

Not another case of final voicing? Laryngeal Realism, Late Middle English delaryngealisation and impossible phonological change.

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1. English, final voicing and phonological theory

English has a number of highly productive monosegmental functional morphemes which attach finally and are all typically transcribed as consisting of only the lenis fricative /z/: the plural suffix, the third-person-singular-present-tense suffix, the possessive clitic. There are no equivalent widely-attachable morphemes that consist only of a fortis fricative (such as /s/). It is also an exceptionless generalisation that the fricative-final forms of English auxiliaries (*is, was, have, has, does*, which, being irregular, must be separately stored) have the same laryngeal specification as those monosegmental bound morphemes, as do all fricative-final possessive/interrogative-determiner-related forms where those fricatives are not in obstruent clusters (*hers, his, ours, theirs, whose, yours*). This could all be a coincidence, but it is a commonplace in English phonological history (e.g., Luick 1914–1940, Jespersen 1933, Berg 1995) that there is nothing coincidental about it: these segments can all be traced back to fortis fricatives, and to a change in late Middle English which affected them and several similar segments. This looks suspiciously like a case of final voicing.

Final devoicing (FDV) has been described in the phonology of many languages (for example: Catalan, Dutch, German, Polish, Russian, Wolof) and has a robust place in phonological discussion, having been a theoretical battleground in several ways. But its conceptual phonological twin – final voicing (FV) – is highly controversial: there have been claims that it does not occur in any language (that it is not phonologically *possible*). This article considers these issues (on the basis of the just-discussed development in the history of English) from the perspective of theoretical historical phonology (so the issue is: can such a phenomenon be introduced into a language – is it a possible phonological change?), and from the perspective of a current strand of laryngeal phonological theory.¹ The conclusion will be that the English change was not *voicing* at all, but was rather *delaryngealisation*, which is a type of phonological process that we need to take seriously. More generally, we will see that some other phenomena that have been described as FDV and FV are also cases of delaryngealisation, and that the debate around what is possible in this area of phonology, and of phonological change, makes sense from this perspective: only certain developments are possible in (endogenously-innovated) phonological change, constrained by what is a possible phonological process.

The remainder of the article is structured as follows. Section 2 sets out the details of the basic relevant developments in the history of English. Section 3 considers the general phonological issues that arise around FV and FDV. Section 4 shows how the data from section 2 make sense in terms of a theoretical position developed in section 3. And section 5 concludes.

¹ This article builds on Honeybone & Spaargaren (2010), which itself developed material in Honeybone (2002, 2005) and Spaargaren (2009). I am grateful for comments on those earlier works, and from the reviewers and editors of this article, which have improved it a lot (although no-one else should be taken to agree with it all, of course).

2. The laryngeal phonology of fricative-type segments in early English

The specifications that characterise series of obstruents are *laryngeal* features. The typical situation in European (and many other) languages is to have two series of contrastive obstruents, which means that one feature is needed to distinguish them, although many languages have more than two series, so we know that more than one laryngeal feature exists. It is common to assume that laryngeal features are privative, and I follow this assumption here. This means that in a language with two obstruent series, one will be specified and the other not (that is: one series is underlyingly unspecified). The situation in (reference varieties of) Present-Day English (PDE) fits with the European norm, with two series of obstruents. These are standardly transcribed using symbols like /p, t, k, tʃ, f, θ, s, ʃ/ and /b, d, g, dʒ, v, ð, z, ʒ/ (varieties vary as to which segments these series contain, with some, for example, also having /x/, some lacking /θ/ and /ð/ etc). I shall call the former series ‘fortis’ and the latter ‘lenis’ (until section 4, where I discuss the nature of laryngeal specification in detail).

The history of the English fricative contrast is famously complex. While there have always been two series of stops (from early English² to PDE), Old English (OE) did not have the same fricative system as that just described for PDE. It is agreed (for example, by Hogg 1992, Lass 1994, Minkova 2014, Ringe & Taylor 2014) that there was only one substantial series of underlying fricatives, standardly transcribed using symbols like /f, θ, s, ʃ/, and that these were subject to medial lenisation in singletons.³ The current contrast emerged during the early history of English, with both endogenous and exogenous factors widely assumed to have been involved (including a reanalysis of medial lenis forms and substantial borrowing of Romance lenis-fricative-initial words). The precise dating of the emergence of the contrast is contested (see, for example, Laker 2009 and Minkova 2011, and also some parts of Starčević 2024a, 2025), but it is commonly assumed to have emerged (in principle, and in most environments) by the middle of the Middle English (ME) period.

Affricates are also relevant. English is traditionally assumed to have had since OE an affricate contrast of the /tʃ : dʒ/ type, due to the lexicalisation of palatalised stops. This has recently been questioned (Minkova 2019, Stenbrenden 2019), with doubt cast on how far back it goes. Minkova argues that “bisegmental perception and production of the pre-affricates [tʃ] and [dʒ] is an option until at least the end of the fourteenth century” (2019, 178), meaning that affricates might have only emerged in mid-ME, but there is no doubt that a contrast of this type existed by the late ME period.

To summarise: while there is some uncertainty about the precise details in OE, we can be sure that by around the middle of ME, both fricatives and affricates fitted with the

² The Old and Middle English periods are relatively well-defined, but it is sometimes convenient to group them together. I use ‘early English’ for this, as in the ‘Early English Text Society’ (see, e.g., Spencer 2025).

³ This considers all fricatives relevant here (those at labial and coronal places). There is no agreement about OE dorsal fricatives. Hogg (1992) and Minkova (2014), for example, assume that OE had a /x : ɣ/ contrast (which disappeared by ME, leaving only /x/), while Lass (1994) assumes that there was only a fortis underlying velar fricative during OE. These issues are not crucial here, in part because velar fricatives were absent in key relevant environments, but also because Lass is right (not only for the reasons he adduces). The widespread fortition (ɣ > g) that is required if /x : ɣ/ is assumed in OE is improbable and unnecessary. The issue is: was there /ɣ/ (in words like OE *gos* ‘goose’, *grund* ‘ground’) as an unconditionally spirantised product of PIE mediae aspiratae? This is quite widely assumed, but, like Luick (1914–1940), Iverson & Salmons (2003) and several others, I disagree – the initial segment in such words was a stop in Proto-Germanic (and hence in OE), see Honeybone (to appear). In any case, the developments to be considered here affected anterior/coronal segments, so that is my focus.

English obstruent pattern of showing a laryngeal contrast between two series. The development in focus in this article fits here.

2.1. Laryngeal change in early English fricative-type final obstruents

The OE pattern of singleton fricative realisation (setting aside dorsals, following footnote 3) meant that ME inherited fricatives with the surface distribution in (1).

(1) F- -V- -F

Fricatives (the capitals imply all relevant fricatives) were fortis initially and finally, and lenis medially. This simplifies things slightly by setting aside consonant clusters (along with geminates, which maintained fortisness), but captures relevant points. The factors that introduced the contrast (considered carefully in Lass 1992 and Minkova 2011) meant that, by the mid-ME period, a number of V- forms existed (Lass's 1992 examples are *veal*, *victory*, *zeal*, *zodiac*), and -F- forms, too, largely from degemination, which had begun. Some -V forms will doubtless also have existed once that became possible with the establishing of the contrast (Lass 1992 mentions *nose* and *love* from OE *nosu* and *lufu*, once final unstressed vowels are lost), but there will not have been many in ME. Most final fricatives during the early-to-mid ME period were of the -F type.

It is clear that a phonological change interfered with this. While words like *was* had a fortis final '-F'-type fricative in OE (as in Proto-Germanic, descended from a fortis /s/ in Proto-Indo-European), this is not the case in PDE. As described at this article's start, the final fricative is now a '-V'-type. The standard explanation for this is that, as Berg (1995, 185) puts it: "voiceless fricatives were voiced in word-final positions". Precisely that is the focus of this article: was there really a case of FV in the history of English? Berg is agreeing with Lass (1992): "[t]his is a word-final voicing, e.g. in the noun plural ending -es, and low-stress words like *is*, *of*, *was*; it first shows up in fourteenth-century spellings like -ez, *oue* 'of'." Luick (1914–1940) describes it as an aspect of the "[s]pätmittelenglische Spirantenerweichungen" ('late Middle English fricative weakenings'). Lass mentions one of the now-monosegmental morphemes listed at this article's start: the plural suffix.⁴ It originally ended in an '-F'-type segment, but now ends in (due to unstressed vowel loss, consists only of) /z/.

Other changes affected fricatives around this period. In some varieties, the 'Southern English Fricative Weakening'⁵ ('SEFW') added a 'V-' type distribution to the '-V-' type distribution (see, for example, Honeybone 2005). There is no need to assume a relationship between the change in question here, which occurred across the English-speaking area, and the SEFW, which occurred in southern dialects, with a very different patterning. It is tempting to search for a connection because both changed F fricatives to V during the centuries of the ME period (are fricative laryngeal specifications particularly subject to change? in English?) but coincidences happen, and the change in focus did not just affect fricatives. I assume that it and the SEFW were not connected (beyond the fact that they both enacted the same type of change).

⁴ In early English there were several 'plural morphemes' (nouns formed plurals in several ways). The suffix in question was one of them, and has since spread, through morphological change and analogy, to become the regular plural morpheme.

⁵ In Honeybone (2005), I call this the 'Southern English Fricative Voicing', but that is misleading (see also Starčević 2024b), so I revise the name here, using 'weakening' (which is vaguer).

As Lass (1992) mentions in the just-cited passage, our change shows up in some spellings during the 14th century. Jordan (1934) and Dobson (1968) use this as its dating, although Jespersen (1933) suggests a slightly later date (in the 15th century) because of other spelling evidence. The dating must be somewhat vague as ‘the change’ will, like all such changes, have involved the initial innovation of a variable process, which later stabilised and then lexicalised into underlying representations. The variation will have lasted a good while, but all evidence places the key developments around the late ME period, after the emergence of the fricative laryngeal contrast and of the pair of affricates.

Our change is discussed in the classic handbooks, and to some extent in detailed literature, but little focused attention has been given to it – Jespersen’s work and Berg (1995) are some of the few exceptions. I call it the Late Middle English Final Weakening (LMEFW). The LMEFW is quite limited in its effect. We have seen it described as occurring in final position, but not all or only final fricatives were affected, and – while there is a lot of agreement about the change – there is some disagreement about its patterning. Wright & Wright (1928, 108) write: “[f]inal -s and -þ became voiced after vowels during the ME. period in unaccented syllables, although the -s, -þ (-th) were retained in writing. And similarly in unaccented words like *his, is, was*.” Mossé (1952, 40) says that: “[i]n a final position -s > -z in unaccented words or syllables, as indicated by some manuscripts which employ *z* or *z* for this purpose.” Jordan (1934, 154) writes “[t]he fricatives or affricates /s/ and /tʃ/ become voiced in unaccented syllables already in the 14th cent[ury].” Jordan includes the fortis affricate in the input set, as does Jespersen (1933), who groups a set of changes: *f* > *v*, *θ* > *ð*, *s* > *z*, *tʃ* > *dʒ*.

A common observation about the LMEFW is that stress is relevant. The PDE monosegmental functional morphemes mentioned above have origins in forms that constituted unstressed syllables at the time of the change, as in (2a). The few monomorphemic forms which ended in an unstressed syllable closed by /s/ are also listed as being affected by writers like Luick (1914–1940), as in (2b) – these forms now all end in /z/. The auxiliary and possessive/interrogative-determiner-related forms⁶ mentioned above are linked to it because they did/do not have a stress (in practically all occurrences) – they are listed in (2c), excepting those which derive from post-ME analogical reforming and/or morphological change. (2c) also includes two prepositions which are commonly brought in because they, too, had fortis-final fricatives in early English but now have lenes, and are also words which normally have no stress. The examples in (2d) give some of the affricate-final forms which can be included as part of the change (with the affricates also occurring finally in unstressed syllables). (2b-d) compares written forms taken from those given for the ME period in the *OED* with those for PDE (all of which end in a ‘-V’-type segment in reference varieties). Definitions for currently less common words are also from the *OED*.

⁶ This set extends to include pronouns in some varieties. The only relevant pronoun is *us*, and forms with [z] are common across the North and Midlands of England. They are attested in other areas, but have not made it into reference varieties. Forms with [z] are recorded in all the areas that the *Survey of English Dialects* split the country into (the *SED* collected traditional dialect forms in the middle of the 20th century – see, for example Orton 1962), but with few in the south: the North has [z]-forms in 57 localities and [s]-forms in 21; the West Midlands has [z]-forms in 23, and [s]-form in 37; the East Midlands and East Anglia have [z]-forms in 30 and [s]-forms in 53; the South has [z]-forms in 13 and [s]-form in 51 localities (with *we*-forms common in many places). The form *us* is also used as a possessive-determiner (‘our’) in some dialects in the North and Midlands, where it behaves like the other possessive-determiner-type forms: every occurrence of *us* as a possessive-determiner in the *SED* has [z].

- (2) (a) *-es* (/əʃ/) > *-s* (/əz/) 'plural', 'possessive'
- (b) *adys* > *adze* 'tool similar to an axe'
eyues > *eaves* 'edge of the roof of a building'
almis > *alms* 'charitable relief given to the poor'
- (c) ME: *is, uuas, his, whos, yowrs, hirs, oures, þeires, of, wið*
PDE: *is, was, his, whose, yours, hers, ours, theirs, of, with*
- (d) *knaulech* > *knowledge*
parterich > *partridge*
caboch > *cabbage*

All forms in (2) had final '–F'-type fricatives or affricates (henceforth 'fricative-type segments') at earlier stages (either when the language first emerged or when they were first borrowed) and now have final⁷ lenis '–V'-type segments. While standard spelling does not show the change in most cases, manuscript spelling variation is common around late ME, and all evidence for Early Modern English shows that the 'final unstressed lenis' pattern was current by then. Indeed, it was more widespread then than now. Hart (1569), for example, records lenis-final forms also for words like *curious*, *purpose*, *witness*, and Mulcaster (1582) has a lenis fricative in *if* (also found occasionally in Hart). There is thus good evidence that the extent of final-lenis forms in current reference varieties is a retreat when compared to their widest historical extent. Work which has focused real attention on the laryngeal state of such forms (e.g., by Jespersen and Luick) also brings in developments in proper nouns, like *Thames*, *Norwich*, *Swanage*, *Stevenage*, which are recorded with fortis-final unstressed forms in their earliest forms but are now lenis-final.⁸

Phonological change is standardly represented using diachronic correspondences of the type given above (f, θ, s, tʃ > v, ð, z, dʒ). These are helpful (so I use them) but they hide detail. It is important to bear in mind that, if we assume something like f, θ, s, tʃ > v, ð, z, dʒ (in the relevant environment), where the outputs of the change are now underlying, that at least two fundamental diachronic events were involved. First, a synchronic process is innovated, of the type f, θ, s, tʃ → v, ð, z, dʒ. Processes are initially variable, but variability can stabilise. This can leave a synchronic process in a language (relearned by generation after generation) if there is evidence for learners from alternations. If not, a second

⁷ Jespersen sought to discern a 'Verner's Law'-type patterning in the change (non-initial 'fortis > lenis' unless the relevant obstruent was directly preceded by a stress) on the basis of forms like *posséss* and *exhibit* with [z] and *póssible* and *éxhibition* with [s], but this has not been accepted because, if such a change occurred, it had more exceptions than occurrences (compare *posséss* with *asséss*, *forsáke*, *percéive*, *procéed*, all of which occurred in ME), and at least some of the forms with lenes had them already when borrowed.

⁸ Berg (1995) is sceptical of evidence from proper nouns and for the change in affricates. This strikes me as mistaken. We should be somewhat cautious of evidence from proper nouns as they are often borrowed, and can be subject to folk-etymology-analogies, but they are not exempt from the general (historical) phonology of a language (unless they clearly denote a 'foreign' thing, which these do not). Berg argues that any change in affricates is due to intervocalic voicing (with subsequent loss of a final vowel). This seems unlikely for a form like *knowledge*, which is widely attested with spellings showing a final fortis (e.g., from the *OED*: *cnawlec*, *cnoulech*, *knaulech*, *knowleche*) before the final lenis form appeared, and cannot work for forms like *partridge* which the *OED* shows was borrowed from (consonant-final) Anglo-Norman and Old French *perdriz*, *pertriz* (where final <-z> spells [ts] – see Einhorn 1975) and has never had a post-affricate vowel (there are plenty of final <-e> spellings once that stopped representing a vowel, of course). The evidence for final tʃ > dʒ from the late ME period is convincing, whereas a putative intervocalic-affricate-voicing is not found elsewhere that we would expect it if it were real (as in forms like *neckerchief* /nékəʃɪf/ and *handkerchief* /hánkətʃɪf/, which both existed in ME).

fundamental change occurs, lexicalising the outputs of the change into underlying forms (sometimes called ‘restructuring’). The evidence for change in (2) is robust, and we can thus assume that it went through a stage of variation (as a synchronic process) and then lexicalised. Are Lass (1992) and Berg (1995) right about what kind of change it was? *Was* it a case of final voicing? It would be very interesting if it was.

3. Possible and impossible developments in final laryngeal phonology

Why is it interesting if the LMEFW was a case of FV? There have been strong claims in the literature that FV is an impossible change. Kiparsky (2004/2008, 2006) develops a set of arguments that FV is amphichronically impossible: the phonological grammar forbids processes of that type and therefore it can never occur as a phonological change: “a language which violates the universal (e.g., by having a final voicing process) would be not just historically unattainable, but synchronically complex, in the sense of being hard to learn, or hard to use, or both” (2004/2008, 47). While FV has always been thought rare, and FDV *not* rare (although see Iosad 2025 for evidence that FDV, while not rare, is far from ubiquitous), the question of whether FV occurs at all (whether it is *possible*) has become a major phonological debate over a string of articles replying to each other, including Kiparsky’s articles and also: Yu (2004), Blevins (2006), Iverson & Salmons (2006, 2007), Harris (2009), Blevins, Egurtzegi & Ullrich (2020) and Schwartz & Ulfsgjorninn (2025).

Blevins, building on Yu’s work, has argued that, while rare, FV *does* occur. Blevins is arguing from a position that assumes there are no phonological constraints on what is possible (in grammars), and that all phonological changes are motivated and constrained exclusively by phonetic factors, and are “consistent with exemplar-based models” (2008, 2). It is important that FV is possible for Blevins – if there is nothing in phonology to forbid it (because there is no substantive content to phonology not abstracted from phonetics), then it may be that the diachronic pathway through which FV can emerge is dispreferred, but it should occur at least sometimes. Blevins has argued that several phenomena from a number of languages represent cases of FV. Iverson & Salmons adopt a more substantive phonological model, but follow Blevins in accepting that cases of FV are real, and propose a typology of final laryngeal processes including both FDV and FV, unifying them as cases of ‘final laryngeal neutralisation’ – I discuss this in section 4.

Kiparsky (2006) is a response to Blevins (2006), arguing again that FV is impossible. He shows that all five putative cases that Blevins (2006) considers are not authentic examples of FV. For example, Somali has two sets of stops, often written as /t, k/ vs /b, d, g/, and there *is* neutralisation to the lenis series, but the feature that makes the contrast is not ‘voicing’. It is important not to be misled by symbol choice: Somali fortis stops are, in fact, aspirated (and voiceless), while the lenis series are unaspirated (and voiceless or voiced depending on context). Kiparsky cites descriptions of the Somali contrast as ‘tense/lax’, showing that the most straightforward analysis is that the fortis segments are specified for aspiration, and the lenis series unspecified, which means that what Blevins assumes to be a case of FV is really final deaspiration (FDA). Most of Blevins’ (2006) other putative FV phenomena are similar misinterpretations of the data (often, again, because authors have used the two common series of symbols – /p, t, k, f, θ, s/ *etc* and /b, d, g, v, ð, z/ *etc* – to transcribe phonological objects that do not contrast in terms of voicing). The case of putative FV in Lezgian (following Yu) is less clearly a misinterpretation along these lines, but is interpretable as a case of degemination and devoicing (which makes it closer to what happens in other Caucasian languages).

Kiparsky sees the absence of FV as an absolute universal – the hallmark of grammatical principles. A facet of phonological UG, for Kiparsky, is that it does not allow for FV. Kiparsky sees UG as a set of OT-type constraints, arguing that constraints can prohibit marked but not unmarked feature values in ‘weak positions’ like codas. Given that voicelessness is unmarked for voicing, and unaspirated unmarked for aspiration, for Kiparsky, coda devoicing and deaspiration are possible, but not their inverse. Harris (2009) argues a similar point from a different perspective, based on the assumption that “...final position is overwhelmingly acknowledged to be a weak position in the sense that it favours or fails to resist segmental changes”. This builds on the model set out in Harris (1990, 1994), where processes involve either ‘composition,’ in which feature-specifications, called ‘elements,’ can spread to a segment from its neighbouring phonological environment, or ‘decomposition,’ in which elements are lost from a segment (this builds some observations often described as ‘markedness’ into the theory – the marked value is represented by an element being present, the unmarked by its absence). Decomposition is expected in ‘weak positions’ (which have a precise definition in the model), such as final (coda-type) environments.⁹ So, like Kiparsky (but implemented differently), Harris argues for a model which makes predictions about which processes are possible, based on autonomously phonological principles: spontaneous composition is not possible, all the more so in a weak position, while decomposition in weak positions may be innovated in any language at any point.

The argument about the existence of FV is thus in part an argument about the nature of phonology. Is all phonology abstracted by learners from phonetics (so that anything phonetically possible is learnable) or does phonology place substantive constraints on which phenomena are learnable (in ways that are autonomous to and hence not reducible to phonetics)? There are two competing currents in this debate, a Phonetic-Reductionist (PR) and an Autonomous-Abstract (AA) position, with Blevins representing the former and Kiparsky/Harris the latter. This can, to an extent, be mapped onto the key cleft in linguistics, with PR linked to the functionalist/usage-based approach and AA to the formalist/generative approach. Neither can be *proved* right, but they could be proved wrong (see Honeybone, to appear, on falsifiable predictions in phonology). If there are no inviolable absolute phonological universals, the AA position would look shaky. The impossibility of FV is a candidate phonological universal, predicted by Kiparsky’s and Harris’s models. If it is shown to be false, that would not immediately falsify the whole AA approach, but it would falsify Harris’s and Kiparsky’s approaches within it, and the reason to think AA true would be lessened. The true formalist position is not that *all* asymmetries in the distribution of linguistic features are due to internal/innate principles (see, for example, Newmeyer 1998) – some are, but others have functional explanations. As Kiparsky says: tendencies are not due to AA-type principles. If such principles exist, however, they predict that there cannot be a single counterexample. This is why the LMEFW, as a possible case of FV, is important.

The most recent episode of the debate involves Blevins, Egurtzegi & Ullrich (2020: ‘BEU’) and Schwartz & Ulfsbjorninn (2025). BEU argue that Lakota shows an authentic case of FV. Their study is detailed, and cannot be easily dismissed, but Schwartz & Ulfsbjorninn show that there is reason to be cautious that it is a true case of FV: there is no firm evidence for underlyingly voiced stops in Lakota (there are several robust stop series, but the contrasts are based on aspiration and glottalisation), and, indeed, that

⁹ Iverson & Salmons’s (2006, 2007) ‘final fortition’ analysis of German *Auslautverhärtung* is relevant here. I consider this (and Harris’s 2009 reanalysis of it) in the following section.

there is “no reason to assume that [voice] is active in the phonology of the language” (2025, 234). They note that there is a single two-way contrast in fricatives, which BEU (like others) describe as being neutralised in final positions through *devoicing*. The case of FV that BEU argue exists in Lakota involves only /p/ and /k/, because other segments in that series (/t/ and /tʃ/) alternate in the same environment with the sonorant /l/. There are thus several aspects of the process which detract from it being FV (when compared to the characteristics of FDV in languages with an undeniable voiced/voiceless obstruent contrast). Schwartz & Ulfsbjorninn argue that the phenomena affecting stops and fricatives in the same environment should be analysable as the same process (rather than two separate, contradictory processes – voicing and devoicing), arguing that they are, in fact, unifiable as a case of decomposition, involving the loss of a single ‘[fortis]’ specification. Their representations for Lakota (based on analysis of its obstruent system) require such a specification in both lenis fricatives and fortis stops, and its loss gives, respectively, ‘s,ʃ,x’-type fricatives and ‘hard sonorants’ (the latter giving the false impression of FV). This means that there is neither FDV nor FV in Lakota, but rather a type of sonorisation.

The case is not closed. No unobjectionable case of FV which patterns as straightforwardly as cases of FDV has been reported. Is FV possible? Can cases be innovated into languages? Does the LMEFW fit the bill?

4. Laryngeal phonology through the lens of Laryngeal Realism: delaryngealisation

We have seen that processes and/or changes which look like cases of FV might *not* be cases of *voicing* when properly analysed. The same is true for cases that look like FDV. The issues in question arise from a problem with comparison of the laryngeal nature of obstruents across languages: the traditional segments used to transcribe them are ambiguous. This is not a new observation, but it is still not fully recognised in phonology. We saw some of the issues in section 3 – languages with two obstruent series are typically transcribed using the two basic sets of symbols that the Latin alphabet (and IPA extensions) give us: /p, t, k, tʃ, f, θ, s, ʃ/ and /b, d, g, dʒ, v, ð, z, ʒ/. This *seems* reasonable as they are straightforward symbols to use – but the phonological objects that occur in these languages are, in fact, not always the same. Hence the problem.

We have seen that, in Somali, fortis stops are aspirated and voiceless (unless in the neutralising environment) and lenis stops are not reliably voiced. This is, in fact, a common pattern in languages – it typically occurs because lenis segments have only *passive* voicing, because they have no laryngeal specification. The difference between passive and active voicing is important: in active voicing, voicing is reliably present, showing the hallmarks of phonological specification. In passive voicing, the segment has no specification for voicing itself, but if it occurs in an intersonorant (or similar) environment it can show some coarticulatory voicing which carries on the vocal-fold vibration of a preceding segment and anticipates the voicing of a following segment – it is not specified to be antagonistic to voicing, so voicing can occur, but it is also not specified inherently to be voiced. This neatly describes the Somali pattern, but also fits with reference varieties of German: fortis segments are specified for aspiration, while lenes are unspecified (and voiceless unless affected by passive voicing, so forms like *bin* ‘am’ and *Dach* ‘roof’ are often transcribed as [bɪn] and [dax], which really mean [pɪn] and [tax]). All this follows from the model of laryngeal phonology that I adopt here.

The model is often called ‘Laryngeal Realism’ (LR), a name it received in Honeybone (2002, 2005). It has become well-known since Iverson & Salmons (1995, 2003, 2006 *etc*), but also fits with work such as Anderson & Ewen (1987) and Harris (1994), and the ideas

that it represents have been developed in other work, including Huber & Balogné Bérces (2010), Beckman, Jessen & Ringen (2013). It has also led to work which maintains its essence while heading in a somewhat different (more substance-free) direction, as in Iosad (2017) and the ‘Laryngeal Relativism’ of work like Cyran (2017), Balogné Bérces & Huszthy (2018). The version of LR adopted here is a ‘classic’ type which glosses over implementational differences to focus on the key idea. I contrast it with the ‘traditional approach’ to laryngeal phonology.

LR fits well with privative laryngeal features, but the crucial factor concerns how these specifications are applied. Two privative specifications are needed to characterise all aspects of laryngeal phonology considered here (a third is needed for other segments, including glottalics – ignored here, for reasons of space). While different LR practitioners use specifications with different precise characteristics, the equivalences set out in (3) largely hold (Lombardi did not adhere to LR, but was influential in establishing serious work on laryngeal representation).

(3)

Lombardi (1991)	Harris (1994)	Iverson & Salmons (1995)	Iverson & Salmons (2003)
[aspiration]	H	[spread glottis]	Glottal Width
[voice]	L	[voice]	Glottal Tension

Following Iverson & Salmons (1995), much LR work refers to ‘|spread|’ and ‘|voice|’,¹⁰ although they themselves followed Avery & Idsardi (2001) and now see laryngeal ‘dimensions’ as the primary representational unit, which can be implemented as features like [spread] (Iverson & Salmons 2003). As mentioned above, Harris (1994) uses *elements* in his work (see further Backley 2011). In what follows, I use two ‘cover features’ to refer to these specifications: |spread-H| and |voice-L|.

LR differs from the traditional approach in that the latter characterises all languages that fit with the above-mentioned ‘European norm’ (with two obstruent series traditionally transcribed using /p, t, k, f, θ, s/-fortis-type and /b, d, g, v, ð, z/-lenis-type symbols) as phonologically the same: the former are unspecified and the latter have [voice] (‘|voice-L|’). LR recognises that some European languages are like Somali – examples are: standard varieties of German (as seen above), Icelandic and Welsh. These languages typically have aspiration in fortis and only passive voicing in lenes. If such languages have laryngeal assimilation, this involves only assimilation to fortis (as in /t/ + /z/ → [ts]). Other languages pattern differently, lacking aspiration in fortis, but with robust active voicing in lenes. If such languages have laryngeal assimilation, this will include assimilation to lenes (as in /t/ + /b/ → [db]). Standard varieties of Spanish, Ukrainian and Hungarian are typically cited as examples of this type.

LR assumes that only the latter languages contrast laryngeally unspecified fortis with lenes specified with |voice-L|. The former contrast fortis specified with |spread-H| with laryngeally unspecified lenes. This means that *three* types of segments are involved, as set out in (4), adapted from Honeybone (2005). This adopts the convention of marking |spread-H|-specified segments consistently with superscript ^h (whether there is surface aspiration or not), and marking unspecified segments with superscript ^o, for clarity. Segments transcribed like /b, v/ are consistently seen as specified with |voice-L|.

¹⁰ The use of square brackets or vertical bars around the feature-names is not significant. Neither Harris nor Iverson & Salmons use bars, but I add them to make it clear that these are phonological objects.

(4)

‘neutral’, ‘voiceless’ non-specified	‘voiceless aspirated’ spread-H	‘voiced’ voice-L
p ^o	p ^h	b
t ^o	t ^h	d
k ^o	k ^h	g
f ^o	f ^h	v
s ^o	s ^h	z
x ^o	x ^h	ɣ

LR representations for stops in the two types of languages are given in (5), adapted from Honeybone (2005), with Standard German as an example of a |spread-H|-language and Spanish an example |voice-L|-language. This is where the difference between LR and the ‘traditional’ approach is most clear. The segments in (5) are underlying forms, but the symbols in (4) could be either underlying or surface-type. The representations in (5) imply a definition of ‘fortis’ and ‘lenis,’ which makes them more precise: in a language with two series of obstruents, ‘fortis’ means ‘those segments typically written with ⟨p, t, k, f, s⟩-type letters’ (or, perhaps, those segments with less sonority), and ‘lenis’ means ‘those segments typically written with ⟨b, d, g, v, z⟩-type letters’ (or those segments with more sonority).¹¹

(5)

Letters	German	Spanish
⟨p⟩	/p ^h /	/p ^o /
⟨t⟩	/t ^h /	/t ^o /
⟨k⟩	/k ^h /	/k ^o /
⟨b⟩	/p ^o /	/b/
⟨d⟩	/t ^o /	/d/
⟨g⟩	/k ^o /	/g/

(4) and (5) imply that the fricative-type segments of German are of the type /f^h, s^h, pf^h, ts^h: f^o, s^o/ (listing only those with labial to alveolar place, which are typically spelled ⟨f, s-ß, pf, z : w, s⟩), and similarly in other such languages. This allows for pattern congruity with other obstruents, but does not imply that fortis fricatives have surface aspiration (any spreading of the glottis tied to |spread-H| takes place during oral frication).

The LR approach is now widely (although not universally) adopted. It gives a number of predictions concerning the patterning of the two types of languages in terms of possible types of assimilations and phonological change (as set out in the references in this section, with considerable corroboration). These predictions also extend to languages with more than two series of obstruents, giving further corroboration for LR (as in Schwarz, Sonderegger & Goad 2019).

With LR, Kiparsky’s analysis of Somali makes perfect sense: the neutralisation of the fortis to lenis segments is of the type t^h, k^h → t^o, k^o. It is not FV, but deaspiration (FDA). FDV occurs straightforwardly on LR terms in languages like Dutch and Catalan, which are |voice-L|-languages (this really *is* FDV, of the type b, d, g → p^o, t^o, k^o). Both true FDV and

¹¹ There are often cases where correlations between letters and phonological objects do not fully work on a one-to-one basis in languages. The correlations in (5) are indicative of typical common correlations.

FDA are ‘delaryngealisation’ – the loss of segments’ laryngeal specifications. This fits with Harris’s model of decomposition in weak positions, and allows Kiparsky’s arguments about impossible change to hold. As long, that is, that all other cases that have been or could be described as FDV and FV fit with the approach.

German *Auslautverhärtung* throws up problems. As foreshadowed in footnote 9, a prominent LR-based analysis of this seems to disprove both Kiparsky’s and Harris’s positions. In LR, (Standard) German is clearly a |spread-H|-language. It also has *Auslautverhärtung*, which is typically described as FDV. *Auslautverhärtung* causes alternations in morpheme-final obstruents that occur word-medially with following vowel-initial morphemes (in intersonorant position), and word-finally. Traditional transcriptions assume analyses like those in (6), which gives uninflected (nominative) and suffixed (genitive) forms for four morphemes, two of which are fortis-final and two lenis-final. The surface segments affected by *Auslautverhärtung* are in bold.¹²

(6)	<i>bunt</i>	/bunt/	[bunt]	/bunt+əs/	[buntəs]	‘colourful’ (nom, gen)
	<i>weiß</i>	/vais/	[vais]	/vais+əs/	[vaisəs]	‘white’ (nom, gen)
	<i>Bund</i>	/bund/	[bunt]	/bund+əs/	[buntəs]	‘federation’ (nom, gen)
	<i>Haus</i>	/hauz/	[haus]	/hauz+əs/	[hauzəs]	‘house’ (nom, gen)

The analyses in (6) cannot be right in LR. Iverson & Salmons (2006, 2007) are true to LR principles and assume that *Auslautverhärtung* involves unspecified lenis obstruents acquiring |spread-H|, in a process (which they call ‘final fortition’) of the type: p^o, t^o, k^o, f^o, s^o → p^h, t^h, k^h, f^h, s^h (this does not list all affected segments). That is, they assume the analyses in (7).

(7)	<i>bunt</i>	/p ^o unt ^h /	[p ^o unt ^h]	/p ^o unt ^h +əs ^o /	[p ^o unt ^h əs ^o]	‘colourful’ (nom, gen)
	<i>weiß</i>	/f ^o aish ^h /	[f ^o aish ^h]	/f ^o aish ^h +əs ^o /	[f ^o aish ^h əs ^o]	‘white’ (nom, gen)
	<i>Bund</i>	/p ^o unt ^o /	[p ^o unt ^h]	/p ^o unt ^o +əs ^o /	[p ^o unt ^o əs ^o]	‘federation’ (nom, gen)
	<i>Haus</i>	/haus ^o /	[haus ^h]	/haus ^o +əs ^o /	[haus ^o əs ^o]	‘house’ (nom, gen)

This cannot fit with Harris’s LR-and-decomposition analysis, however, and goes against Kiparsky’s line of argumentation, too: a privative laryngeal feature is added spontaneously to lenis obstruents (making them ‘marked’), in a ‘weak’ environment. If this is possible, there is nothing to stop FV (as the addition of a voicing specification), and Iverson & Salmons accept this, assuming that FV is indeed possible. This would weaken the ‘AA/LR/decomposition’ approach, losing the potential attractiveness of its restrictiveness. However, Harris (2009) points out that there is good reason to doubt that

¹² (6) shows how FDV involves neutralisation: *bunt* and *Bund* are distinct underlyingly, but the contrast is lost at the surface. There has been considerable discussion of whether this neutralisation is ‘complete’ or not (see, for example, Port & Leary 2005). It is clear from careful studies that pairs like *bunt* and *Bund* need not be pronounced exactly the same. Despite claims in some work, the differences along these lines do not fit with the predictions of ‘PR’ functionalist/usage-based models. Rather, they fit with psycholinguistically sensitive applications of the ‘AA’ formalist approach (see, e.g., Goldrick & Blumstein 2006, Du & Durvasula 2025, Zeng, Wang & Zhang 2025). Neutralisation is complete in the phonology, but the implementation in speech of words that exist in paradigmatic relationships with other words which maintain underlying specifications (as recognised in models like those involving cascading activation) can lead to the former being pronounced slightly differently. One further phonological point: I set aside the question of precisely *which* domain the final processes are ‘final’ in: syllable-final, word-final, or prosodic-word-final. I assume that, whatever the answer, it will not undermine the key points (and possibly that all could be true for different languages at different diachronic stages of the generalisation of a process).

either (6) or (7) correctly characterise *Auslautverhärtung*, arguing that “the traditional term ‘devoicing’ describes a situation in which the only type of obstruent permitted in final position is plain” (2009, 18). That is: *Auslautverhärtung* (and by extension, we might conclude, what has traditionally been seen as FDV in any |spread-H|-language) is, in fact, as in (8).

(8)	<i>bunt</i>	/p ^o unt ^h /	[p ^o unt ^o]	/p ^o unt ^h +əs ^o /	[p ^o unt ^h əs ^o]	‘colourful’ (nom, gen)
	<i>weiß</i>	/f ^o aɪsh/	[f ^o aɪs ^o]	/f ^o aɪsh+əs ^o /	[f ^o aɪshəs ^o]	‘white’ (nom, gen)
	<i>Bund</i>	/p ^o unt ^o /	[p ^o unt ^o]	/p ^o unt ^o +əs ^o /	[p ^o unt ^o əs ^o]	‘federation’ (nom, gen)
	<i>Haus</i>	/haus ^o /	[haus ^o]	/haus ^o +əs ^o /	[haus ^o əs ^o]	‘house’ (nom, gen)

The underlying representations in (8) are the same as in (7), but the process applies to the fortis series, not the lenes. While not what is traditionally assumed, that is no reason to reject the analysis. The morpheme-final obstruents in *Bund* and *Haus* have no laryngeal specification and so are voiceless when final (as expected), and can be subject to passive voicing medially (as Iverson & Salmons assume, too). If this occurs, it is post-phonological (an aspect of coarticulation), so is not shown in (8). We could transcribe it as $\uparrow$ p^oundəs $\uparrow$ and $\uparrow$ haʊzəs $\uparrow$ (using Hale & Reiss’s 2008 ‘human body brackets’ to indicate speech). The morpheme-final obstruents in *bunt* and *weiß* are specified with |spread-H| underlyingly, which is lost at the surface in a case of final decomposition (which, as ‘weakening’, is expectable in final position).

If we assume Harris (2009) is right, everything falls into place, and it is indeed reasonable to predict that FV is impossible: there are no counterexamples, of it or analogous processes, and this needs an explanation. Final neutralisation in German involves decomposition of fortis, not lenes, because fortis are ‘marked’ (i.e., specified by a laryngeal feature – in this case |spread-H|). In a |voice-L| language like Dutch (with no aspiration in fortis, robust voicing in lenes, and assimilation to lenes), final neutralisation is indeed FDV. This is shown in (9), with uninflected (singular) and suffixed (plural) forms for four morphemes, two of which are fortis-final and two lenis-final.

(9)	<i>kant</i>	/k ^o ant ^o /	[k ^o ant ^o]	/k ^o ant ^o +ən/	[k ^o ant ^o ən]	‘side’ (sing, pl)
	<i>kous</i>	/k ^o aus ^o /	[k ^o aus ^o]	/k ^o aus ^o +ən/	[k ^o aus ^o ən]	‘stocking’ (sing, pl)
	<i>band</i>	/band/	[bant ^o]	/band+ən/	[bandən]	‘bond, ribbon’ (sing, pl)
	<i>huis</i>	/hœyz/	[hœys ^o]	/hœyz+ən/	[hœyzən]	‘house’ (sing, pl)

LR, allied with the expectation of decomposition in non-spreading-type processes, makes sense of cross-linguistic laryngeal phonology in a way that the traditional approach does not. It makes a set of predictions about how languages can behave synchronically and diachronically (e.g., FV is impossible) and is compatible with all the systems considered above. In science (and reasoning more generally), more restrictive approaches are prized because they are more explanatory (see Honeybone, to appear) and stand a chance of being proved wrong. The AA/LR/decomposition position is therefore in principle preferable to any other option set out above.

The cases of final decomposition considered here (as examples of FDV and FDA) are all cases of *delaryngealisation*: the loss of laryngeal specification. But does English fit with this? Could the LMEFW be a case of FV? Isn’t that meant to be impossible?

5. Not another case of final voicing: LR, PDE and late ME

To sum up so far: there is good evidence for a change affecting the laryngeal specification of late ME final fricative-type segments (the LMEFW) and the status of this change as a possible case of FV is important in phonological theory. The ‘AA/LR/decomposition’ approach makes falsifiable predictions: one robust case of FV would falsify it. No case yet proposed is unambiguously an example of FV in the way that the Dutch data in (9) show an unambiguous case of FDV (it applies to all obstruents, in a broad environment, and is exceptionless). If the LMEFW is a case of FV it is somewhat non-canonical: it applies only in unstressed syllables and does not affect stops, but these are all phonologically-defined categories, and all putative cases of FV previously proposed have some kink that make them somewhat questionable (as less clearly phonological processes than the Dutch case of FDV). So, we need to interrogate the LMEFW.

We need to know what kind of a language late ME was (in its laryngeal phonology). There is neither phonetic evidence nor ‘direct’ written evidence (commentaries on pronunciation) to help us figure this out, but there are multiple sources of evidence that we can use: we can look ‘bottom-up’, considering current varieties of English, we can look ‘top-down,’ considering what we can reconstruct for Proto-Germanic (both with comparative reconstruction in mind), and we can consider what evidence there is for the synchronic patterning of early English. Luckily, all these sources of evidence converge, so we can be quite sure about the matter.

Reference varieties of PDE, such as the ‘Typical English English’ (‘TEE’), in focus in work like Cruttenden (2014 – Cruttenden himself calls it ‘General British’), and also what are often (e.g., by Cruttenden) called ‘General American’ and ‘Standard Scottish English’ are well described, and concur in showing the pattern of realisation that is commonly transcribed in the traditional laryngeal approach as in (10), where vowels have TEE values.

(10)	fortis		lenis
initial	<i>pin</i>	[p ^h ɪn]	<i>bin</i> [b _ɪ n]
medial	<i>happy</i>	[hápɪ]	<i>shabby</i> [ʃábi]
	<i>appease</i>	[əp ^h í:z]	<i>abase</i> [əbéɪs]
final	<i>lip</i>	[lɪp]	<i>lib</i> [lɪb _ɪ]

Under LR assumptions, this looks like a |spread-H| language: fortis stops are aspirated unless in weak positions, and lenis stops are only voiced in passive-voicing environments. LR surface representations (for TEE) are as in (11).

(11)	fortis		lenis
initial	<i>pin</i>	[p ^h ɪn]	<i>bin</i> [p ^o ɪn]
medial	<i>happy</i>	[há ^p ɪ]	<i>shabby</i> [ʃá ^p ɪ]
	<i>appease</i>	[əp ^h í:z]	<i>abase</i> [əp ^o éɪs]
final	<i>lip</i>	[lɪ ^p]	<i>lib</i> [lɪ ^p]

(11) assumes that reference varieties of English have a deaspiration process (applying in prosodically weak positions: foot-internal and final). This follows pre-fortis clipping (PFC), which is indicated by a breve (see Wells 1990 and especially Bermúdez-Otero 2014, to appear, who shows that PFC applies at the stem-level, so is early in a derivation). PFC transphonologises the underlying |spread-H|/unspecified contrast (e.g.,

between *lip* and *lib*) to a contrast of vowel length. Forms like *shabby* and *abase* may have passive voicing (giving a ɸbɸ), which is not (or is much less) likely after clipped vowels (because the vocal fold activity that they are exposed by is too short).¹³

The assumption that reference varieties of English are |spread-H| languages predicts that if there is any laryngeal assimilation in them, it must be to fortis. This is what we find. As mentioned at this article's start, highly productive monosegmental functional morphemes are typically taken to be underlyingly lenis fricatives. The past-tense and past-participle morphemes are also typically assumed to be lenis (coronal stops). These morphemes all surface as reliably fully voiceless only when they directly follow a fortis obstruent (as in *snakes*, *mammoths*, *walked*, *bluffed*), which is often assumed to involve assimilation to fortis.¹⁴ Also, the one single-segment morpheme which is underlyingly fortis is the ordinal suffix /θ/. This is infrequent and highly constrained in its attachability, not affixing transparently to most basic numbers (one to three and five), so that it seems different to the common lenis single-segment morphemes, but it is productive (e.g., *googolth*), and it has the same effect on preceding lenis obstruents as fortis do on the plural and similar morphemes (as in *hundredth*),¹⁵ which can also be interpreted as assimilation to a fortis segment.

The type of laryngeal patterning just described is the most common in varieties of English. It is not the *only* one, though: Balogné Bérces (to appear) summarises cases of non-|spread-H|-patterning. These certainly exist – in traditional-dialect Durham English and in some varieties of Scots, for example, there is no aspiration and there is assimilation to lenes, but these are not found in contiguous areas (varieties between Scotland and Durham, such as Tyneside English, have robust |spread-H|-type patterning), so these non-|spread-H|-type systems presumably represent separate innovations. A comparison of traditional and modern varieties of English from other parts of Britain (and elsewhere) shows an overwhelming preponderance of |spread-H|-type systems.

To consider the issue from the other end: what was Proto-Germanic? It is not possible to consider all Germanic varieties in detail, but we can recognise that the |spread-H|-type pattern is currently widespread across the language family. It occurs robustly in West Germanic (in English and German), and also in North Germanic (Icelandic, Norwegian, Danish, Faroese). There is also some evidence for it from assimilations in Gothic, and those Germanic languages which show a |voice-L|-type pattern are cases where contact

¹³ PFC could have been represented in (10), of course, but it is typically omitted in traditional transcriptions. A reviewer asks if this approach can account for cases like *pampa* vs *mamba*. I think so. There is good evidence that PFC applies with NC clusters as with simple Cs, i.e., considerably if the C is fortis (affecting the nasal, if there is one, as well as the vowel) and not if the C is lenis (see, for example, Cardoso 2015). I assume that this affects the chances of passive voicing in forms like *pampa* just as it does in forms like *happy*.

¹⁴ This is a mainstream assumption, made by many analysts (e.g., Iverson & Salmons 1995, Gussmann 2002), but is not the only way of seeing the situation in these final clusters. Szigetvári (2020) sets out another, arguing that, although English is indeed a |spread-H|-language, there is no laryngeal assimilation at all here (analysing these final clusters differently). Neither approach goes against LR predictions, but if we maintain that there *is* laryngeal assimilation in English, Szigetvári is right that it does not have the same patterning as in a language like Hungarian, where, for example the /p/ in the compound *népdal* 'folk song' assimilates to the |voice-L| specification in /d/, giving [ne:bdal]. In English, the trigger must be assumed to be tautosyllabic (assimilation does not occur in forms like *bagpipes*).

¹⁵ The ordinal suffix is also shown to be productive by forms like *ith* and *yth*, where the fricative patterns as a fortis segment in triggering Canadian Raising in varieties with it (Idsardi 2006). This evidence for phonological activity in the ordinal's laryngeal specification fits with the assumption that *hundredth* has a fortis stop in the final cluster due to assimilation. Fortisness is implied as an option in transcriptions for *hundredth* in pronouncing dictionaries (e.g., Upton & Kretschmar 2017) alongside the morphological-transparency-preserving [d].

explanations seem most plausible: Yiddish has long been in contact with |voice-L|-type Slavic, and Dutch has had prolonged close contact with |voice-L|-Romance speakers in several areas. Germanic-focused laryngeally-informed work such as Iverson & Salmons (1995, 2003) argues from this and other evidence that Proto-Germanic was a |spread-H| language, making the contrast between stops using this feature. A strand of work which I follow here further assumes that the single full series of Germanic fricatives, which was derived in the Grimm's-Law fortis-stop spirantisation (in the ancestors of words like *foot*, *thin*, *hundred*), preserved the |spread-H| specification which drove this spirantisation (see Honeybone 2002, to appear, and also Starčević 2024b for arguments that fortis fricatives can behave in this way in systems with only one series).

Two in-depth studies have considered the question of the laryngeal specifications of early English: Spaargaren (2009) and Starčević (2024a, 2025). They consider all available evidence from assimilations and laryngeal modifications, and show that everything fits with it being a |spread-H| language, in terms of both its fricatives and stops. For example, assimilations recorded in spellings or changes overwhelmingly are assimilations to fortis (e.g., OE *mēd* 'reward, pay' and *and-* 'against' are recorded with assimilation to a following fortis when morphologically joined with *sceatt* 'payment, price' and a form of *sacian* 'wrangle, strive' as *mētsceat* and *antsacodon*).

All this shows that, as long as we accept any aspect of the LR case, then early English was a |spread-H| language, in both stops and fricatives. Evidence from earlier and later stages (Proto-Germanic and PDE dialect comparison) and from contemporary sources all point to this. OE simply preserved the laryngeal specifications of Proto-Germanic obstruents (where the contrast in stops is made using |spread-H| and the single series of fricatives is also specified with |spread-H|). We can therefore assume that the late ME inputs to the LMEFW, as in (2), were |spread-H|-final: for example, *of*, *wið*, *-es*, *eyues*, *uuas*, *his*, *parterich* ended in /f^h, θ^h, s^h, tʃ^h/, and the LMEFW can be understood as f^h, θ^h, s^h, tʃ^h > f^o, θ^o, s^o, tʃ^o (occurring finally in unstressed syllables). The synchronic process that was its first stage (f^h, θ^h, s^h, tʃ^h → f^o, θ^o, s^o, tʃ^o) was perfectly possible – it was an unexceptional case of delaryngealising FDA in a prosodically very weak environment (finally in unstressed syllables), producing laryngeally unspecified obstruents which have since merged with those which already existed underlyingly in that environment.

Changes of the LMEFW type – delaryngealisation to lenes – are not surprising in a language like English, which had |spread-H| obstruents throughout its history (in most varieties). Handbook-style discussions of the LMEFW often discuss analogous changes that occurred around the same time. Lass (1992, 59), for example, mentions that lenis dental-fricative-initial forms emerged in English at around this point in “a very restricted class, all normally occurring under low sentence stress: deictics like *the*, *this*, *that*, *these*, *there*, *then*, *thou* and a few conjunctions like *though*”. It is entirely possible that this change was similar to the LMEFW, in that it deleted |spread-H| in unstressed syllables, although it had a distinct patterning, affecting only /θ^h/, and deleting |spread-H| wherever it occurred in an entirely unstressed word (it shows up as a word-initial change in the words Lass lists because that is where dental fricatives occurred in those words).¹⁶

¹⁶ It may therefore be, in fact, that this change accounts for the commonly lenis fricative in *with*, rather than the LMEFW. The word *this* is exceptional, as its final fricative remained fortis. This has a phonological explanation: it had a geminate in its paradigm – in forms like *bisses* (gen-masc-neut-sing) and *bissum* (dat-masc-neut-sing-pl). Geminates often resist decompositions that affect singletons (see Honeybone, to appear) and paradigm uniformity can enforce this even in paradigmatic forms without geminates themselves. A similar phenomenon may account for the only possessive-determiner-related form which did not undergo the LMEFW (if it existed in English when the LMEFW occurred, which is not completely clear): *its*. The fortis

6. Conclusion

The LMEFW was not a case of final voicing. Indeed, no robust, general and unambiguous case of FV has yet been found, either as a live synchronic process or as a diachronic change. This does not prove that the autonomous-abstract-formalist phonological current is correct (because nothing can prove a theoretical position correct), but Kiparsky (2006) shows that there are multiple imaginable ways in which FV could be innovated into a language, involving changes that are diachronically plausible, so the absence of any robust cases in the record of known languages lends support to the AA position.

It is important to study cases like the LMEFW both for their own sake – to understand the detail of the phonological history of English – and to understand what light they can throw on historical phonology (and phonological theory) in general. The LMEFW makes sense through the lens of the AA/LR/decomposition position, and shows that the set of observations about PDE listed at this article's start is indeed no coincidence: the highly productive final-attaching monosegmental functional morphemes, the fricative-final forms of English auxiliaries, and the fricative-final possessive-type forms listed there all lost their |spread-H| specification in the LMEFW.

fricative in that word was in a cluster with /t^h/, so the two segments would share their |spread-H| specification (and their place), and this kind of phonological structure can also inhibit decomposition (see, again, Honeybone, to appear).

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