.3. Lenisisation: Scouse diddification

Phenomena which derive lenis from fortis obstruents are standardly recognised as cases of lenition. This is commonly referred to as 'voicing', but there is good reason to believe that this is not an appropriate name for the phenomenon since the derived segments are not always actively specified for voice; for this reason we call it 'lenisisation' here. One case of lenisisation relevant to our concerns is that found in the phenomenon that Honeybone (2010) labels **Scouse diddification**.

Scouse diddification is found in the dialect of English spoken in Liverpool, England (typically called 'Scouse' in British English). It involves a pattern of templatic truncation producing a 'diddified' prosodic morpheme, which contains part or all of the initial syllable of the base (and possibly the initial part of the base's second syllable) and affixes an unstressed *-i*. The phenomenon is productive, and is able to derive diddified forms from common nouns. The first post-vocalic consonant of the base is preserved, meaning that this consonant is always intervocalic in the diddified form. In fact, diddification creates a classic lenition environment—no matter what environment the consonant had in the base, it is in foot-internal intervocalic position in the diddified form. Relevant to our current concerns, lenisisation of the preserved post-vocalic consonant kicks in after diffification under certain phonological conditions. For lenisisation to occur, the consonant must be a fricative (thus /s/ is rendered as [z], for example) meaning that this is uncontroversially a type of sonorising lenition, in line with Lass' (1984) hierarchy in (1). A comparison of the forms given in (6), taken from the corpus described in Honeybone (2010), shows the other phonological condition that must

apply for lenisisation to occur. The forms in (6a) show that underlyingly lenis forms remain lenis after diddification; those in (6b) and (6c) have a fortis fricative in the base. The second column in (6) gives a surface transcription for the bases (some of which are the names of places in, or parts of, Liverpool), with the part of the base that is preserved in diddification underlined.[5] The third column gives a surface transcription for the diddified form.

(6)	a.	lavatory	[lavətɾi]	[lavi]
		Crosby	[kxɾɒzbi]	[kxɾɒzi]
	b.	afternoon	[aftənʉːn]	[avi]
		Sefton Park	[sɛftɳpaːx]	[sɛvi]
		duffle coat	[dʊfl̩kxɛʉθ̼]	[dʊvi]
		gossamer	[gɒsəmɛ]	[gɒzi]
		chestnut	[ʧɛsnʊθ̼]	[ʧɛzi]
		hospital	[(h)ɒspɪθ̼ɬ]	[(h)ɒzi]
		best friend	[bɛstfrɛnd]	[bɛzi]
		mustard	[mʊstəd]	[mʊzi]
	c.	Leece street	[liːsstɾiːθ̼]	[liːsi]
		ice cream	[aɪskxɾiːm]	[aɪsi]
		loose cigarettes	[luːssɪgəɾɛts]	[luːsi]

For our present purposes, the comparison of the forms in (6b) and (6c) is crucial—when the preserved vowel is long (i.e., complex), the fricative does not become lenis, as shown by the examples in (6c). Lenisisation only occurs if the preserved fricative follows a short vowel.

The synchrony of Scouse diddification likely now involves a template imposing the truncation and the loss of laryngeal specification (which, in a [spread glottis] language like English, produces a lenis segment). The origins of the lenisisation, however, must have involved an active intervocalic lenisisation when diddification was first applied, and it is this which has since become grammaticalised into the template. In any case, the current pattern is robust: lenisisation only occurs in intervocalic position in Scouse, but only if the preceding vowel is short (simple)—long (complex) nuclei block it.

[5] Some other characteristics of Scouse are apparent in these forms, such as the dispreference for final schwa and plosive affrico-spirantisation, but some phonetic detail is suppressed.

2.4. Spirantisation: Wermelskirchen German

Spirantisation is one of the main forms of lenition that we have not yet addressed. Hasenclever (1904) and—following Hasenclever—a number of publications including Iverson–Salmons (2006) describe a phenomenon which is very relevant to our concerns. This involves the way in which the High German Consonant Shift (HGCS) patterned in the dialect of Wermelskirchen in North Rhine-Westphalia, Germany. The HGCS affected fortis stops, deriving affricates, which then developed into fricatives in certain prosodic and melodic environments. It affected all varieties of High German to some extent, but it varies considerably in its patterning in different HG dialects, affecting northern varieties least: many northern varieties do not show all, or even any, effects in initial position, for example—indeed Wermelskirchen is one such dialect. In what follows, we consider only the intervocalic environment, in line with the focus of this paper. The relevant changes can be represented as in (7).[6]

(7) p > pf > f
t > ts > s
k > kx > x

At their earliest stages, these changes would have been innovated as synchronic processes, deriving fricatives in certain environments. In Wermelskirchen, as Hasenclever (1904, 5) explains, the HGCS spirantisation "**is dependent on the length of the preceding vowel**: it only occurs following an originally short vowel".[7] The intervocalic HGCS reflexes thus pattern as shown in the first column in (8), which gives forms taken from Hasenclever (1904). (8) also gives (i) the Standard German spelling of the words; and (ii) the cognate English words, which retain the West Germanic consonants in this regard, and which also work as glosses.[8]

[6] (7) follows the interpretation of the HGCS argued for in Honeybone (2002), and skirts over the facts that the coronal fricative was initially not a simple [s] (it has since merged with [s]) and that the dorsal fricative is now subject to '*ich-laut*∼*ach-laut*' palatalisation. The HGCS is also complicated by a related gemination and certain other facts which do not affect the facet of the overall phenomenon that we focus on, and which are thus not considered here further.

[7] "Die Verschiebung zur Spirans aber **ist abhängig von der Quantität des vorhergehenden Vokals**: sie tritt ein nur nach ursprünglicher Kürze." [Emphasis in the original.]

[8] The transcriptions are adapted here in line with IPA conventions, so length is marked with [ː], for example; furthermore, tone is left unmarked. Since a range

(8) (a) Reflexes of West Germanic /p/

[ɔfən]	o**ff**en	o**p**en
[pɛfər]	Pfe**ff**er	pe**pp**er
[aːpə]	A**ff**e	a**p**e
[diːpə]	tie**f**	dee**p**

(b) Reflexes of West Germanic /t/

[frjɛsən]	verge**ss**en	forge**t**
[vasər]	Wa**ss**er	wa**t**er
[ʃiːtən]	schie**ß**en	shoo**t**
[ʃtrɔːtə]	Stra**ß**e	stree**t**

(c) Reflexes of West Germanic /k/

[brɛçən]	bre**ch**en	brea**k**
[kɔxən]	ko**ch**en	coo**k**
[ruːkən]	rie**ch**en	ree**k**
[zyːkən]	su**ch**en	see**k**

The current stops and fricatives have long been lexicalised into underlying representations, but it is clear from the above that the HGCS, as it patterned in Wermelskirchen, was once a synchronic process which involved spirantisation, but only if the preceding vowel was short—long nuclei blocked it.

3. Theoretical considerations

We believe that the four cases discussed above show that there is ample support, both synchronic and diachronic, for the contention that lenition theory needs to recognise an additional parameter: whether or not the length of the vowel to the left of the intervocalic site influences the process. If it does, the environment is weaker after a short/simple vowel and stronger after a long/complex vowel. The theoretical consequence of these

of quantity adjustments affected vowels after the HGCS ceased to be synchronically active, the forms in (8) have been chosen as they reflect the original West Germanic vowel length in the Wermelskirchen forms. Note that German was standardised on the basis of varieties where vowel length did not constrain the process, so all the orthographic forms have fricatives (which have been emboldened). Orthographic geminates indicate phonological singletons in Standard German orthography, ⟨ß⟩ is used following a long vowel in place of ⟨ss⟩, and ⟨ch⟩ = /x/, which is realised as a palatal following front vowels, as Hasenclever transcribes for Wermelskirchen.

observations is that phonological theory needs to be able to account for the post-short vs. post-long distinction in the form of a parametric representational difference. In addition, we suspect that our observation is connected to the stress parameter—our examples all come from 'stress-timed' languages which tend to show stress-sensitive lenition systems. Our claim is that, in any theory of lenition, (i) both the stress effect and the vowel quantity effect should be expressible as **parametric** choices; (ii) the length effect should probably turn out to be a sub-parameter dependent on stress-sensitivity; and (iii) both (i) and (ii) should follow from some aspect of the phonological **representation**. We do not provide such an analysis here; we aim simply to flag up, in squib-like fashion, the following: lenition theory is well aware of the need to produce a model which does not overgenerate by allowing lenition where it does not occur; it must also be careful, we observe, not to undergenerate, either, by excluding well-attested lenition patterns from the realms of the possible.

The opposition between positions that becomes interesting on the basis of the phenomena discussed in section **2** is the difference between the consonantal environment in [vcv] and [vvcv]. It could be that [vcv] is the interesting case, because it makes the consonant more susceptible to undergo lenition processes, or it could be that [vvcv] is the interesting environment, because it makes the consonant less susceptible. Furthermore, if we are right that the parameter allowing the [vcv] vs. [vvcv] distinction can only apply in a system which allows the [v́__v] vs. [v__v́] distinction, then it might well be that the true distinction that we have observed is [v́cv] vs. [v́v́cv], which has implications for what counts as the 'interesting' environment. Any framework which aims to account for lenition phenomena needs to be able to account for these observations; we briefly consider some potential and actual theoretical responses to them in this section.

3.1. A special status for [v́cv]: ambisyllabicity, coda capture, virtual geminates...

While the data that we consider in section **2** have barely been discussed before, one of the environments that is phonologically interesting in the data has been: [v́cv]. A number of theoretical positions have assigned a special status to consonants following short vowels but not to ones following long vowels in order to derive some difference in phonological behaviour, often related to stress.

The earliest generative solution is to assume that such consonants are ambisyllabic (e.g., Kahn 1976)—that they are syllabified both as onsets of the syllable focused on the following nucleus (as the Maximal Onset Principle would dictate), but also as codas of the syllable focused on the preceding nucleus (to make stressed syllables heavy which would otherwise be light; Giegerich 1992). Often, however, there is little evidence from segmental behaviour for the ambisyllabic status of consonants: the prediction that ambisyllabic representations make that consonants in the [v́cv] environment should undergo both processes that affect onset consonants and those that affect consonants in codas is not convincingly borne out by data. For example, Giegerich (1992) assumes that both coda-based glottalisation and onset-based aspiration should apply to ambisyllabic fortis stops in many varieties of British English, citing data like [p^hɛʔt^hrəɬ] *petrol* as evidence for this (the [t] is ambisyllabic in order to make the first syllable heavy). However, non-cluster fortis stops in this environment—the intervocalic singletons that we focus on here—do not exhibit this behaviour: the stops in *happy, hatter, hockey*, for example, are neither glottalised nor clearly aspirated, indicating that the behaviour of the /t/ in words like *petrol* is likely due to something else.

Hammond (1997) adopts a similar but subtly different Optimality Theoretic approach, assuming that consonants in the [v́cv] environment are subject to covert gemination. This means that they have two ×-slots/moras all to themselves, without sharing one with the following syllable, in order to achieve bimoraicity and thus fulfil the bimoraic ('heavy syllable') requirement on stressed syllables. This abstract analysis, however, fits uneasily in an OT account, as it requires the geminates never to be realised on the surface. It also requires the lenition patterns to be separated from these representations, meaning that Hammond needs to append a separate foot-based account for flapping.

As Harris (2004) points out, both ambisyllabicity and covert gemination actually imply that the consonants in this position should be the **least** likely to submit to lenition, rather than the most likely, based on the observation that segments which share phonological material with multiple prosodic units are typically placed in a strong environment.[9] Harris (2004) and Jensen (2000) provide a number of further arguments against accepting ambisyllabicity into the theory of phonological representation,

[9] This is classically termed 'geminate inalterability'; furthermore, Honeybone (2005) shows that phonological sharing in general provides phonological strength.

and neither it, nor the assumption of covert/virtual geminates, are now widely accepted.

At least the ideas just discussed provide a specific environment to characterise the [v́cv] vs. [v́v́cv] distinction. Much work which addresses relevant phenomena chooses a different representational solution which fails this test. This approach assumes that the consonants in this environment are subject to foot-internal 'resyllabification' coupled with rule ordering or a non-derivational alternative, resulting in 'coda capture'—the consonant in the weak [v́cv] environment is argued to be fully in a coda, giving the syllabification [v́c.v], in violation of the Maximal Onset Principle (which either needs to be ordered before this case of coda-capture, or ranked lower than a coda-capture-enforcing constraint). Bye and de Lacy (2008), for example, in their OT analysis of the NZE data introduced in **2.1** above, argue that the fundamental difference between the Acrolect, where the [v́cv] vs. [v́v́cv] distinction plays a role, and the Basilect, where it does not, is that, in the Basilect, both environments are syllabified with onset-maximisation: [v́.cv] and [v́v́.cv], whereas in the Acrolect, the syllabifications are [v́c.v] and [v́v́.cv]. They also claim that in both varieties, flapping simply applies wherever it can—the distinction lies in the way in which the two varieties inhibit the flapping. In the NZE Basilect, *σ́*-IDENT[manner] is ranked high, whereas in the NZE Acrolect, ONSIDENT[manner] is ranked high. Both of these constraints block flapping from applying—to occurrences of /t/ in the foot-head in the basilect, and to occurrences of /t/ in any onset in the acrolect. This is crucially coupled with the representational difference: in the basilect, only intervocalic forms in the environment [v́v́cv] are in an onset—in [v́cv], the /t/ is in a coda, and so is not protected by high-ranked ONSIDENT[manner].

Bye and de Lacy's analysis of the flapping distinction, while ingenious, has attributes which make it not fully compelling. Firstly, it requires two unconnected pieces of theoretical machinery—the representational difference ([v́.cv] and [v́v́.cv] vs. [v́c.v] and [v́v́.cv]) and different faithfulness constraints (*σ́*-IDENT[manner] and ONSIDENT[manner]) to capture the difference. Secondly, it reduces all lenitions in systems where the length parameter is on (and [v́cv] vs. [v́v́cv] pattern differently) to cases of coda lenitions—the relevant weak environment is 'coda', not 'intervocalic'; this is an intriguing position, but it has implications—classical 'coda' processes such as final devoicing should occur in the [v́c.v] environment, and, while the precise formulation that Bye and de Lacy

use forbids it, we might wonder whether flapping should start to show up word-finally (in final codas), if it occurs in medial codas.

The mechanism through which Bye and de Lacy (2008, 197) enforce coda capture also raises questions. They argue that 'post-stress coda incorporation' is "a manifestation of a general pressure to reduce foot-internal material outside the head syllable". This is combined with the assumption that feet in English are only ever bimoraic. Thus *hatter* is [(ˈhæɾ.ə)], but *metre* is [(ˈmiː).tə] because the initial foot is (miː) and cannot fit any more material into it because it is already bimoraic. The mechanism and motivation behind 'foot-internal non-head syllable reduction' is not explained, however, and the assumption that footing in English respects a bimoraic maximum completely (needed to avoid any material from the second syllable in *metre* occurring inside a foot) produces some surprising results, implying that words like *carpenter* and *Indianapolis* would be footed [(ˈkɑː).pn̩.tə] and [(ˌɪn).di.ə.(ˈnap).ɬ̩.ɪs], producing sequences of two unfooted syllables, which is typically seen as non-English in monomorphemic forms.

We conclude that the theoretical models that have been proposed to deal with the basic environmental distinction that we focus on ([vcv] vs. [vvcv]), in such a way that post-short consonants receive some special treatment (ambisyllabicity or resyllabification or covert/virtual gemination) are not convincing in handling all the theoretical or empirical aspects of the issue.

3.2. Representational consistency: Government Phonology approaches

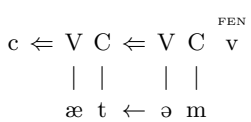
The type of questions that we have been considering in this paper have been taken most seriously in representational phonological models, such as Government Phonology—in both its classical form (e.g., Kaye et al. 1985; Harris 1994) and its descendent, CVCV phonology (since Lowenstamm 1996). Given that we expect to find a representational difference between post-short and post-long intervocalic consonants, motivating their difference in phonological patterning, and that broadly GP-type perspectives have led to the most comprehensive models of lenition along these lines, we consider some of the work that has addressed relevant concerns here. GP and allied approaches eschew resyllabification, meaning that any analysis of the distinction between [vcv] and [vvcv] will involve some degree of cross-linguistic consistency. For reasons of space, we can only consider the approaches we judge to be the most relevant;

thus, we ignore proposals that fail to consider stress (e.g., Coda Mirror: Ségéral–Scheer 1999), or, on the contrary, base their whole model on stress (e.g., Licensing Inheritance: Harris 1997), since we regard the parametric nature of stress as a fundamental property in its role in lenition.

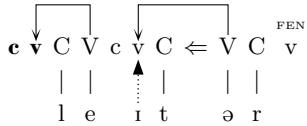
A number of attempts to express the difference between stress-sensitive and stress-insensitive lenition systems representationally have arisen within CVCV phonology: several proposals have been made to account for the impoverished governing potentials of stressed vowels in languages like English, on the assumption that government inhibits the melodic expression of the governee.[10] As for vowel length, its link to the phonotactics of following consonants, and even to their phonological strength, has been attributed to its special nature in representational models of this type. CVCV phonology envisages the skeleton as a sequence of strictly alternating Consonantal and Vocalic positions, interspersed with empty categories ('c' and 'v'). Long vowels are considered to have the underlying structure Vcv, where the first V is lexically occupied by the melody of the vowel, but the second vocalic position must satisfy certain structural conditions in order to become available for the spreading of the first V's melody. It is those structural conditions that make long vowels marked structures, whose existence hinges on other structural constellations formed by surrounding segments.

In the earliest versions of CVCV phonology (e.g., Lowenstamm 1996), the structural condition on long vowel spreading is the right-to-left (proper) government emanating from a following nonempty V. That is why in some languages long vowels are only found in what are traditionally referred to as open syllables, and, according to Balogné Bérces (2008, Ch. 5.3.3), this also provides an explanation for the split-intervocalic pattern in lenition that we describe above. Thus, for example, a flapping pattern like the one in the NZE Acrolect, discussed in **2.1** (which has flapping in words like *atom* but not in words like *later*) would be represented as shown in (9).

(9) (a) *atom*



(b) *later*



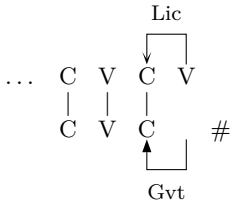
[10] These include the arguments that stress 'materialises' as an empty CV unit (Ségéral – Scheer 2008) and the Antipenetration Constraint, according to which "Government cannot penetrate a stress domain" (Szigetvári 1999, 79).

This model assumes that, roughly, government (denoted by single arrows) spoils, while licensing (double arrows) supports, the inherent properties of its target (following Ségéral–Scheer 1999 and Szigetvári 1999). Ignoring some minor technicalities of the analysis, these representations predict that (more) lenition can occur in (9a), where the intervocalic /t/ is targeted by government (the destructive phonological power), than in (9b), where the vowel immediately following the /t/ has to govern the second structural slot of the long vowel to facilitate its spreading; meaning that it only has licensing capacity to spend on the consonant. This puts the /t/ into a licensed-only position, making it (more) strong phonologically.

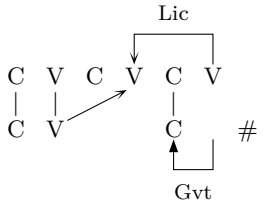
However, this analysis suffers from a number of weaknesses. Firstly, it is unable to express the sensitivity to the post-short/post-long distinction as a parameter, making the post-long environment a universally strong(er) phonological position. Secondly, the theory-internal objection often raised to this conception of (proper) government is that its ability to license the realisation of the second term of long vowels is incompatible with its more classical use in accounting for the non-realisation of empty nuclei in general.

Motivated by the latter argument, several authors have proposed that the second slot of long vowels actually needs licensing rather than government. As meticulously investigated in Scheer–Ziková (2010, 418), this predicts that post-long consonants are in what they call the 'nightmare position', i.e., superweak; consider the word-internal equivalent of their diagram (6), reproduced here as (10).

(10) (a) C# following a lexically short vowel: intervocalic position



(b) C# following a lexically long vowel: nightmare position



The consonant following a lexically short vowel (10a) is both licensed and governed, while the consonant after a lexically long vowel is only hit by the destructive force, government. At this point, Scheer and Ziková (2010, 418–9) make their empirical claim that we encountered in section **1**, repeated and enlarged here: "[t]his kind of variable consonantal strength according to whether the preceding vowel is long or short hardly meets

any empirical echo. [. . .] It may be doubted that empirical response is waiting out there, whether in internal or in final position." Consequently, they propose to modify the classic CVCV phonology Coda Mirror analysis (Ségéral–Scheer 1999), in such a way that all intervocalic consonants are governed only, whatever type of vowel quantity precedes them. The difference between weak and superweak positions ceases to exist, together with the very possibility of expressing a post-long/post-short distinction. However, as we have noted, the weight of data given in section **2** provides the empirical echo that Scheer and Ziková doubt. Furthermore, where there is a difference of strength in terms of preceding vowel-length, the weaker phonological position is that which occurs after **short** vowels, not the post-long 'nightmare position'.

In sum, the above representational approaches of the broadly GP type—even if they attempt to connect the special licensing requirements of long vowels to consonantal lenition patterns in the following position—are not fully successful.

4. Conclusion

In this paper we propose that the typology of possible lenition environments must be expanded to include an additional parameter—the 'length parameter'. We observe that, in certain lenitions which occur in (at least) the intervocalic/medial position, the length of the vowel preceding the consonant concerned is able to block the process. From the data that we have found thus far, the parameter discussed here seems to be dependent on the 'stress parameter'; while further work may show that there is no such connection, we assume here that the relationship holds. The position that we are left with is presented in (11), overleaf.

All the data that we consider above exemplify the 'intervocalic', medial lenition site. We leave to future research the question as to whether the same parameter applies in other basic positions, such as the 'coda' environment: can the length/quantity of the vowel preceding a coda consonant affect its ability to resist lenition? We note here briefly, however, that the HGCS in Wermelskirchen (as discussed in **2.4**) also affected consonants in this environment, and also shows a post-short vs. post-long distinction there, so we expect that the answer to the question will turn out to be 'yes'. Thus, for example, in Wermelskirchen German, [nos] *Nu**ss*** *nu**t*** contrasts with [uːt] *au**s*** *ou**t***, and [bɛç] *Ba**ch*** *be**ck*** contrasts with [diːk] *Tei**ch*** *di**k**e*.

(11) An expanded typology of lenition environments

<table>
<tr><td>Strong</td><td colspan="5">Weak</td></tr>
<tr><td>‘initial, onset’</td><td colspan="2">‘final, coda’</td><td colspan="3">‘medial, intervocalic’</td></tr>
<tr><td>[#—]
[c.—]</td><td colspan="2">[—.c]
[—#]</td><td colspan="3">[v—v]</td></tr>
<tr><td rowspan="3"></td><td rowspan="3"></td><td colspan="3">‘stress parameter’</td></tr>
<tr><td>[OFF]</td><td colspan="2">[ON]</td></tr>
<tr><td>[v—v]</td><td>STRONG
[v—v́]</td><td>WEAK
[v́—v]</td></tr>
<tr><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3"></td><td colspan="3">‘length parameter’</td></tr>
<tr><td colspan="2">[OFF]</td><td>[ON]</td></tr>
<tr><td>[v—v́]
vs.
[v́—v]</td><td>STRONG
[v́v́—v]</td><td>WEAK
[v́—v]</td></tr>
</table>

We have also shown that previous attempts to build something like the distinction between [vcv] and [vvcv] into phonological theory suffer from shortcomings. We propose that a parametric approach along the lines sketched out in (11) is needed, along with a set of appropriate representations, to capture the ways in which phonology can pattern in this regard.

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